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Capital Raising Strategy for Czechia

Buildings and renewable energy supply

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Project in brief

The report is a contribution to Output indicator O.2 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) climate & energy investment maps to track public finance and private investment flows, (ii) investment gap & need analyses to reach 2030 climate and energy targets, and (iii) capital-raising plans to close the investment gap. This report presents the capital raising strategy in the buildings and renewable energy sectors in Czechia.

Report abstract

This report presents the capital raising strategy in the buildings and renewable energy sectors in Czechia. The report summarizes existing policy framework, financing sources and structures in both sectors. Based on in-depth interviews and focus debates with national experts, the report highlights the main existing barriers for capital raising and project development and conveys tailored recommendations to overcome the barriers and therefore to help close the gap between the current investment flows and investment need to reach the 2030 (and beyond) climate and energy targets.

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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Acronyms

CEF	Connecting Europe Facility
CF	Cohesion Fund
CMZRB	Českomoravská záruční a rozvojová banka (Czech-Moravian Guarantee and Development Bank)
CRS	Capital Raising Strategy
CVUT	České vysoké učení technické v Praze
CZ	Czech Republic
EE	Energy Efficiency
EIB	European Investment Bank
ELENA	European Local Energy Assistance
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Contracting
ERDF	European Regional Development Fund
ESCOs	Energy Service Companies
ESF+	European Social Fund+
FIT	Feed-in-tariff
FIP	Feed-in-premium
GHG	Greenhouse gas
HDD	Heating degree-days
INGA	Investment needs and gap analysis
IRENA	International Renewable Energy Agency
IROP	Integrated Regional Development Programme
JTF	Just Transition Fund
LTRS	Long-Term Renovation Strategy
MFF	Multiannual Financial Framework
MMR	Ministerstvo pro místní rozvoj (Ministry of the Regional Development)
MPO	Ministerstvo průmyslu a obchodu (Ministry of Industry and Trade)
MŽP	Ministerstvo životního prostředí (Ministry of the Environment)
NEEAP	National Energy Efficiency Action Plan
NECP	National Energy and Climate Plan
nZEB	Nearly Zero Energy Buildings
OP E	Operation programme Environment
OP EIC	Operational Programme Enterprise and Competitiveness for Innovation
PV	Photovoltaics
RES	Renewable Energy Sources
SME	Small and Medium-sized Enterprise

List of Figures

Figure 1 Climate and Energy Investment Map – Czechia 2017. Buildings and renewable energy supply and infrastructure, CZK billion (Valentová et al., 2019b)	3
Figure 2 2030 Yearly investment gap to reach 2030 targets – Czechia, EUR million (Valentová et al., 2020)	5
Figure 3 Sources of funding for programmes in Czechia as proposed by the European Commission (Ministerstvo pro místní rozvoj ČR, 2020) (Cohesion Fund, CF, European Regional Development Fund, ERDF, European Social Fund+, ESF+)	7
Figure 4 Variation of energy consumption in households (2000 – 2017)	11
Figure 5 Average energy per unit of floor area of a dwelling [koe/m ²] and heating degree days in the EU-28 Member States, year 2016	11
Figure 6 De-risking policies and financial instruments identified by interviewees	23
Figure 7 Share of RES in gross final energy consumption (%) in Czechia (European Commission, 2020g)	30
Figure 8 Gross power generation from RES in Czechia (Ministry of Industry and Trade, 2019)	31
Figure 9 De-risking policies and financial instruments identified by interviewees	41
Figure 10 Main barriers to EE and RES development in Czechia	46

List of Tables

Table 1 Operational and investment support for RES in the period of 2021-2030, CZK billion (Ministry of Industry and Trade, 2019)	5
Table 2 Overview of financing sources in Czechia (Ministry of Industry and Trade, 2019)	6
Table 3 EU level financing sources in 2021 - 2027	8
Table 4 Overall RES share by sector in Czechia (Ministry of Industry and Trade, 2020b)	30
Table 5 Development of RES share in gross final consumption by sector (Ministry of Industry and Trade, 2019)	31
Table 6 RES Support Mechanisms in Czechia (Valach, 2019; Ministerstvo průmyslu a obchodu, 2020),	34
Table 7 Czech RES indirect support (Ministerstvo průmyslu a obchodu, 2020)	35
Table 8 Summary of the key barriers and recommendations	47

Annexes

- Annex 1: List of interviewed experts
- Annex 2: Questionnaire

Executive summary

The climate neutrality transition brings about the need for increased investment in GHG mitigation measures. Yet, in Czechia, the current investment flows namely in buildings and renewable energy sectors remain substantially lower than are the levels of investment needed to reach the 2030 climate and energy targets. Specifically, in the buildings sector the level of investment would have to roughly double in order to reach the 2030 targets, in case of renewable energy supply the investment will have to be approximately six times higher than were the 2017 levels. This report, therefore, aims at identifying the key instruments and policies to overcome the main barriers to renewable energy sources (RES) and energy efficiency (EE) project uptake, with the ultimate aim to close the investment gap facilitate the low-carbon transition of the country.

Based on in-depth interviews with stakeholders (policy makers, municipalities, financial institutions and other experts) and thorough literature review, we identified the main barriers that prevent a large scale-up of GHG mitigation measures and investment in the buildings and renewable energy sectors. Here below is a **set of recommendations to tackle each of the identified barriers**.

Lacking prioritisation and low public awareness and education on energy efficiency and renewables

Recommendations

- Create a **positive, motivating narrative** for energy savings and renewable energy for all levels of stakeholders. A prerequisite is a long-term dedicated communication campaign to send a clear message on low-carbon transformation and valuation of energy savings and renewables.
- Share **good practice examples** at regional and local level among peers has proven as a powerful tool to motivate for and scale up energy efficiency and renewable projects implementation. Good quality, complex, deep renovation projects should be widely communicated, as well as simple, behavioural, low-cost solutions. **Showcasing and visualising** the good practice examples will help engaging the target groups (citizens, municipalities, and other).
- Sustainability and energy literacy should be promoted in curricula at all stages of the educational system. The number of national and international projects in this area offer a good start for more systemic incorporation.
- **Multiple impacts** of energy efficiency and renewable energy should form an integral part of the communication and evaluation. They can serve as the tipping point.

Low strategic leadership and coordination and perceived stability of legal and regulatory framework

Recommendations

- Stable, transparent, and sufficiently motivating conditions are a prerequisite for the transformation of the Czech energy sector.

- Enhance the existing support for development and implementation of **regional and local strategic documents and action plans**, which ensure continuity and points of reference, especially in the public sector.
Share good practice and lessons learnt with the existing strategic documents at local and regional level.
- The **National Energy and Climate Plan** should be used to its full potential as the **main guiding document** to navigate the low-carbon transition pathway. Monitoring the progress of the main targets and indicators needs to be put fully in place and guide the ongoing adaptations of both the key indicators (which may need to be strengthened along the way in terms of increasing to the ambition to align with climate neutrality) and the policy framework.
- Due to the cross- and multi-sectorality of both energy efficiency and renewables, the **coordination mechanisms** among various resorts need to be strengthened and followed. Due to the growing agenda of climate and energy issues, the **internal capacities** should be **strengthened** at national, regional, and local levels to support the strategic guidance and implementation.
- In case of RES, the main need is to speed up the update of the legislative framework that will create the conditions for complex structural changes throughout the sector. This needs to be set as a clear priority, together with the adoption of a clear strategy for coal phase out. In particular, the key legislative activities entail speeding up the preparation of the new Energy Act and embedding the energy accumulation, and other (new) terms and types of entities, such as energy communities, aggregators, and entities providing storage services in the legislation, and adopting a long-term strategy for the development of the use of RES.

Low implementation of energy management and complexity of energy efficiency projects

Recommendations

- Implement financial and educational support to introduce **energy management as a form of quality management** by national and regional programmes. Encourage and support continuous work on day-to-day energy demand, including behavioural factors, with a specific focus be on small and medium enterprises. Consider a carrot-and-stick approach to introduction of energy management.
- Increase awareness about the necessity of **proper training, monitoring and evaluation after implementation** of energy efficiency measures to avoid unnecessary and undesirable rebound effects due to improper management of the new technologies and potential non-efficient energy behaviour. It can be a part of grant schemes or one of the bonus conditions.
- Technical assistance to help prepare the project pipeline should be widely available. With respect to that, focus on fully using the **potential of the programme InvestEU**.
- The various financing channels, including **EIB technical assistance** and other national sources should be widely communicated. The regional offices of CzechInvest could serve as an intermediary to further spread the knowledge.
- Additionally, the establishment of **one-stop shops** should be further explored. They could optimally be independent bodies such as regional energy agencies, which will facilitate energy

efficiency and renewable projects and guide the project developers through the whole process.

Ineffective use of financing mechanisms, budgetary constraints and administrative burden

Recommendations

- With the new multiannual financial framework and Recovery and Resilience Facility, Czechia has to start utilising a much **broader portfolio of financial instruments** to increase the leverage of public finance and thus effectiveness of public spending while enhancing the low-carbon transition. The Recovery and Resilience Plans offer a basis to write a country strategy and link it to MFF sources. Support from the Structural Support Programme could accompany this step.
Investment grants should target only very specific (sub) sectors (e.g. vulnerable households) and measures (e.g. innovative technologies). Alternatively, they should serve as an additional/accompanying support mechanism rather than stand-alone one.
The grant schemes must be complementary to other financial instruments. The new programmes should **avoid duplication** of target actions and actors, as it was the case in 2014 – 2020, thus undermining the use of financial instruments other than grants.
- **Fiscal instruments** should be taken into consideration, including carbon and energy tax and tax rebates/exemptions. For instance, tax rebates for commercial/industry sector may provide much clearer and more transparent incentive with potentially lower administrative burden as compared to investment grant schemes. In the same time, any form of fiscal instruments must be accompanied by supporting instruments to compensate for potential negative distributional effects (such as disproportionate negative effects on the most vulnerable households).
- **New models of RES development**, such as PV on rented roof and RES community projects, should be supported by **appropriate legal framework**.
- Increased investment from the private industry (heavy industry, IT and others) into RES projects through Power Purchase Agreements as a consequence from international climate obligations should be enhanced and promoted as they will allow for effective and efficient investments in green projects.
- An early and **thorough preparatory phase** of the programmes is crucial for the effectiveness of the programmes and may help decrease the subsequent administrative burden both for the administration body and the recipients of the support.
- **Stability of the institutional environment** throughout the course of the programmes increases absorption capacity.
- The **administrative processes** need to be differentiated **according to the size of projects**, with simplified procedures for smaller projects.
- Verification, monitoring and evaluation has to stay in place. In some cases, it may take form of selected sample ex-post evaluation, instead of ex-ante.
- **Simplification** of administration with respect to issuing **building and land-use permits**, including creating a single permitting decision for both permit types and ensuring that it covers all administrative bodies concerned with a project.



Table of Contents

1	Introduction	1
2	Methodology	2
3	Current Status of Investment and Strategy to reach 2030 targets	3
3.1	Status of investment flows and investment needs	3
3.2	Financing sources and investment strategy	6
4	Capital Raising Strategy for building and renewable energy sectors in Czechia	10
4.1	Energy efficiency in the building sector	10
4.1.1	Policy framework	10
4.1.2	Existing financing structures and sources	13
4.1.3	Barriers to uptake of energy efficiency projects in buildings	15
4.1.4	De-risking policy and financing instruments to raise capital for energy efficiency in the building sector	22
4.2	Renewable energy projects in Czechia	30
4.2.1	Policy framework	30
4.2.2	Existing financing sources and structures	36
4.2.3	Barriers to uptake of renewable energy projects	37
4.2.4	De-risking policy and financing instruments to raise capital in the renewable energy sector	41
5	Conclusions and policy recommendations	45
6	References	52
7	Annexes	56
	Annex 1: List of interviewed sector experts & financing institutions in Czechia	56
	Annex 2: Questionnaire for interviews	58

1 Introduction

The European Union and its Member States have set out ambitious climate and energy targets to be reached by 2030 and subsequently in 2050. The climate neutrality transition brings about the need for increased investment in greenhouse gas (GHG) mitigation measures. Yet, we have identified in our previous reports (Valentová et al., 2020; Valentová et al., 2019b) that in Czechia, the current investment flows namely in buildings and renewable energy sectors remain substantially lower than are the levels of investment needed to reach the 2030 climate and energy targets. This report, the Capital Raising Strategy (CRS) for the energy efficiency in buildings and renewable energy sectors in Czechia, therefore, aims at identifying the key instruments and policies to overcome the main barriers to renewable energy sources (RES) and energy efficiency (EE) project uptake, with the ultimate aim to facilitate the low-carbon transition of the country.

In the context of this report, we therefore define Capital Raising Strategy as a **holistic governmental (national and sub-national-level) strategy to improve the regulatory environment with policy and financing instruments in order to mobilize capital from public and private sources (national and international) to finance a low-emission, climate resilient development pathway** as defined under the Czech National Energy and Climate Plan (NECP). CRSs are required, because market imperfections (barriers), externalities, asymmetric information and other market disruptions prevent the optimal allocation of financial resources to climate friendly adaptation and mitigation projects.

The primary target group of CRSs are the ministries responsible to develop NECPs, namely the Ministry of Industry and Trade (MPO) in Czechia. In addition, CRSs are relevant for entities that require financing (e.g., project developers or Energy Services Companies (ESCOs)) and institutions that offer it (financial institutes, banks, private capital investors).

The report unfolds as follows. After the methodical section 2, section 3 summarizes the status of investment flows and needs in Czechia. Section 4 then analyses the policy framework in the two sectors: buildings and renewable energy supply. It examines the existing financing structures and sources, analyses the main barriers in the sectors and suggests de-risking policy and financing instruments to develop projects and raise capital in the two sectors. The last section (5) conveys policy recommendations.

2 Methodology

The report builds on desk research, semi-structured interviews and a discussion workshop.

First, the literature review was conducted to identify the key climate and energy investment flows and needs in Czechia with a focus on the key funding sources, programmes, and policy mechanisms to help reaching the 2030 climate and energy targets.

Second, the desk research identified the key barriers to energy efficiency and renewable energy projects development. Additionally, we held an expert discussion workshop on 19th May 2020, gathering 23 participants representing policy-makers, financial institutions, academia, and think-tanks in the field of energy efficiency (EE) and renewable energy sources (RES). The webinar identified the key barriers and policy recommendations to speed the low-carbon energy transition. The key outcomes of the webinar were summarized in a short note (Valentová, 2020).

To complement the literature review and the workshop, 16 personal interviews were conducted to gain in-depth insights in the key barriers, limiting factors, and ways to improve the framework conditions for climate investment in Czechia. The questionnaire used in the semi-structured interviews is provided in Annex 2. The interviews took place between May and September 2020 and the interviewees were representatives of policy makers, project developers, financial institutions, and other specialists in the field of energy efficiency and RES policy. The list of interviewees is provided in Annex 1.

The draft report has been sent for comments to all the interviewees and selected participants of the workshop. Additionally, following the CIC 2030 project methodical guidance, the draft report was also submitted to selected experts for their peer review. Reviewers were selected based on their expert knowledge of the national policy context and academic excellence in the field of climate finance. The feedback received was addressed and the next version of the report was submitted to all interviewees and workshop participants for their validation.

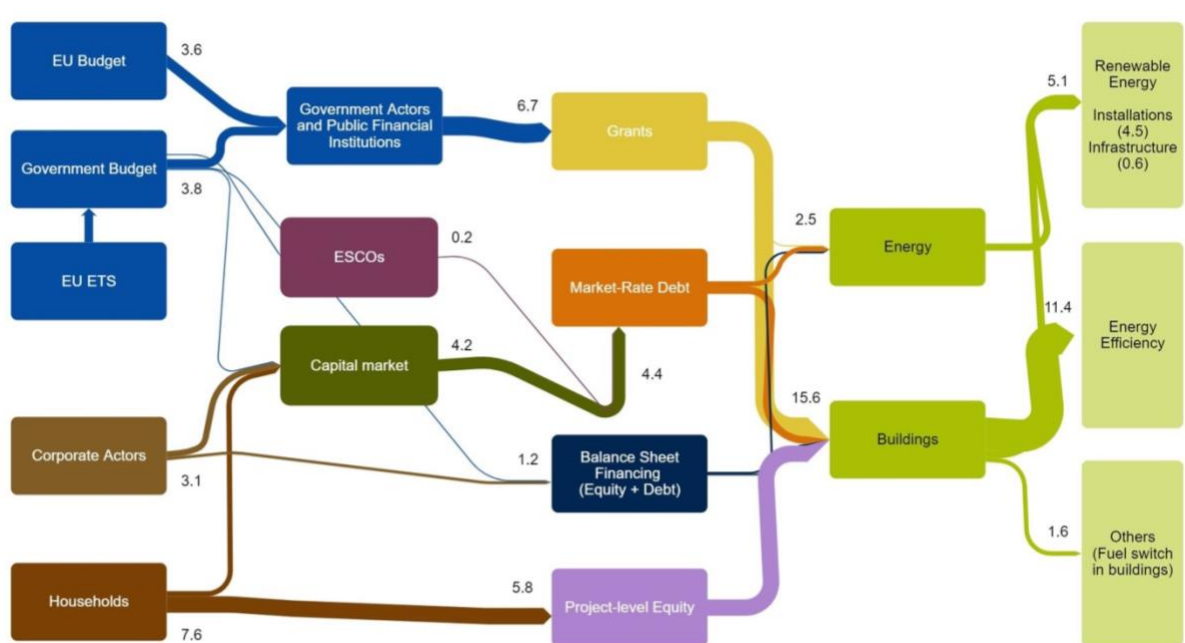
3 Current Status of Investment and Strategy to reach 2030 targets

This chapter sheds light on the status of investment flows and investment needs to reach the 2030 climate and energy targets in Czechia. It then provides an overview on the main strategies and policies to trigger the investments both within the upcoming multiannual financial framework (MFF) and the currently prepared recovery and resilience plans.

3.1 Status of investment flows and investment needs

By tracking climate and energy investment flows in buildings and renewable energy supply and infrastructure sectors, Valentová et al. (2019b) calculated that at least CZK 18.1 billion (EUR 686 million¹) have been invested in GHG emission reduction in both sectors. Of this volume, CZK 15.6 billion (EUR 591 million) targeted at the decarbonisation of the buildings sector, including thermal efficiency of new and existing buildings, building-integrated renewable energy, fuel switch to low-carbon energy carriers, as well as energy-efficient appliances. The remaining approx. CZK 2.5 billion (EUR 96 million) have been invested in renewable electricity generation, transmission and distribution, and renewable heat production and distribution. Figure 1 shows the above volumes, together with the main intermediaries and instruments triggering these investments².

Figure 1 Climate and Energy Investment Map – Czechia 2017. Buildings and renewable energy supply and infrastructure, CZK billion (Valentová et al., 2019b)



¹ We use the exchange rate of 26.4 CZK/EUR as a yearly average of 2020 by the Czech National Bank (www.cnb.cz).

² The full report with further details is available for download [here](#).

The current system of non-financial and financial support for buildings and RES, or the setting of parameters of this system, therefore, does neither lead to sufficient development of EE and RES projects in order not only to meet the 2030 targets, nor to transform the whole economy towards an efficient, low-carbon system.

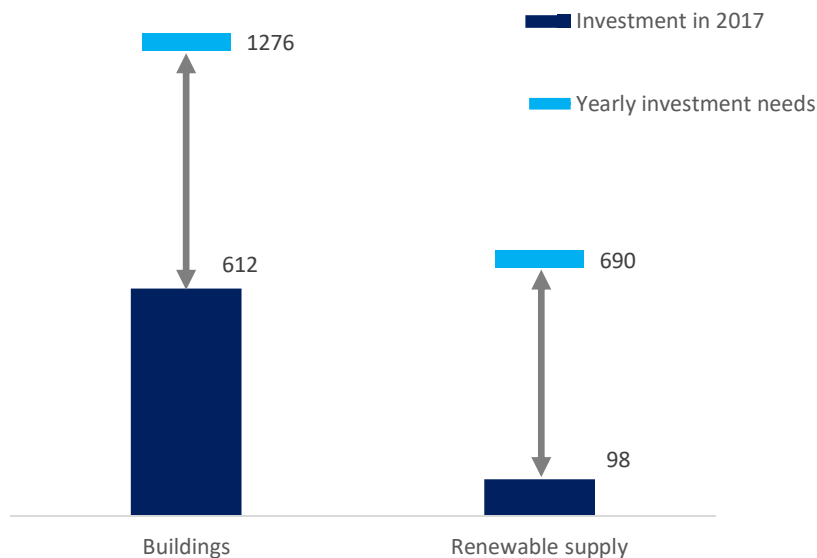
Figure 2 displays the estimated investment gap, i.e. the difference between the observed investment flows and estimated yearly investment needs to reach the 2030 targets (Valentová et al., 2020). In total, the yearly estimated investment needs in buildings reach EUR 1.276 billion for the period of 2021 – 2030, covering renovation and other EE measures (EUR 690 million) and RES integrated in buildings (EUR 586 million)³.

The average annual amount of investment into renewable energy supply sector needed to meet the 2030 climate and energy goals, as stated in the Czech NECP, is EUR 690 million (Figure 2). This excludes technologies integrated in buildings. As stated above, the volume of investments flowing into the sector in 2017 reached EUR 98 million, including related infrastructure.

The current system of non-financial and financial support for buildings and RES, or the setting of parameters of this system, therefore, does neither lead to sufficient development of EE and RES projects in order not only to meet the 2030 targets, nor to transform the whole economy towards an efficient, low-carbon system.

³ It must be noted though that this amount does not meet the required parameters in terms of GHG reductions as set in the Czech Climate Protection Policy. The investment needs to reach the 2030 targets in buildings sector would be EUR 3.3 billion (instead of 1.3 billion as in Figure 2). In the same time, in the buildings sector, not all investment (especially private) could be tracked. Please refer to (Valentová et al., 2019b) for more details.

Figure 2 2030 Yearly investment gap to reach 2030 targets – Czechia, EUR million (Valentová et al., 2020)



In addition, the Czech NECP estimates some of the investment needs to reach the climate and energy targets. However, given the scope, the methods of estimating the needs, and the sectors covered, the investment is not directly comparable with the estimates above.

According to the Czech NECP, the total investment needs in the period 2021 – 2030 to reach the target set out in Art. 7 of the Energy Efficiency Directive⁴ amount to CZK 634.5 billion (EUR 24 billion) of which CZK 157.8 billion (EUR 6 billion) shall be financed with public support using both EU and national sources (Ministry of Industry and Trade, 2019).

In the renewable energy sector, an estimated total of CZK 511.2 billion (approx. EUR 19 billion) of public operational support (in the form of feed-in-tariffs and feed-in-premiums) will be needed and another CZK 51.6 billion (approx. EUR 1.9 billion) in investment subsidies to reach the 2030 renewable energy targets (Ministry of Industry and Trade, 2019) as also shown in Table 1. The NECP does not, however, specify the total (public *and* private) investment needs for RES.

Table 1 Operational and investment support for RES in the period of 2021-2030, CZK billion (Ministry of Industry and Trade, 2019)

Source	Amount
Total operational support	511.2

⁴ Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency

of which	
Current sources (FIT, FIP)	411.3
Maintenance	53.5
New facilities	46.4
Investment subsidies	51.6
Total	562.8

3.2 Financing sources and investment strategy

The Czech NECP prepared by the MPO provides information on which financing strategies will be implemented in order to reach the 2030 targets. Public finance sources include the national budget, most relevant EU funds for the period 2021-2027, revenue generated from emission allowances sales, and the Connecting Europe Facility (CEF) fund for electricity and gas infrastructure. A further overview of these finance mechanisms is provided in Table 2.

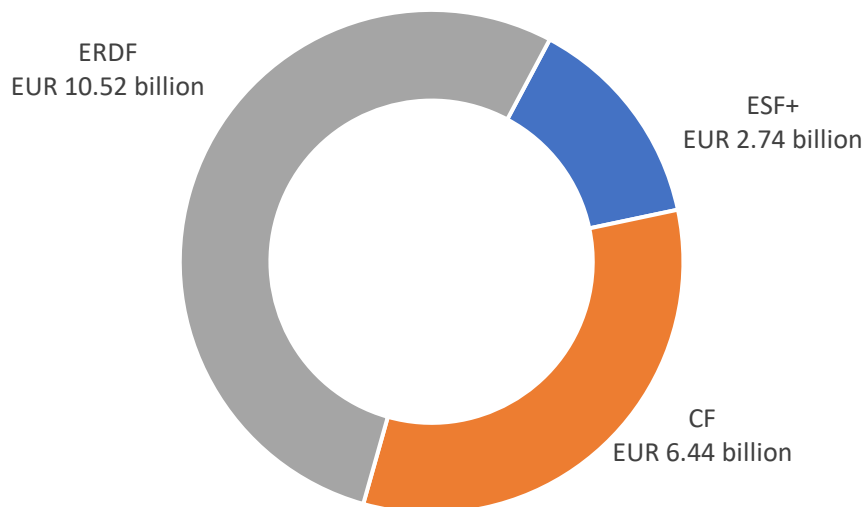
Table 2 Overview of financing sources in Czechia (Ministry of Industry and Trade, 2019)

Source	Overview
National Budget	RES operating aid (FIT, FIP) National programmes supporting energy efficiency, e.g. EFEKT, PANEL
EU Funds 2021-2027	Operational Programme Technology and Application for Competitiveness Operational Programme Environment Operational Programme Transport Integrated Regional Operational Programme Rural Development Programme, and other
Emissions Allowances Revenue	Modernisation Fund Innovation Fund Successor Programme to New Green Savings
Connecting Europe Facility (CEF)	Finance mechanism to improve electricity and gas infrastructure.

The EU funds for the period 2021-2027 are planned to come mainly from the European Regional Development Fund (ERDF), Cohesion Fund (CF), and European Social Fund + (ESF+).

Total allocation from these funds is approx. EUR 20 billion (Ministerstvo pro místní rozvoj ČR, 2020). Figure 3 displays the planned allocation into each of the funds in Czechia.

Figure 3 Sources of funding for programmes in Czechia as proposed by the European Commission (Ministerstvo pro místní rozvoj ČR, 2020) (Cohesion Fund, CF, European Regional Development Fund, ERDF, European Social Fund+, ESF+)



In their evaluation report of the final NECP, the European Commission (2020a) lacked mainly the fact that the information on funding sources has been rather descriptive, instead of including a comprehensive assessment of the investment needs, market risks and barriers, and the impact assessment of planned policies and measures with respect to investment needs. In addition, the ways to involve private sector in financing the investment needs has been missing.

The European Semester Country Report for Czechia in 2019 (European Commission, 2019a) enumerates important factors to maintain effective delivery of the funds from the EU:

- strengthened capacity of national, regional and local authorities to effectively manage and use EU funds, and to support policy making and implementation with analysis, evidence and broad consultation with stakeholders.
- strengthened capacity of beneficiaries, stakeholders and partners to prepare and implement high quality projects and to shape policy through public consultation.
- improved public procurement performance, in particular avoiding the use of contracts without prior calls for tenders and contracts with a single bidder, and applying green public procurement criteria.
- improved and more efficient measures to prevent and address conflict of interest, fraud and corruption.

- Broader use of financial instruments, as well as exploiting synergies with InvestEU, for revenue generating and cost-saving activities.

The last factor is crucial in order for Czechia to receive additional funding to support further climate and energy investments. Table 3 provides an overview on proposed budget information for the relevant funds.

Table 3 EU level financing sources in 2021 - 2027

Programme	Proposed Budget
Recovery and Resilience Facility ¹	Proposed budget: EUR 672.5 billion (EUR 724 billion in current prices), of which: <ul style="list-style-type: none"> - EUR 312.5 billion in grants (EUR 338 billion in current prices) - EUR 360 billion in loans (EUR 386 billion in current prices)
	Percentage focused on climate mainstreaming: 30%
InvestEU ²	Proposed budget: EUR 38 billion
Horizon Europe ²	Proposed budget 2021–2027: EUR 91 billion Percentage focused on climate mainstreaming: 25%
LIFE programme ²	Proposed budget 2021–2027: EUR 5.45 billion (adjusted from 2018 prices which were EUR 4.8 billion) Percentage focused on climate mainstreaming: 61%
CEF-Energy ²	Proposed budget 2021–2027: EUR 5.8 billion Percentage focused on climate mainstreaming: 60%
Just Transition Fund ²	Proposed budget 2021–2027: EUR 17.5 billion

¹(Council of the European Union, 2020)

² (European Commission, 2020a)

The largest financial source under the next MFF will be the Recovery and Resilience Facility, that aims at providing up-to EUR 672 billion to Member States. The objective of the Facility is to promote the Union's economic, social and territorial cohesion by improving the resilience and adjustment capacity of the Member States, mitigating the social and economic impact of the crisis, and supporting the green and digital transitions aimed at achieving a climate neutral Europe by 2050, thereby contributing to restoring the growth potential of the economies of the Member States in the aftermath of the COVID-19 crisis, fostering employment creation and promoting sustainable growth (European Commission, 2020b). According to the Annexes to the proposal, Czechia will receive up to EUR 6.7 billion to promote, among others, the green transition. As the Recovery and Resilience Fund (RRF) has a climate earmark of at least 30%, about EUR 2 billion could be used to finance the green transition in the Czech Republic. In order to utilise the available funding, the Member States must prepare and submit Recovery and Resilience Plans to the Commission. Complementary, the EU raised financing sources for Technical Support via the Structural

Reform Support Programme to provide technical and administrative assistance to states in preparing their plans.

Horizon Europe funding is used to promote research and innovation projects (Cabinet of Ministers, 2020). LIFE Programme funding will be used to help enhance and enforce EU environmental and climate policy and legislation (European Commission, 2018a).

InvestEU⁵ (European Commission, 2020c) is implemented by the European Investment Bank (EIB). InvestEU provides guarantees for the EIB-financed projects with public banks and the private sector. As foreseen in the Proposal for a Regulation of the European Parliament and of the Council establishing the InvestEU Programme, the guarantee mechanism will be accompanied by an advisory hub that will provide technical assistance and project development support. The Commission expects that InvestEU will contribute to mobilize more than EUR 650 billion of additional investment across the Union (mobilization factor of 13.3). EIB has substantial experience in providing financing for the building, transport, industry and power sectors (e.g. comprehensive EFSI project list). When blending additional funds (Innovation, Horizon Europe, CEF, etc.) with InvestEU, the rules of the programme will apply to all grants involved in the project.

An additional source of funding will come from the Just Transition Fund (JTF). This new finance mechanism was introduced by the Commission under the new European Green Deal. The JTF will support Member States that are most affected in their transition towards climate neutrality and avoid any regional disparities (European Commission, 2020d). The fund will be implemented in the EU cohesion policy and can therefore be used as a single programme and in programmes that are also supported by the ERDF, ESF+, or CF. Member States such as Greece have already made plans to use the JTF in order to phase-out their lignite power plants by 2023 (Ministry of the Environment and Energy, 2019).

Czechia will be allocated roughly EUR 1.5 billion from the JTF (European Commission, 2020e), which it intends to use to transition its coal-intensive regions towards clean, low-carbon energy (European Commission, 2020f). Phasing out coal mining activities could lead to significant job losses in those regions and thus, the JTF should facilitate the smooth transition of these regions by assisting in different key factors identified by the Commission which include mainly investment in business diversification, upskilling and reskilling, digitalisation, R&D, and regeneration and decontamination of sites, land restoration and repurposing projects (European Commission, 2020f).

⁵ <https://europa.eu/investeu/>

4 Capital Raising Strategy for building and renewable energy sectors in Czechia

For both sectors, the building sector and renewable energy sector, we present the existing policy framework, that shapes the levels of investment and capital raising in the sectors. We analyse the typical sources and structures of financing in the sectors and explore the persisting barriers. We finish by presenting the de-risking policy and financing instruments to raise capital and scale up the development and implementation of projects in both sectors⁶.

4.1 Energy efficiency in the building sector

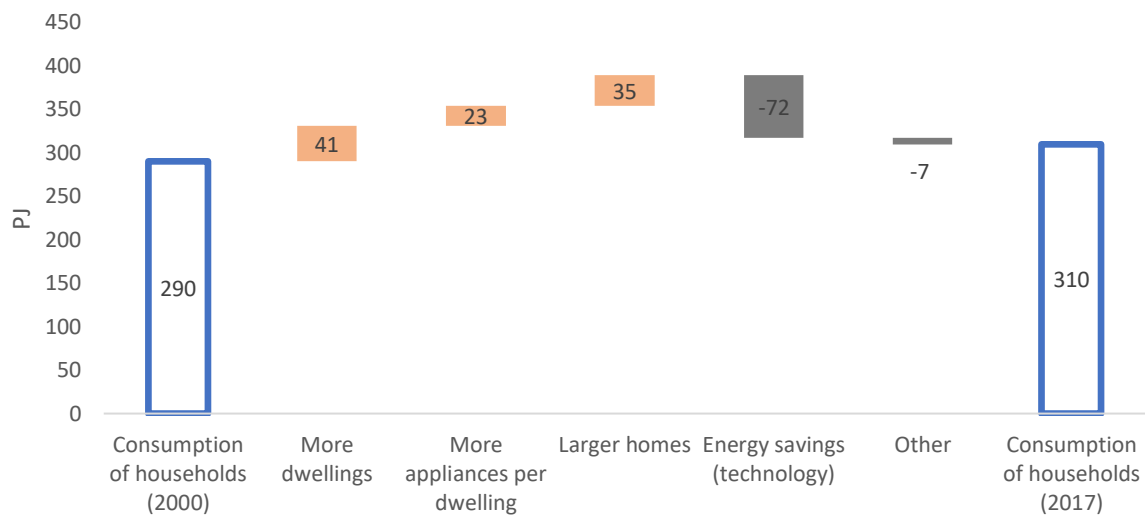
4.1.1 Policy framework

In 2016, the total energy consumption in buildings was 349 PJ, which is about 35 % of total final energy consumption in Czechia (Ministry of Industry and Trade, 2019, 2017), with residential sector accounting for roughly two thirds of the total consumption. Buildings account for roughly 44 % of total GHG emissions in Czechia in the same year (Lupíšek, 2016).

The EE measures carried out in the past have contributed significantly to containing the energy consumption in buildings. For instance, in the household sector, between 2000 and 2017, EE savings reached 72 PJ, i.e., 25 % of the household energy consumption in 2000. However, the EE gains in residential buildings (mainly through renovation and exchange of space heating) have been mostly offset by an increase in the number of dwellings, higher rate of appliance ownership, and generally larger homes (Figure 4).

⁶ We are aware that buildings and RES are growingly interconnected sectors/areas and often the barriers and policies overlap. Nevertheless, we keep this division in the report in order to follow the stream of the previous reports. We highlight it in the sections when there are overlaps.

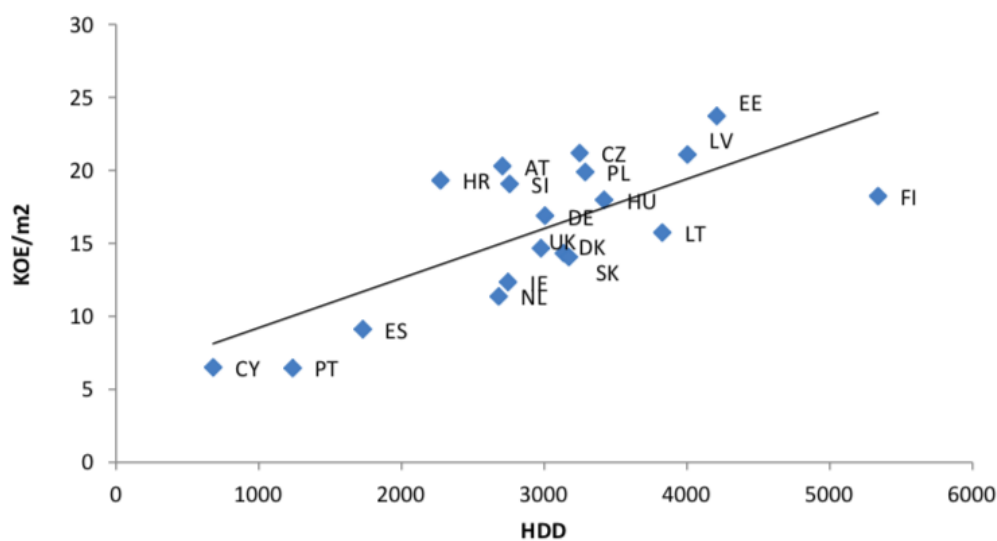
Figure 4 Variation of energy consumption in households (2000 – 2017)



Source: Odyssee-Mure Database

There is still a high potential for further energy savings in the buildings sector. For instance, Tsemekidi-Tzeiranaki et al. (2018) assessed the energy consumption per floor area (koe/m^2) in the residential sector in EU-28. From the countries with similar climatic conditions (expressed by the number of heating degree-days, HDD), Czech households ranked among the most energy intensive ones in the EU-28 in 2016 (Figure 5).

Figure 5 Average energy per unit of floor area of a dwelling [koe/m^2] and heating degree days in the EU-28 Member States, year 2016



Source: Eurostat (HDD), Odyssee (energy)

Source : (Tsemekidi-Tzeiranaki et al., 2018)

According to the current long-term renovation strategy (Ministry of Industry and Trade, 2020a), the “baseline” scenario (no measures) would see energy savings of 20 PJ in 2030 and 56 PJ in 2050, whereas the “hypothetical” scenario would lead to energy savings of 96 PJ in 2030 (27 % of the initial 2013 energy consumption) and 163 PJ in 2050, i.e. leading to 50 % decrease of energy consumption of buildings as compared to the initial year 2013. Notably, only the “hypothetical” scenario leads to CO₂ emission reduction of 60 % by 2050 (Lupíšek, 2016), therefore, on its own, falling short of the 80% (indicative) target by the Czech Climate Protection Policy (Ministry of the Environment, 2017).

The overall policy framework in Czechia is guided by the EU legislation, in case of buildings, it is especially the Directive on Energy Performance of Buildings (EPBD)⁷. Among others, the EPBD requires that each Member State establishes “a long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, into a highly energy efficient and decarbonised building stock by 2050, facilitating the cost-effective transformation of existing buildings into nearly zero-energy buildings”. From the end of 2020, all new buildings must be nearly-zero energy buildings (nZEB)⁸.

The main programmes to support EE in the buildings sector in Czechia are the New Green Savings Programme, and specific axes of the Operation programme Environment (OP E), Operational Programme Enterprise and Competitiveness for Innovation (OP EIC), and Integrated Regional Development Programme (IROP). The first one is funded through the sale of GHG emission allowances, the rest through European Structural and Investment Funds (ESIF). All the programmes take form of an investment grant, i.e. the applicant who fulfils the general and specific technical criteria of the programme receives an investment grant covering part of the investment (typically 30 – 50 % of the eligible project costs).

The New Green Savings programme aims at households (single-family houses and multi-apartment buildings), the OPE supports renovations in public buildings, the OP EIC promotes enterprises, and the IROP incentivises energy efficiency measures in multi-apartment buildings⁹. A minor role (so far) is devoted to other programmes, based on loans and guarantees, such as the ENERGA and Energy Savings programmes by the Czech-Moravian Guarantee and Development Bank (CMZRB), which offer zero-interest loans and subsidize energy assessment for SMEs. Energy Performance Contracting (EPC), which focuses on EE improvement in technology and energy management, is also steadily growing, mainly in the public sector¹⁰.

⁷ Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency.

⁸ The nZEB is broadly defined in the EPBD as a „building that has a very high energy performance (...). The nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.” It is up to each Member State to specify the values.

⁹ Further details on the programmes and evaluation of their outcomes can be found at (Karásek and Pavlica, 2016; Valentová et al., 2019a, 2019b, 2018).

¹⁰ See for instance <https://qualitee.eu/cz/publications/ceska-zprava-o-trhu-a-kvalite-sluzeb-zvysujicich-energetickou-efektivitu/>

A survey carried out by the Chance for Buildings for the MPO (Chance for Buildings, 2018) found that most EE measures in residential buildings (93% respondents in the survey) are carried out without any support programme. In addition, half of them would carry out the renovation through self-help and if they have carried out more energy efficiency measures in the last 5 years, they would typically implement them gradually, instead of all at once.

4.1.2 Existing financing structures and sources

The energy efficiency measures in buildings are mostly financed through own sources. Public policy programmes trigger a smaller share of all energy efficiency projects. Investment grants have been the main public financial instrument.

The main stakeholders involved in the renovation of buildings are:

- Policy actors – Ministry of Industry and Trade (MPO), Ministry of Regional Development (MMR), Ministry of Finance (MF), Ministry of the Environment (MŽP)
- Financial institutions – State Environmental Fund, Czech Moravian Guarantee and Development Bank (CMZRB) and commercial banks,
- Building owners,
- Intermediaries: Energy auditors, ESCOs, consultants and project managers, building management companies,
- Construction companies, guilds, and professional bodies (such as Union of Construction Entrepreneurs).

The renovation of **single-family houses** is mostly financed from own savings of the owners (equity). The owners are strongly risk averse and “loan averse”. The main public financial instruments for renovation are the grants offered by the State Environmental Fund (SEF, the New Green Savings Programme). However, Chance for Buildings (2018) found that only 7 % of the owners in the survey used a grant to finance their renovation. In our study (Valentová et al., 2019b) we tracked that in 2017 CZK 2.8 billion (EUR 106 million) was invested in the renovation of single-family houses with the help of the grant scheme¹¹. Using a very simple rule-of-thumb estimate, that would mean that additional CZK 29 billion (EUR 1.1 billion) could have been invested into renovation through own sources by the house owners. However, the renovation carried out through the grant scheme may be deeper (and therefore needing more initial investment) than the one carried out by the owners “on their own”. Therefore, the total investment will be most probably lower.

The Green Savings Programme is a programme funded through the sale of emission allowances under the EU ETS. It has been in operation since 2009 and has co-financed nearly 90 thousand projects with nearly EUR 900 million worth of support in the period 2009 – 2019 (mostly renovation, but also built-in renewable energy, and fuel-switch) (State Environmental Fund, 2019). The programme provides investment grants, typically 20-50 %

¹¹ The grant covered about 35 % of the total investment costs of the renovation, the rest was financed by the households.

of eligible costs. In terms of renovation, the support ranges from 30 – 40 % of eligible investment costs. The programme also incentivises a combination of measures with a grant bonus and preparation of the application.

In **multi-apartment buildings**, the renovations are also majorly financed through own sources (savings in the renovation funds of the condominiums, etc). About half of all owners used a loan to finance the renovation, and 12-20% of the respondents used the grant scheme. The main grant schemes for multi-apartment buildings are provided by the Ministry of Regional Development (Integrated Regional Operational Programme; IROP). The IROP provides investment grants to support EE and RES measures in multi-apartment buildings. The IROP finances about 30% of the eligible investment costs. Besides, the Czech Moravian Guarantee and Development Bank (CMZRB) offers soft loans to municipalities. In 2017, we tracked that CZK 0.3 billion (EUR 11 million) were invested in the renovation of multi-apartment buildings with the help of grant schemes. Again, by a rule of thumb, the total investment in renovation could have been roughly CZK 1.5 billion (EUR 57 million), which would probably be an upper estimate given the depth of renovation.

Conversely to residential buildings, **public buildings'** renovations are mostly (75%) co-financed through grants (Chance for Buildings, 2018). In the Czech climate investment landscape, we estimated that in 2017 CZK 1.7 billion (EUR 64 million) were invested in public buildings' renovations using grants (Operational Programme Environment, OP E). The Operational Programme Environment has been launched in 2007. It has so far supported over 7,700 RES and EE projects in public buildings (State Environmental Fund, 2019, 2016). The OP E provides investment grants, and the applicants are paid about 40 % of total eligible investment costs. To co-finance the grants, the State Environmental Fund (SEF) also provides soft loans to municipalities. In 2018 and 2019, 10 projects were granted the loan¹². Apart from the support schemes, the CMZRB runs a programme of soft loans for municipalities. It is not directly aimed at energy efficiency, but renovation can be financed through the programme.

Additionally, the **Energy Performance Contracting** (EPC) projects accounted for CZK 0.2 billion (EUR 7.6 million) investment in public buildings in 2017. The ESCO/EPC market has been growing steadily in the last 20 years, but has been almost exclusively limited to the municipal and regional levels of the public sector (Boza-Kiss et al., 2019). The combination of EPC and thermal insulation has been supported in the OP E since 2014 by a special bonus. However, the complexity of EPC remains one of the major barriers.

Commercial buildings are the least tracked sub-sector due to their high variety. The CMZRB provides two soft-loans programmes for entrepreneurs to finance EE measures. However, due to existence of other financial instruments (grants), the uptake has been rather low.

¹² <https://www.sfzp.cz/dotace-a-pujcky/inovativni-financni-nastroje/>

Typical project in public buildings: insulation of schools

By now, there remain very few buildings owned by the municipalities that would not have undergone a basic thermal insulation¹³. Typically, these buildings are educational facilities (schools, kindergartens) and administrative buildings.

It is important to note that the depth and quality of renovation varies greatly, especially for the renovations carried out 5-10 years ago and more. Moreover, the thermal insulation is not often accompanied by proper ventilation or, ideally, the forced ventilation systems. The study by Hrubý (2016) showed that the indoor CO₂ levels after renovation exceed the recommended values 2-3 times.

Nearly all of the retrofits would be financed using a public support programme (typically the OP E, aimed at the public sector). As one of the respondents put it, given the high upfront costs of the actions, they have to be either supported by a programme, or they are not carried out at all. The projects are typically co-financed through own funds, much less by loans, as the municipalities are bound by the rules on public debt.

The positives of the programme prevail, including the financial aid itself. The projects bring about significant decrease in energy costs, and therefore additional “free” means to be spent by the organisations. In the current programme, forced ventilation systems and recuperation are a prerequisite, and therefore, the energy efficient projects will also improve the indoor air quality.

The negatives that have been mentioned by the respondents of the interviews for this report would be the administrative intensity of the projects – it requires a devoted team of highly motivated experts. Additionally, there is a lack of ex-post monitoring and evaluation of the measures – i.e. energy management and education of the energy users. The reasons are the lack of capacity, knowledge and motivation.

PV installations has been much less scarce and remains scattered in the municipal sector, rather than developed systematically. Some of the projects have been realised in the PV boom in 2009-2010. Other projects are a product of initiative by motivated individuals.

4.1.3 Barriers to uptake of energy efficiency projects in buildings

Low prioritisation as well as a lack of strategic leadership and technical assistance are the key barriers to the development of energy efficient projects.

The general barriers to uptake of EE measures tend to be mainly high upfront costs, lack of information and awareness about them, transaction costs (i.e. administrative burden) and principal agent problem (Ryan et al., 2012; Sanstad and Howarth, 1994; Valentová, 2010).

¹³ This is the case for other buildings, too. Vast majority of the buildings (residential and non-residential) have already undergone at least partial EE (thermal insulation) measures. Therefore, other EE (and RES) options may need to be searched for.

The uptake of EE projects specifically in buildings would then typically “suffer” from very similar barriers.

Based on the desk research, in-depth interviews, and a discussion workshop¹⁴, we identified the following main barriers to energy efficiency development in the buildings sector in Czechia.

Lack of prioritisation for energy efficiency

Despite the European pledge for Energy Efficiency First principle (European Parliament and the Council, 2018), the concept remains rather rarely operationalised and put in practice (ENEFIRST, 2019). The interviews revealed that even the opposite may be true in Czechia. The topic of EE (and climate change mitigation in general) has not been widely acknowledged as a significant and important topic in the political discourse. Conservatism prevails on different levels of political and administrative decision making, favouring the status quo before innovative solutions. Some of the interviewees even believe that instead of playing the exemplary role, the “state” itself can be seen as one of the main barriers to the promotion of EE projects in that it does not provide an effective policy framework to overcome the barriers. Relatedly, the Czech NECPs ranks among the less ambitious in terms of energy saving target for 2030, supporting the notion of lack of priority for EE measures (Economidou et al., 2020).

In addition, the policy cycle impacts the (usual) decisions on EE (and RES), which are usually long-term and strategic, and therefore, often collide with the typical four-year political cycle. As one of the municipality representatives put it, there is a high inertia in the political management, which after the elections needs to get first acquainted with the departments. After that, they “keep doing things for two years”. The last year before the new elections is marked by lower activity and “leaving it to the ones after them”.

Similarly, energy efficiency remains rarely prioritized among entrepreneurs who are largely reluctant to carry out measures with payback longer than 3-4 years.

Across sectors, the general feeling prevails that each project needs to be explained from the beginning, and the leaders have to be persuaded. So far, there has rarely been a general strategic consensus on the preference and willingness to implement good quality EE and RES projects. It is not taken as a matter of course. The decision making has rather been based on the fact that “we need to change the windows because they are old/bad”, less so focusing on the quality and parameters of the measures and complexity of the projects to reap the whole energy saving potential.

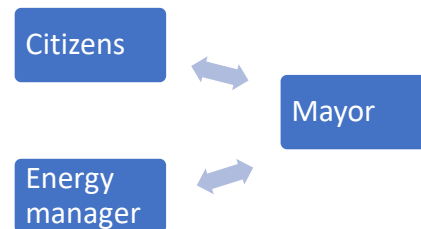
¹⁴ For more details, please refer to the methodology section.

Municipality – key actors

“Energy efficiency is about telling the right story.”

The municipal energy manager is the specialist that provides ideas and initiatives. City management (vice/mayor) should be attentive to the initiatives. The projects need to be set up in a way that citizens understand the initiatives and support them. They are an important source of feedback to the mayor.

The budget is limited and there are many projects that could be supported. The mayor has to understand and be able to defend why exactly RES and EE are chosen as priorities.



From the interviews:

“Tell the decision makers what the energy manager needs, but in a way that they want to listen to.”

Low strategic leadership and coordination

Connected with the lack of prioritisation is the perceived low strategic leadership and lack of coordination among the various policy stakeholders.

According to our interviews, the higher political actors do not provide clear strategic leadership in EE (and generally in climate mitigation), leading to a chaotic set of policies and measures. The issue seems both institutional and personal. The path dependence of the institutions is supported by the “human factor”, which is further amplified given the size of Czechia and their personnel representation in the field of EE and RES. Put bluntly, there are a handful of persons responsible for the whole course of the agenda. Therefore, the influence of a single person can be high – be it in the “positive” or “negative” direction.

Besides, the general personnel capacity at the relevant ministries is insufficient, combined with common low levels of expertise at the higher levels of the governmental institutions. As one of the respondents stated, the expertise and interests vary greatly, leading to a low will to change the course of things. Often the main goal would be to “spend the allocated budget” regardless of the results and impacts of the spending.

Coordination between the relevant ministries and actors is lacking, resulting in a lack of general strategy. There is little or no coordination of activities, conceptuality, awareness, and information between ministries, concerned with EE and RES (especially among the Ministry of Industry and Trade, the Environment, Transport, Finance and Ministry of Regional Development), but to a large extent also among the other public (financial) institutions.

The interviewees further stressed that there were too many different support programmes targeting energy efficiency, which made it unclear and chaotic for the target audience. The programmes do not seem to follow a unified strategy and modes to reach it. As a result, the programmes then target the same audience and the same measures. For instance, the OP EIC has offered grants and the CMZRB has provided soft loans both to promote EE measures at SMEs. Consequently, the latter programme has not fully taken off. Similarly, the programmes tend to differ in the stringency of criteria leading then to a lock-in effect especially for buildings.

Insufficient public awareness, education, and energy management

A common theme also mentioned from the participants is a lack of awareness and education from the public sector and consumers. Currently, “the public has neither interest nor the knowledge in developing energy-efficient behaviour.” As another respondent mentioned, “there needs to be a different mindset to eliminate the outdated thinking”¹⁵.

The EE and energy savings are also quite complex and intangible and, therefore, hard to grasp for the general public (including decision makers on different levels). Their value has not been clearly communicated yet. Therefore, the concept needs a clear political message and spin. The market is non-existent and the sensitivity to wasting energy has been lower than in other cases, such as water conservation.

Additionally, good understanding of energy saving measures is a prerequisite for seizing the full potential of EE measures. In many cases, behaviour of the energy consumers after installation of the technology measures is key to maintaining the energy savings.

In the survey conducted by Chance for Buildings (2018), more than a third of the owners of non-residential buildings (industry) did not have an overview of their energy consumption. Besides, the non-residential sector misses information about the support programmes to renovate buildings - about one quarter of the respondents in the survey did not know about the options to use them.

Similarly, the public sector lacks systemic monitoring and energy management. The managers of the buildings do not have a clear overview of energy consumption, and therefore, the potential for energy savings. The study of (SEVEn, 2018) found that over 60 % of the municipalities do have a special energy manager or cooperate with an external company in these matters. On the other hand, nearly 40 % of the responding municipalities deal with energy savings ad hoc without systemic approach. Similarly, the study showed that 14 % of the surveyed municipalities “do not deal with energy management too much at the moment” and 59 % do follow energy consumption but not according to EN ISO 50 001 norm on energy management.

High upfront costs and complexity of energy efficiency projects

Many of the EE measures tend to come along with high upfront costs¹⁶. The decision-making is then usually relying on the initial investment costs rather than life-cycle costs. In addition, especially entrepreneurs are not willing to invest in projects with a long-term payback period. The low-hanging fruit projects have largely been addressed already (e.g., most

¹⁵ Although Czechs generally support transition to clean energy according to Eurobarometer (2019b), they do not generally see climate change as a serious problem.

¹⁶ This can be prohibitive in some case, for instance for low-income, vulnerable households who are unable to pay for the measures even if part of the investment is covered by a grant, as is the case in Czechia. The programmes are not specifically dealing with energy poverty, therefore, questionably aiming at investors who may have carried out the investment even without the investment grant, or would be equally motivated by e.g. a soft loan instead.

buildings would already have at least partially renewed windows, etc). However, given their complexity, the projects then tend to lack ambition.

Energy saving projects are complex. According to one of the respondents, one cannot just “pick up the phone and insulate the house in two weeks”. The planning and preparatory phases of the projects are therefore crucial for the overall success of the project. Similarly, the tendering procedures may not be straightforward (if not purely aiming at the lowest price). The experience and capacity for such projects remain inadequate especially in the public sector (cf. barrier on technical assistance).

The Chance for Buildings (2018) found that in case of the residential sector, the situation is quite similar. Many of the renovations are carried out through self-help, which is highly likely not reaching the standard of deep renovation¹⁷ and therefore may lead to a lock-in effect.

Only a minority of public buildings owners and managers consider EPC as a possible instrument for EE measures (Chance for Buildings, 2018), and would largely distrust the ESCO industry (Szomolányiová, 2018).

The complexity of EPC procurement remains the most important barrier for public and governmental organisations (Szomolányiová, 2018). In addition, according to the Czech NEEAP, even though they may be interested in this type of service, the public organisations are also “are frequently concerned about making mistakes when entering the projects in the accounting system, as they view this process as the funding of investments from operating costs”, i.e. mixing the investment and operating budgets (Ministry of Industry and Trade, 2017).

Administrative burden

The administrative burden and transaction costs of the EE and RES support programmes are high and even increase during the implementation of the programmes (Valentová, 2020). The entire implementation process increases disproportionately the administrative costs and poses a barrier for investors and administrators especially in case of small projects. Additionally, the conditions of the programmes tend to change (sometimes in small nuances), which further increases the administrative burden and largely prevents the economies from learning-by-doing.

Most respondents agreed that the subsidy programmes are “terribly complex and, especially for businesses, therefore completely irrelevant and absolutely uninteresting”. In order to be attractive, the programmes “need to be greatly simplified.” While there is always a trade-off between simplification and the accuracy of the reported outcomes, the current state of the programmes seems rather prohibitive in their complexity¹⁸.

In their survey conducted for the MPO among building owners, the Chance for Buildings (2018) concludes that the administrative costs were the main reason among households

¹⁷ The Czech Long-Term Renovation Strategy (Ministry of Industry and Trade, 2020a) defines deep renovation as conforming to “passive” U-values (A and B in the Energy Performance Certificate) and leading to energy savings of up to 81 % compared to the reference building .

¹⁸ See also findings of Valentová et al. (2020a)

(both single-family and multi-apartment) not to use any of the support programmes (mainly in form of investment grants). In multi-apartment buildings, the internal approval procedures among the apartment owners (in the condominiums) were mentioned as too difficult, administratively intensive and time-consuming. The homeowners further feared they would have to massively change the project in order to get the grant. In addition, 16 % of the respondents among single-family houses did not know about the possibility to receive a grant.

Related to that, the infamously long building permit procedures remain another barrier in the buildings sector. As one of the interviewees stated the development projects would typically last for 10 years, meaning that in the time of their implementation they are already unfit for the current situation and out of date, not using the current state of knowledge, technologies, and solutions.

Several municipal respondents further confirmed that a lot of the EE and especially RES measures cannot be carried out due to the preservationists' negative statements towards such projects. One of the respondents went as far as to state that they feel there is "little pressure for factual quality and rightness of the projects and high pressure on making the projects administratively right".

Low levels of project development

Project developers (i.e. municipalities, SMEs implementing EE measures) do not seem to have the necessary skills and capacity to perform these types of projects. Overall, the project pipeline does not exist and the projects are not prepared and implemented in the sufficient level of quality to fully utilise the EE potential. The institutional and personnel capacities are inadequately covered to provide the necessary technical assistance both in the public sector and in industry.

This leads to the fact that the EE potential of the projects is not fully exploited (and in buildings, lock-in effect will prevail). The stress is still put on the investment costs, instead of assessing the full life-cycle costs (and regardless of other multiple impacts of energy efficiency¹⁹). The project developers tend to favour simple (pure renewal) solutions rather than complex ones (e.g., a one-to-one exchange of obsolete boilers instead of a complex solution to the heating and ventilation system in the building).

The projects also lack focus on good technical supervision and project control. The expertise of the construction companies is getting better, especially in terms of knowledge and skills in nZEB. However, the respondents stressed that it remains crucial to have all the technical criteria well specified already in the contract (e.g. airtightness), so that it can be controlled and sanctioned if not done properly. It seems that e.g. in the public sector, most municipalities have already gained experience in "classic" insulation. However, they lack any experience with more complex projects, such as EPC.

At the municipal level, the projects, subsidized or not, need to be well-planned from the very beginning, because of the budget planning processes in the public sector. Any

¹⁹ For multiple impacts definitions and overview, see e.g. (Ürge-Vorsatz et al., 2016).

subsequent changes to the project (i.e. related to higher efficiency, thicker insulation, moving to a passive standard), and thus to the budget, are highly difficult.

The project development and preparation are indeed rather time and resource consuming activities. Therefore, the decision makers need to be well acquainted with the purpose and importance of this stage. As confirmed by the respondents, the preparatory phase has been perceived as “waste of money” so far. The general perception remains, that the (scarce) finances should be directed to “hard” measures and fixed capital investment rather than to the “soft” project development. The energy managers especially emphasize that the city management has hard time understanding and navigating the number of energy assessments and other documents that are needed in EE projects (i.e., energy audits, energy assessments, energy performance certificates, and other). This may put the energy managers in an unfavourable position when defending the more complex projects.

Importantly, very small municipalities (and companies) obviously face capacity issues in terms of personnel and in terms of expertise. They may have trouble keeping up with the legal requirements (revisions, etc), let alone the complex EE issues (buildings, public lighting).

Low diversity of financing mechanisms

In general, most of the experts agree that there needs to be a wider portfolio of financial instruments in place. Investment grants are still the predominant tool to aid both EE and RES projects. The landscape of climate and energy investment in Czechia for 2017 identified that in the buildings sector, 42% of the tracked investment were grants, which also remained the single largest public instrument forming over 90% of the value of the public instruments (Valentová et al., 2019b) (cf. also Fig. 1). According to our findings, both the existing and new financial instruments should also favour combinations of EE and RES measures over individual solutions, especially in the building sector, to support the full GHG mitigation and EE potential in the projects, rather than funding partial, suboptimal solutions.

Also, financial institutions need capacity building and assistance in financing sustainability projects. According to the respondents, commercial banks are still behind on sustainable finance issues, i.e. being able to identify and evaluate sustainable projects. Helping to implement the EU Taxonomy in practice among financial institutions can help clarify climate and energy measures when aiding investments (Valentová, 2020).

Even though the prevailing opinion is that the financing itself (i.e. the availability of finances) is not a barrier to development of EE projects, specifically the municipal sector does seem concerned about their budgetary constraints. There is only a certain level of indebtedness permitted for the municipalities (cf. Act No 23/2017 Coll.). Given the (obviously) limited public sources, the EE projects then tend to compete with other public projects for external financing²⁰.

²⁰ It must be noted that some of the respondents raised concerns about the EE projects in the post-Covid period when they expect the budgets to be even more constraint. However, other municipal representatives stressed out that EE projects specifically have been all kept in the budget plans, even after the cuts.

Split incentives²¹

Especially in the residential sector of multi-apartment buildings, the developers tend not to be motivated to invest in EE measures. There is no clear demand on the side of the consumers in the residential buildings for high-efficient buildings, yet. Unlike in the non-residential sector, where a certain standard for buildings starts to be required, especially in case of international companies bringing in the push for sustainability.

Similarly, the split incentives may be specifically strong as a barrier in the public sector, where often the building owner is different from the building user/manager (for instance, the owner would be the municipality, while the user would be a school). Upon implementation of the EE measures, the managers of publicly owned buildings would not fully profit from the reduced energy bills resulting from the energy savings. Such savings are often taken by the owner – the local government or the state (Szomolányiová, 2018). The manager of the site has therefore little motivation to implement the EE project.

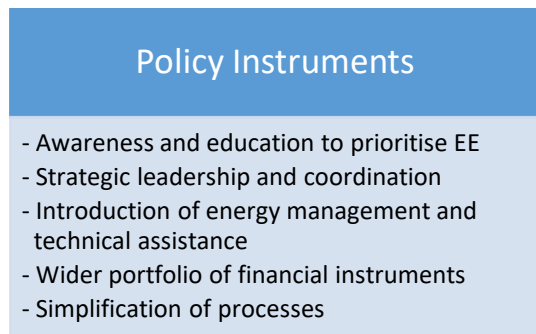
4.1.4 De-risking policy and financing instruments to raise capital for energy efficiency in the building sector

Higher awareness on energy efficiency and clear strategic leadership need to be combined with wider portfolio of instruments and technical assistance to create the pipeline of energy efficiency projects.

In this subchapter, we summarize the main recommendations for de-risking policy and financing instruments to raise capital and increase uptake of EE in the building sector. Referring to the results of the interviews and discussion webinar with the expert panel (Valentová, 2020), the following policies and financial instruments in Figure 6 can be seen as a catalyst to de-risk investments and eliminate barriers in the buildings sector.

²¹ The split incentive (sometimes also called the principal-agent dilemma means that the owner of the facility (of the rental unit) has low incentive to invest in the efficiency measure, as they will have “no control over the use of the efficient equipment and thus no control over the efficiency gains. Furthermore, the owner does not receive the benefits of the measure, because it is the user who pays lower energy bills” (Valentová, 2010).

Figure 6 De-risking policies and financial instruments identified by interviewees



* local municipalities can create a budget for energy users. If users save energy, the savings can be partially paid back to them.

Narrative, awareness and good practice examples

First and foremost, the thinking in the society needs to be changed, both top-down and bottom-up. As one of the respondents put it, we need “to get to a stage in which wasting energy will be unacceptable” and “to make energy efficiency part of our lives”. The narrative and messages need to be positive, to get people motivated.

One of the key instruments that many actors have agreed on would be a massive information campaign to promote not only the specific EE programmes, but also energy savings and climate mitigation, to change and raise awareness in the wide spectrum of actors (general public, but also the decision makers). Good quality, complex, deep renovation projects should be well communicated, as well as simple, behavioural, low-cost solutions. The key leader of this activity would be the national government.

The respondents agreed that the promotion needs to focus on tangible benefits (such as cost savings, indoor air quality). Largely, the other benefits with indirect impact on costs (environmental and climate impacts, and other) seem to be less persuasive at the moment.

The messages need to be communicated in a way that the target group can identify with. **Localised, concrete examples** can be a powerful tool. Following the good example from the interviews, we recommend that as soon as a (public) energy saving or RES project is completed, an inherent part should be showcasing the results to others (citizens, municipalities, etc). For instance, informing about the energy and cost savings, and where the saved money has been reinvested or used. The local actors are closer and can be much more trustworthy and therefore impactful. “Showing off” and sharing experience among the target actors can be an important part of the project. As one of the respondents put it, they see a great value in sharing experience and “learning from ones and passing on their information to others”. Especially in the municipal sector, highlighting the benefits and creating positive messages is seen as beneficial both for the take up of EE projects, but also as an important input for the political cycle (the policy makers and politicians need to be

able to sell the outcomes to their voters)²². Additionally, sharing good practices examples also helps to build trust towards more complex projects, such as EPC (Szomolányiová, 2018).

Hand in hand should also go introducing climate, EE, and RES issues in the educational cycle (see also box below). In addition, proper training and education are low-cost measures, which enhance reaching the energy saving potential, both with and without the technology measures.

Education activities

In Prostějov, according to our interviewee, the photovoltaics were installed on the roof of the sport centre owned by the municipality. Apart from decreasing the consumption from the grid and therefore lowering the energy bills, an interactive information panel about the PV was installed in the main hall of the centre. It shows the production and energy savings. Given the location, it specifically targets the youth and managed to raise their interest.

The energy manager of the city further launched a project on measuring the CO₂ concentrations at schools. The pupils would record the CO₂ concentrations at different times of day and learn about the importance of proper ventilation. In the same time, the energy manager gets valuable data for their further evaluation on whether some adaptations are needed²³.

Skills for nZEB

Czechia is active within the EU Build up Skills initiative. Since 2012, several training schemes for construction professions have been developed (Train-to-NZEB, Fit-to-NZEB, ingREeS). Recently, CraftEdu H2020 project develops innovative qualification and training scheme for craftsmen and on-site workers in the field of EE and use of RES in buildings.

Strategic leadership

The topic of EE should be clearly put into the forefront of climate mitigation options. In line with the EE principle, the policy makers should provide a clear message acknowledging it as the biggest and foremost source of energy.

Subsequently, many respondents agreed that the top-down (regulatory) approach may be necessary especially for the regional and local authorities (together with the narrative and information). The “stick” of the norms may fasten the whole process. Otherwise, the actions depend solely on the individuals and their motivations, and therefore remain rather ineffective.

²² Although one of the respondents deplored that energy managers are among the few positions at the municipality, that need to constantly defend their work, even though they are also often the ones that actually „pay for themselves“ with their work.

²³ Another EUKI project, [BEACON](#), works towards climate change education together with schools and municipalities.

Some respondents found strategic documents as highly helpful. Be it an energy plan, smart city concept or other, importantly, they serve as points of reference and therefore help (to a large extent) to shield the EE actions against the changes caused by the political cycle.

Wider portfolio of financial and other instruments²⁴

The EE support programmes in Czechia took prevalingly the form of investment grants. So far, the programmes have not created a sufficient amount of energy savings. Therefore, a much wider portfolio of financial instruments is necessary to provide the needed take-up of energy saving measures.

Firstly, the **soft loans and guarantees** should be introduced much more widely. There are a few instruments, mostly administered by the CMZRB. However, the general awareness of these instruments is low and they have not been able to compete with the investment grants, which largely target the same recipients. Soft loans and guarantees are, however, much more effective from the point of view of public sources, as they create much higher leverage effect than simple investment grants, thus potentially changing the market more effectively²⁵. The state guarantees may even gain importance in the post-Covid era, as the enterprises may face financial difficulties. Given the long-term nature of EE projects (typically 8-10 years for technology measures, and more for thermal insulation projects), the credit risk for commercial banks may be too high despite the nature of the climate mitigation projects.

In the residential sector, some form of investment grant will remain necessary, but should be well targeted (e.g., vulnerable households, vulnerable regions). Nevertheless, the existing investment grants could still be combined with the soft loans and guarantees offering the households an easy option to co-finance the investment (or vice versa, i.e. offering a soft loan and partial subsidy of the repayment upon meeting certain conditions)²⁶. A financing programme for EE in households and SMEs, similar to the ones the German bank Kreditanstalt für Wiederaufbau (KfW) offers via financial institutions²⁷, would be helpful.

Additionally, the banks need to learn how to “deliver” these kinds of projects: learn about the incorporation of the EU taxonomy of climate mitigation projects in their decision making and widening the portfolio of their instruments.

Carbon taxing needs to be considered to be included in the instruments’ portfolio. While carbon tax cannot be seen as a panacea and silver bullet, designed correctly it remains a strong, effective instrument to support climate change mitigation. Other fiscal instruments,

²⁴ Consult <https://valueandrisk.eefig.eu/financingenergy> for a great overview of financial instruments. This subchapter highlights the ones that have been mostly mentioned by the respondents and, therefore, can be perceived as the most readily viable in the Czech context.

²⁵ Nevertheless, they, too, need to adhere to strict EE criteria in order not to create lock-in effect.

²⁶ Note: In the time of writing up of this report, there has been a similar product being prepared by the Czech Moravian Guarantee and Development Bank with the help of the ELENA facility by the European Investment Bank assisting in development of this instrument.

²⁷ More on this programme at

<https://www.kfw.de/inlandsfoerderung/Privatpersonen/Bestandsimmobilie/>

such as **tax rebates** may serve as a powerful tool and would be highly welcome especially in case of the industry and services sector (Chance for Buildings, 2018)²⁸.

The EPC market has developed in Czechia since the 1990s. The governmental/state buildings remain largely unexploited, and the **combination of investment grants and energy performance contracting** provides a great opportunity to combine measures with long payback (thermal insulation) and technology and energy management measures. It is yet to be fully exploited, even though a bonus in form of extra points in evaluation in the existing support scheme (OP E) has been granted to such combinations²⁹.

There is obviously a room for other innovative instruments, such as sustainable crowdfunding, green mortgages and others to play a supportive role to low-carbon energy transition. So far, however, there has been a low level of trust in financial instruments given the long-term history of grant funding (subsidies). A higher uptake of other financial instruments is basically connected to the other identified barriers, such as need to increase awareness on both energy efficiency and the instruments, coordinate the offer of programmes to avoid duplications, and support in-depth ex-ante analysis of the specific markets to identify the needs of the recipients and barriers they have been facing³⁰.

Energy utilities have not yet played a major role in the transition processes and have not shifted their direction towards innovative energy services. Voluntary mechanisms are expected, in the first instance, to serve as the trigger point to start such shift to a new market arrangement. However, it must be noted that there are several key aspects for successful implementation of such schemes. Cornelis (2019) mentions mainly the ambition of the targets, incentives for participants, stringent monitoring and verification procedures, and last but not least, mutual trust between the signing parties.

²⁸ Various tax instruments to support refurbishment have been in place in several European countries. Detail analysis is presented for instance by (Economidou et al., 2019).

²⁹ Although the SEF does not provide the applicant with a specific financial support technology part of the measure under the EPC, the applicant should be able to monitor the resulting savings, which can be evaluated precisely thanks to the introduction of the EPC method. This also helps to ensure the fulfilment of all mandatory conditions of the programme. The programme further grants a higher maximum amount of aid to thermal insulation of the building and, as already mentioned, bonus points in the evaluation of the application. More information available at https://www.opzp.cz/files/documents/storage/2018/11/17/1542487583_Pokyny%20pro%20C5%BEadatele%20vyu%C5%BE%C3%ADvaj%C3%ADc%C3%AD%20kombinaci%20podpory%20z%20OP%C5%BDP%20a%20metody%20EPC.pdf

³⁰

https://ec.europa.eu/energy/sites/ener/files/documents/prague_roundtable_en_proceedings_final.pdf

Revolving energy saving fund in Litoměřice

The town of Litoměřice founded a revolving energy savings fund and introduced a system rewarding energy savings. All the contributory organisations have been provided an “energy budget”. Importantly, the fund is based on a solidarity principle, i.e., if one building had a renovation planned, it is clear they would attain energy savings. The organizations can influence the investment planning only to a limited extent.

If the organization/department managed to save energy, the savings are distributed in the following way: 35% to municipal budget, 30% allocation to revolving energy savings fund, 30% to the municipal department/contributory organisation that have implemented the energy efficiency measure and 5% allocated to a Commission fund (PUBLEnEf, 2017).

Simplification and interlinkage of the programmes

Both the existing and any newly developed programmes should strive for the least administrative burden both for the recipients and for the administration body. Valentová et al. (2020a) found that in the existing programmes, the administrative burden has actually grown rather significantly (by up to 25%).

One of the reasons is that the size of supported projects (in terms of eligible costs) decreased in the MFF period 2014 – 2020. For instance, in OP E the average size of supported projects decreased by 45 % from 2011 to 2019 (roughly from EUR 222 ths to EUR 126 ths) and by 37 % in OP EIC (from EUR 380 ths to EUR 240 ths). The study shows the prevailing share of fixed costs over variable costs, i.e. a large part of the transaction cost does not change with the size of the project. Such fixed costs typically arise during the application procedure, in which all applicants must submit the same level of paperwork, disregarding of the size of the project. The same then applies to reporting and requests for payment, and partially to tender organisation.

Therefore, especially for small projects, the procedures need to be substantially simplified. Rather than checking all projects before granting the support, an effective monitoring and control tools should be implemented to then verify and control the impacts at a selected sample of projects, and adapt the programmes accordingly if needed³¹.

Additionally, an early thorough preparatory phase of a programme and stability of the institutional environment increase the effectiveness of the programmes.

Energy management

There is a high potential for supporting and introduction of energy management in both public and in industry sectors (Chance for Buildings, 2018; SEVEn, 2018). Most respondents agreed that systemizing support to energy management should be one of the policy priorities.

The energy management, if implemented properly, influences the day-to-day behaviour of the building users. Therefore, the energy management should not only deal with energy

³¹ On a related note, the time and administrative intensity for building construction permits should be also simplified, even though this somewhat exceeds the scope of this report.

consumption monitoring and EE technology measures, but it can be seen as a way of quality management in its full meaning.

While the implementation of energy management is higher in large enterprises, the challenge remains to introduce it in SMEs. Similarly, a form of energy (demand) management in the residential sector will gain in importance, especially with the increasing share of electricity consumption, RES development and e-mobility.

In the public sector, the introduction of energy managers as specific positions should also be supported through best practices and sharing experience.

Project development and technical assistance

Technical assistance needs to be much more developed in order to facilitate project development and pipeline. Ideally, an advisory investor's hub would be created, which would promote the EE and RES projects, organize the whole process from feasibility study through project documentation to implementation.

It could take form of one-stop-shops (Boza-Kiss and Bertoldi, 2018), i.e. localised facilitators and advisory tools. For the municipalities, a regional energy agency would be highly helpful, to serve as an independent advisory and assistance body for the public sector and beyond^{32, 33}.

As one of the respondents stated, the aim is to “get people in the field and on-site” so that they can start credibly **explaining the potential for increasing energy efficiency** in buildings, provide the **technical assistance**, help with project development, and therefore, consequently, **decrease the payback and/or lower the risks** of the projects. Ultimately, the absorption capacity should be increased.

We recommend to use the EIB's technical facility under the new scheme InvestEU Advisory Hub³⁴ to systematically support EE project-portfolio development. EIB has a vast know-how in financing this type of projects and could work jointly with local financing institutions to provide financing also for smaller projects.

³² Many respondents at the municipal level agreed that there are expert energy advisory companies. However, the respondents expect that the “independent” organization would provide advice and technical assistance to the energy manager, without necessarily aiming also at “selling equipment or service”.

³³ For instance, in Slovakia, the NECP expects that local energy centres and regional sustainable energy centres will be supported through ESIF 2021 – 2027 (<https://www.economy.gov.sk/energetika/navrh-integrovaného-narodného-energetického-a-klimatického-planu>).

³⁴ The technical assistance provided by the EIB presumes a larger pool of projects. Therefore, it is not directly applicable for smaller municipalities or SMEs. However, an umbrella technical assistance can be created e.g. under the regional authority, see e.g. the example in the textbox. Further information on the technical assistance is available at <https://eiah.eib.org/>.

ELENA by the European Investment Bank

The European Investment Bank's (EIB) products aim specifically at technical assistance. Its programme European Local Energy Assistance (ELENA) has only recently supported the first two projects in Czechia; the Central Bohemian Region and the CMZRB.

The Smart Central Bohemian Region provides technical assistance for deep renovation projects. The planned co-financing of EUR 2.4 million should then lead to investment of EUR 62 million for the renovation of around 170 public buildings, leading to reduction of 17,745 t of CO_{2-eq} (European Investment Bank, 2019).

The assistance to the CMZRB aims at supporting development of EE and RES projects by private enterprises and addressing EE renovation through EPC and RES installation in public buildings. The total project development costs of EUR 3.3 million (of which 3 million co-financed by ELENA) should lead to investment of EUR 90 million and savings of 27,400 t CO_{2-eq}.

eq.

This point is obviously very much connected with awareness raising and education. In the residential sector, the awareness raising campaign combined with consultations will increase the quality of renovations. The technical assistance aims rather at the non-residential sector and municipal (or more generally public) sector. The value-added of good project preparation should be very clear, i.e. using up the full EE and RES potential, decreasing the life-cycle costs of the project.

4.2 Renewable energy projects in Czechia

4.2.1 Policy framework

RES share in Czechia was at approx. 16% of the gross final consumption (Ministry of Industry and Trade, 2020b). Figure 7 depicts RES share in gross final consumption from 2004-2018. Table 4 shows these shares by sector. Figure 8 shows installed capacity of renewables in Czechia over the past decade.

Figure 7 Share of RES in gross final energy consumption (%) in Czechia (European Commission, 2020g)³⁵

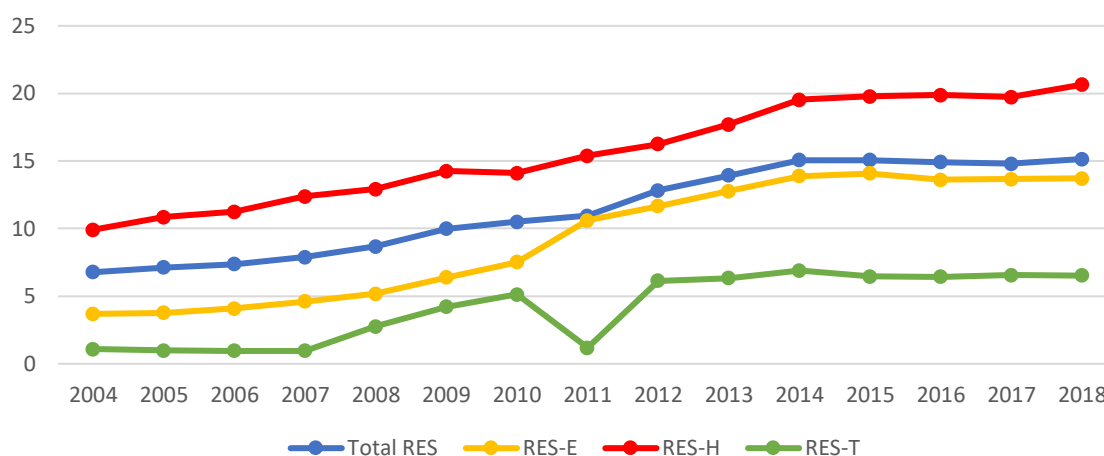
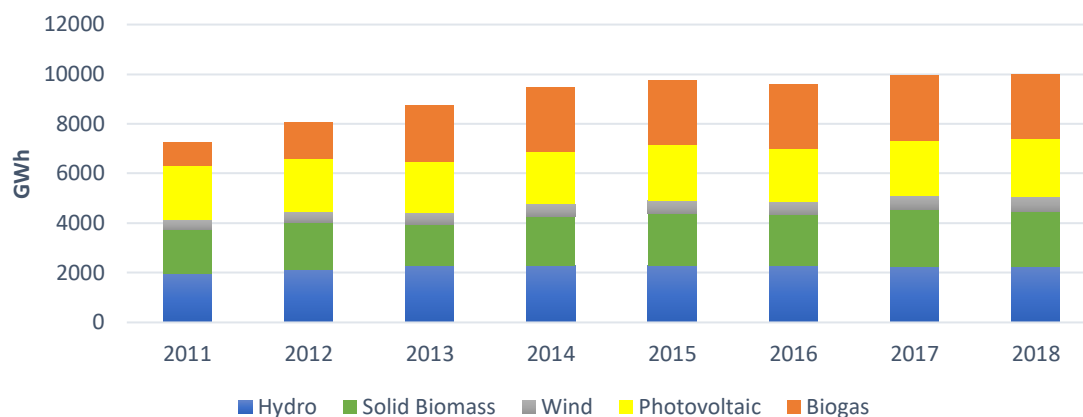


Table 4 Overall RES share by sector in Czechia (Ministry of Industry and Trade, 2020b)

	2017	2018	2019
RES-Heating & Cooling	19.72 %	20.63 %	22.65 %
RES-Electricity	13.65 %	13.71 %	14.05%
RES-Transport	6.62 %	6.56 %	7.83 %
Overall RES share	14.80 %	15.14 %	16.24%

³⁵ Note: There was a different methodology for RES-T in 2011 for counting sustainability criteria.

Figure 8 Gross power generation from RES in Czechia (Ministry of Industry and Trade, 2019)



The figures show that the development of the use of RES for electricity production has been stagnant since 2013. This is caused on the one hand by a significant change in the amount of support for individual types of RES and on the other hand by the exclusion of certain types of RES from support (e.g., photovoltaic power plants). By the Act 165/2012 Coll., the method and amount of support were significantly changed, although the support system based on FIT and FIP was maintained. For the new sources put into operation from 2013, only a simple return of 15 years is guaranteed. This leads to a significant reduction in the internal rate of return (IRR) of the projects to about 3.5% compared to the previous about 6.3% (Králík, 2018).

According to its NECP, Czechia is required to achieve a national target of 22% share in RES gross final consumption in order to contribute to the EU's goals of achieving a 32% share by 2030 (Ministry of Industry and Trade, 2019). Table 5 shows how the RES share is expected to develop over the next decade.

Table 5 Development of RES share in gross final consumption by sector (Ministry of Industry and Trade, 2019)

RES share in consumption	2016	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Electricity	13.6%	13.4%	13.8%	14.1%	14.5%	14.8%	15.2%	15.5%	15.7%	16.1%	16.4%	16.9%
Heating and cooling	19.9%	20.7%	22.3%	23.1%	24.2%	25.0%	25.9%	26.8%	27.7%	28.7%	29.6%	30.7%
Transport	6.4%	8.8%	7.8%	8.1%	8.6%	9.0%	9.5%	10.2%	11.2%	12.1%	13.1%	14.0%
Total	14.9%	15.6%	16.5%	17.0%	17.7%	18.2%	18.7%	19.3%	19.9%	20.6%	21.2%	22.0%

The Czech NECP in the field of development of RES for electricity generation expects a 2.6-fold increase in installed capacity in wind power plants (from 370 MW to 970 MW) and a 1.9-fold growth of photovoltaic power plants (from 2,082 MW to 3,975 MW) by 2030. The other types of RES are expected to stagnate, with the exception of the use of biodegradable waste; there is an increase of about 3 times, but the share of this source in the overall RES mix is rather small (only 154 MW in 2030).

The main reasons for this situation are: 1) almost full utilization potential at hydropower plants, 2) only very limited possibilities for the use of geothermal energy, 3) biogas plants are expected to transform part of them into biomethane stations and existing support for heat use, 4) the use of biomass is primarily expected for the production and supply of heat, biomass in a number of district heating (DH) systems will serve as a substitute for domestic brown coal. In the case of photovoltaics, the substantial development of smaller installations on the roofs and facades of residential and non-residential buildings is expected (Valentová et al., 2019b).

In the case of the use of RES for the production and supply of heat in the horizon until 2030, solid biomass will play an important role. It is expected to grow by about 27% (to a value of about 129 PJ). Solid biomass will serve as a substitute for a part of domestic brown coal, which is still used by app. three hundred thousand households for heating and is also used as fuel for a cogeneration station supplying heat to district heating systems. The contribution of heat pumps is expected to double (by about 6 PJ until 2030). They will mainly replace part of the decentralized heating based on domestic brown coal. The increase in the use of heat from biogas plants by about 6 PJ (to 13.3 PJ) is also significant. This is an effort to significantly increase the EE of currently operated biogas plants in which the heat generated in the cogeneration unit is used only to a small extent.

The policy framework in Czechia is presented in Act No 165/2012 on supported energy sources. This framework is guided by EU legislation through the RES Directive³⁶. In this framework lies the policy measures for support schemes of RES. Table 6 shows existing policy measures for supporting RES in Czechia.

Operational support in the electricity sector (RES-E) comes in the form of either a feed-in-tariff (FIT) or feed-in-premium (FIP) taking the form of so-called green bonus (European Commission, 2016). The FIT is a purchase price which is the only price the producer is entitled to regardless of the current market price. The purchase price varies based on the date when the plant was commissioned and the source of energy being used³⁷. It solely applies to RES of up to and incl. 100 kW excluding hydro power plants with a limit set to 10 MW.

FIP is a bonus (so called green bonus) that operators of RES power plants receive on top of the regular market price of electricity. The green bonus is provided in an annual or hourly mode. Operators of plants with an installed capacity of less than 100 kW and operators of small hydropower plants with an output of up to 10 MM have the right to decide at the beginning of the year on the form of support - FIP or FIT. Annual green bonus is available for RES power plants with installed capacity below 100 kW (and for plants using biologically degradable part of municipal waste and also for plants combusting mixture of renewable and non-renewable fuel), all others are eligible for hourly green bonus. Green bonus is also available for the electricity production based on RES consumed for own purposes except technological own consumption of Res power plants). The electricity market price is paid to

³⁶ Directive (EU) 2018/2001 on the promotion of the use of energy from renewable sources

³⁷ <http://www.res-legal.eu/search-by-country/czech-republic/single/s/res-e/t/promotion/aid/feed-in-tariff-act-on-the-promotion-of-the-use-of-res/lastp/119/>

the producer by the buying electricity trader while the FIP and FIT are paid by the market operator (OTE).

As far the FIP is concerned, a RES producer receives payment from the mandatory purchaser which could be the state electricity trader and the payment itself is the difference between the tariff price and the market price of the (European Commission, 2018b) electricity which is handled by the electricity market operator. FIPs are paid for the producer's own consumption and to producers with capacity over above mentioned limit in addition to the market price they receive from the sold generated electricity (European Commission, 2018b). The electricity market price is paid to the producer by the buying electricity trader while the FIP is paid by the market operator.

The motivation for investors in electricity generation on the basis of RES was significantly reduced by changing the methodology of setting the amount of FIP and FIT according to Act 165/2012, which entered into force on 1 January 2013. Another step de facto stopping the further development of the use of RES for electricity generation was the adoption of an amendment to Act 165/2012 in the autumn of 2013. Therefore, since January 2014, the support in the form of FIT and FIP for new RES plants generating electricity has not been provided anymore. The only exemption is small hydro power plants with an installed capacity up to 10 MW and ongoing projects using biomass, wind and geothermal energy. Semi-finished and yet unfinished projects have to meet certain conditions (i.e., installed capacity, granting the state authorisation for the construction or planning proceedings, and the date of commissioning) set by the transitional provisions of the Act No. 165/2012 Coll. on supported energy sources.³⁸

Additional forms of support come from subsidy programmes as well as tax exemptions. Investment grants are funded from state programmes such as the New Green Savings (financed through the EU ETS) and operational programmes such as the Operational Programme Enterprise & Innovation for Competitiveness (OP EIC) and Operational Programme Environment (OP E), co-financed by the EU structural funds such as the ERDF and Cohesion Fund. Tax exemptions include exemptions on electricity generated from RES and exemptions on land being where RES plants are located.

³⁸ The main policies that trigger investment in the renewable energy supply sector until 2013 were FITs and FIPs. Their setting, however, resulted in a steep RES-E capacity increase between 2006 and 2013 (cf. Figure 7) and a significant burden to the state budget (Králík, 2018). The sharp increase in support for RES for electricity generation was mainly due to the so-called PV boom in 2009-2010. In these years, there was a sharp decrease in the prices of PV components and the Czech Republic was not able to adequately respond to this decline by changing the legislation to support RES. Purchase prices for PV power plants were thus inadequately high, which led, among other things, to a sharp increase in the amount of support for RES, which currently reaches about CZK 43 billion annually (OTE, n.d.). As a result of such development, the public image of PV in particular, but also all RES in general, has suffered severely.

Moreover, due to the above-mentioned RES operational support's abolishment, investment in RES has dropped, with investment figures in 2017 reaching only CZK 2.5 billion, a value which was significantly lower than levels up to 2013 (Valentová et al., 2019b).

Table 6 RES Support Mechanisms in Czechia (Valach, 2019; Ministerstvo průmyslu a obchodu, 2020)^{39, 40}

	Feed-in tariff	Feed-in premium	Quota obligation	Investment subsidy	Tax exemption ⁴¹
RES-E					
Wind	X	X			X
PV	X	X		X	X
Hydro	X	X		X	X
Geothermal	X	X			
Solid biomass	X	X		X	X
Biogas	X	X		X	X
RES-H/C					
Solar thermal				X	X
Geothermal				X	X
Biomass				X	X
Biogas				X	X
Small scale installations*				X	X
Other				X	X
RES-T					
Bio gasoline			X		X
Biodiesel			X		X

*heat pumps, biomass boilers.

Note: Currently tax exemption includes only real estate tax exemption.

Operational support in the heating and cooling sector (RES-H&C) comes mainly in the form of an obligation to purchase heat from RES producers and connecting the RES heat generation to the distribution system (*European Commission, 2018b*). The operating support for heat using biomass combustion is determined from the difference of fuel costs between RES and conventional sources. Investment support comes from both state and operational programmes in the heat sector. These programmes are funded from the national budget as well as EU funds such as the ERDF and cohesion funds. Activities that are funded from these programmes include construction and reconstruction of combined electricity and heat plants (CHP) as well as generating heat from biogas and biomass plants (*European Commission, 2018b*). Additional support comes from real estate tax exemptions in which operators of RES-H plants are exempt from paying property taxes for the plants (Valach, 2019).

³⁹ The availability of support for a given type of RES for electricity production depends on the year in which the source was put into operation.

⁴⁰ For RES support overview and comparison between countries please see also <http://www.res-legal.eu/> and <http://www.res-legal.eu/compare-support-schemes/>

⁴¹ Until the end of 2010, the exemption of electricity production on the basis of RES from income tax was valid for a period of 5 + 1 years (in the year of commissioning and in the following 5 years). In 2016, the exemption of electricity generation based on RES from the payment of electricity tax was abolished.

The main support in the transport sector (RES-T) comes in the form of a quota system. Companies that import or produce petrol or diesel are obligated to ensure that biofuels make up part of their yearly fuel sales (Valach, 2019). The minimum volume of biofuels used in petrol must be 4.1% in petrol and 6% in diesel. Fuel suppliers receive support mainly from consumers through adding a surcharge to their fuel price. Additional support comes in the form of tax exemptions for consuming pure biofuels and biofuel content used in mixed fuels (Valach, 2019).

Additional policies come in the form of indirect support such as reducing administrative burden, guarantees of origin, etc. Table 7 shows current forms of indirect support promoting RES in Czechia.

Table 7 Czech RES indirect support (Ministerstvo průmyslu a obchodu, 2020)

Policy	Overview
Reduction of administrative requirement	Reducing administrative requirements for connection and operation of small sources up to 10 kW (no license needed).
Mandatory assessment	Mandatory assessment of the installation of alternative systems as part of compliance with the requirements on energy performance of buildings.
Guarantees of origin of energy	Issue of guarantees of origin.
Overview of efficient heat supply systems	Overview of efficient heat supply systems pursuant to Section 25(5) of Act No 165/2012, on supported energy sources and amending certain acts.
Spatial planning	Spatial planning of RES plants.

The currently discussed amendment to Act 165/2012 Coll. proposes the preparation of tools and measures with appropriate forms of support for developing new RES sources as well as the maintenance of plants currently in operation for the period 2021-2030 (Ministry of Industry and Trade, 2019). Such measures from this act include:

- replacing feed-in-tariffs with hourly green bonuses (FIPs) on sources up to 1 MW.
- supporting new biogas, biomass, and geothermal plants to generate heat through annual green bonuses.
- maintaining heat and electricity plants in order for new sources to develop through hourly or annual green bonuses.
- introducing support through competitive auctions for sources above 1 MW.
- promoting biomethane in order to achieve RES targets in transport.

Note: In the time of writing of the report, an amendment to Act 165/2012 Coll. on supported energy sources was under discussion in the Parliament. The Government of the Czech

Republic approved a draft amendment to the Act in April 2020. The amendment includes, among other things, the definition of a new system of support for RES after 2020, including the introduction of auction mechanisms.

4.2.2 Existing financing sources and structures

The private sector is the key actor to renewable energy supply development. It uses the operational form of support. Public support programmes also trigger most investment in the residential sector.

Based on the results of the climate and energy investment mapping (Valentová et al., 2019b), the private sector invested CZK 2.4 billion (EUR 91 million), which represented 97 % of the total climate-specific investment identified in 2017 in the **renewable energy supply and infrastructure sector**. Public sources were used mainly for investment in the expansion of the transmission grid and came from EU funds.

In the private sector, the only investors were corporate enterprises. It is important to note that these investment flows reflect the actual investment in capital assets and they do not reflect FITs or green bonuses (FIPs) that are a form of operational support (conversely to investment support).

The largest share of investment for the renewable energy supply and infrastructure sector was assisted by the capital market. In particular, commercial banks played a major role, providing up to 80 % of total project costs in the form of loans⁴².

Due to an established (operational) system of renewable energy support with FITs and FIPs, there is limited direct investment support for these technologies from public financial intermediaries. Thus, in 2017, the MPO provided CZK 71.8 million (EUR 2.7 million) in the form of grants through its OP EIC, financed by the ERDF.

The main instrument for financing renewable energy development in 2017 were commercial loans (nearly 70 % of the total investment). Furthermore, 27 % of the investment was financed through private equity and 3 % through public grants. The public grants (financed from the EU Funds in the financial framework 2014-2020) only started to be disbursed in 2017, but are expected to play an increasing role in the later years. The investment should otherwise be triggered by the existence of the system of FITs and FIPs, which were the main instrument to support renewable energy technologies (Valentová et al., 2019b).

In the **residential sector**, the main public support instrument is the New Green Savings Programme and the Boiler Replacement Programme. In the New Green Savings Programme in 2017, over 40 % of the subsidized technology projects were solar thermal collectors, 27 % were photovoltaics, and 24 % heat pumps. The rest were biomass boilers and gas condensing boilers (Melč, 2019). The mean investment grant ranged from 20 % of the eligible costs (gas condensing boilers) to 45 % for biomass boilers. The PV installations were

⁴² Models used by Energy Regulatory Office to set up FIT and FIP values are assuming the share of equity capital between 20 and 30%.

subsidized by 50 % of the eligible costs⁴³. The rest of the investment is typically co-financed through own equity. Only a fraction of the home-owners would take a commercial loan to co-finance the project (Melč, 2019).

The Boiler Replacement Programme is funded by the OP E and administered by the regional authorities. In 2017, over 23,000 boilers were replaced in the programme⁴⁴. Of this, 35 % were heat pumps and 16 % were biomass boilers. The rest were either gas condensing boilers or coal boilers⁴⁵. The average investment grant covered 80 % of the eligible costs.

As of February 2020, approx. CZK 11 billion (EUR 417 million) was paid for the replacement of boilers, compared to the planned approx. CZK 9 billion (EUR 341 million). According to an estimate by the Ministry of the Environment, approx. 300,000 pieces of non-compliant boilers used by households for heating remain to be replaced. The subsidy program was originally to end in 2020, the Czech Government is negotiating to continue financing the boiler exchange programme with the EU⁴⁶.

In **the municipal sector**, the typical RES project that the respondents considered would be the photovoltaics on the roof of the buildings owned by the municipality.

For instance, in the city of Prostějov, a 30kWp photovoltaic plant was installed on a roof of the sport facility. In the end, the project was not supported by any public programme, and was financed solely through own funds and loans. The payback of the installation is 8 years.

Such projects have been rather scarce so far due to the unsuitable state of the buildings (the statics of the buildings and the roof), the fact that most buildings in the ownership of the municipality are educational buildings which are vacant in summer, and the disapproval from the preservationists.

4.2.3 Barriers to uptake of renewable energy projects

Unstable regulatory and legal framework hinder development of RES which still suffer from the bad reputation gained in the “PV boom”. Administrative burden including building permits further lower the absorption capacity of RES projects.

When selecting financial instruments to support RES investments, it is best to choose those instruments that contribute the most to mobilizing private sources. Additionally, public funds need to target barriers constraining private investments in order to make the investments more efficient (Hussain, 2013). Thus, identifying barriers and reducing or even removing them is crucial in order to attract more private funding.

Removing barriers to investing in RES projects and reducing the risks associated with them plays a key role in activating private investment. There is a logical line between reducing

⁴³ <https://www.novazelenausporam.cz/nabidka-dotaci/rodinne-domy-zdroje-energie/>

⁴⁴ The data were gathered for 11 of the 13 eligible regions (Valentová et al., 2019b)

⁴⁵ The support to coal-fired boilers was discontinued since.

⁴⁶ <https://www.elektrina.cz/kotlikova-dotace-2020-pokracovani>

barriers to the implementation of projects for the use of RES and the associated risks for the implementation of projects and the price of capital⁴⁷.

The removal of barriers (administrative, legislative, etc.) thus not only creates conditions for the implementation of projects for the use of RES, but also reduces the cost of their use, including the cost of support.

With regards to Czechia specifically, current RES policies do not seem to trigger large private investment in RES projects. Similarly to energy efficiency in the buildings sector, the series of interviews and the discussion webinar identified the main specific barriers to RES projects development in Czechia, which are summarized in the following section.

Lack of prioritisation

Most of the participants in the interviews believe that the state itself can be seen as a major barrier to the promotion of RES projects. The policy framework in place does not clearly favour RES over other (fossil fuel) energy sources. According to one of the respondents, the support and development of RES is the responsibility of the state. The approach must be changed to fully incorporate RES into the energy mix.

The lack of prioritisation is then translated in the strategic documents. Even though Czechia has set the targets, they lack ambitiousness and confidence that they are not only a formality. The RES target for 2030 is among the lowest in the EU and has been constantly criticised by major Czech RES representatives (European Commission, 2019c)⁴⁸. According to our respondents, the climate crisis has not been visible so far and therefore also the

⁴⁷ Improving the conditions for the implementation of RES-based projects and the associated reduction of risks leads to a reduction in the weighted cost of capital (WACC), which plays a key role both in investor decision-making and in setting the amount of support. RES-based electricity plants (especially for wind power plants, photovoltaic power plants, hydroelectric power plants, but also for biomethane production) are characterized by a high share of one-off investment costs in the total present value of all production costs over the lifetime. The cost of capital, both equity (including capital invested by other direct private investors) and debt (usually in the form of bank loans), reflects the risks of projects. With increasing risk, both direct investors and providers of loan capital require compensation for higher risks in the form of risk premiums. This then leads to higher required values of FIT, FIP (or other forms of support) - otherwise investors would not have an economic incentive to implement projects - and thus to higher costs related to the development of RES. In addition to reducing the amount of risk, a reduction in the value of the WACC can also be achieved by seeking other sources of financing in the form of loans (e.g., from banking or investment entities from the USA, Asia or from EIB sources). However, exchange rate risks also play a role here, the Czech currency is still characterized by relatively significant exchange rate fluctuations. This increases exchange rate risks and, conversely, reduces the profitability of funding sources from other markets. Also more in http://aures2project.eu/wp-content/uploads/2020/12/eclareon_PT-EU.pdf.

⁴⁸ We are aware though that it is not possible to mechanically compare target values for individual states. Each state has different conditions for the use of RES and a different starting value. The decisive factor is the dynamics of development rather than the absolute value of the goal. There remain concerns about the feasibility of meeting the target in the field of RES, especially in the field of electricity generation and transport. This is due, among other things, to unfavourable conditions especially for wind farms leading to strongly negative impact on the economy of electricity generation. With the exception of PV, other RES also have limited potential for further development. In addition, the Energy Efficiency First principle should be fully utilized, i.e., increasing energy efficiency and energy savings to their maximum feasible potential, and only then look at how to cover the “remaining” energy consumption.

societal response has been rather vague. The overall political and social debate on the climate crisis has been largely lacking.

Similarly, at the regional and municipal levels, RES often lacks the needed prioritisation over other matters, such as transport infrastructure, housing, healthcare, education. Anecdotally, this was also reflected in the regional elections held in October 2020. RES issues were not communicated as priority issues for key political groups in any of the 13 electoral regions. One of the respondents of our interviews observed that while there was a general will by the municipal government to develop RES measures (roof top PV), it was not translated in the project development due to lack of motivation from various departments at the municipal level.

Instable policy framework and lack of strategic leadership

Many of the respondents of our survey stated that one of the major barriers to RES development is the lack of **stable policy environment**. The main restrictive measures, some of them retroactive, (e.g., abolishment of RES tax holidays, so-called solar tax introduction, recycling fee for PV panels, risk of the return of investment control, etc.) in the regulatory framework have started following the PV boom, and the whole sector has not fully recovered, yet (Králík, 2018). As one of the respondents noted, it has become generally much cheaper to invest in RES, but fossil fuel subsidies still persist in the current framework (European Commission, 2020h).

Recently, strategic changes in the whole energy sector have started. There has been a massive change in the heating industry in the sense of abandoning the use of domestic brown coal. According to the representatives of Czech District Heating association, the key reason is the rising price of emission allowances and the high pressure on rising heat prices. The heat from the district heating systems then becomes uncompetitive. Current estimates for the transformation of the district heating sector assume that the transformation of a substantial part of district heating systems based on the use of domestic brown coal will be completed by 2030. The remaining district heating systems will be transformed by 2035. At the same time, in 2019, the so-called "Coal Commission" established by the Czech government began its activities (Ministry of Industry and Trade, n.d.). The aim of this commission is to prepare scenarios for the decline of coal use.

Organisational issues

One of the significant barriers to the development of RES, whether in the case of municipalities or companies, is that a team is not usually created in these entities that would **systematically** and exclusively take care of the **development of RES**. There is thus a lack of a systematic search for opportunities for the use of RES; in the case of the installation of technologies for the use of RES, there is usually no systematic evaluation and monitoring.

Changes in ownership remain a specific problem that limits the installation of small PV systems on the roofs of apartment buildings. Since the mid-1990s, there has been a massive privatization of the state-owned and municipal housing stock into housing cooperatives or private owners/condominiums. This fundamentally **limits the possibilities of implementing municipal policy** in the installation of PV systems. Additionally, municipalities are currently

busy with the problems of transforming heating systems rather than the development strategy of RES.

Lack of social acceptance

Social acceptance of renewables is lacking in Czechia and it is further evident based on the responses given from the interviews. The **reputation of RES** continues to be negatively affected by the PV “boom” in 2009-2010 as a result of a poorly structured subsidy scheme (Valentová, 2020). As stated in one of the responses, there is a “bad reputation of solar projects and how they were executed in 2009-2010 with a poorly constructed incentive structure. People think that the so-called “solar barons” stole money from the government. It has an overhang on other renewables. The issue of RES has become a very sensitive political and economic issue and led to a reduction in the positive perception of RES by both politicians and a significant part of the public. Even though the recent public polls show that the public acceptance of renewables has been growing⁴⁹. We may speculate though this concerns mainly small PV on roofs and biomass, rather than other forms of RES, such as wind and hydro power.

Additionally, in many cases, there is significant resistance at the local level against projects using RES. This applies in particular to projects for the use of wind energy. Many local communities as well as regional structures are against these projects, i.e. typical NIMBY problem (Kristen, 2020).

Administrative burden

Administrative complexity is one of the other obstacles to the development of RES. Both in terms of larger, primarily business projects, and in terms of small decentralized projects. The **permitting procedure for constructions** in the Czech Republic, not only in the area of the use of RES, is very complicated; in fact, one of the most complicated among developed countries (Ministry of Regional Development, 2020). The legislation regulating the construction procedure is currently being re-finalized with the aim of significantly simplifying it. However, the adoption of new legislation is complicated by a number of diverse interests. Rather, there is a problem with the length of administrative permits in our country, one of the reasons is the very complicated building law, which is also currently undergoing significant recodification in the time of writing of the report⁵⁰. This generally increases the risks, but for all investors in all types of construction.

This can be documented, for example, on the average lengths of construction proceedings. According to the Doing Business ranking, the Czech Republic ranks 156th out of 190 countries in the length of the permitting process. According to the currently valid

⁴⁹ Cf. https://cvvm.soc.cas.cz/media/com_form2content/documents/c2/a4398/f9/oe170818a.pdf and https://www.median.eu/en/wp-content/uploads/2020/04/MEDIAN_energeticka_koncepcie_tezba_uhli_200210.pdf

⁵⁰ The so-called the second reading of the law is expected at the beginning of March 2021, and the end of May the third final reading and sending to the Senate.
<https://www.mmr.cz/cs/microsites/nsz/aktuality/mmr-novy-stavebni-zakon-potrebuje-me-co-nejdrive-ne>

construction legislation, 714 general building authorities, 606 special building authorities, 4 military building authorities, 9 mining and another 4 special (ministries) permit. The new legislation should unify the requirements so far fragmented among a number of legislative norms, simplify the process itself, set clear deadlines for individual steps and, in particular, shorten the permitting procedure for constructions from the current average of 5.4 years to about 1 year⁵¹.

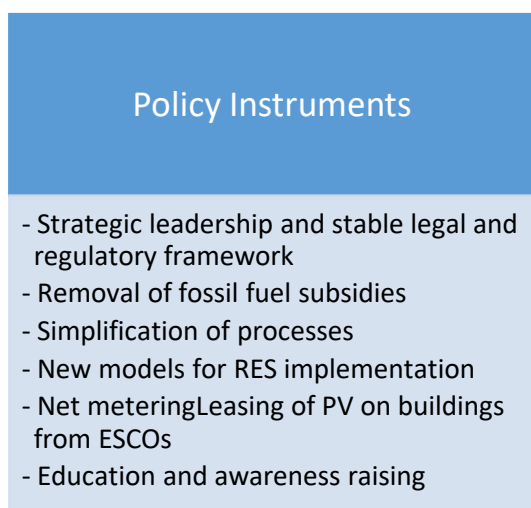
4.2.4 De-risking policy and financing instruments to raise capital in the renewable energy sector

The single most important prerequisite for RES development is the stable policies and regulatory frameworks. This then needs to be accompanied by new models of RES financing and decreasing administrative burden.

Referring to the results of the interviews and discussion webinar with the expert panel (Valentová, 2020), the following policies and financial instruments in Figure 9 can be seen as a catalyst to de-risk investments and eliminate barriers in RES projects.

The interviewees mostly agreed that in the case of RES the market is generally well developed. Rather, the stable policy environment in Czechia (and in the whole region) would be highly needed in order to decrease the risk for investors.

Figure 9 De-risking policies and financial instruments identified by interviewees



Narrative

Similarly to energy efficiency, clear narrative and messages need to be communicated to the wide public to raise awareness on the RES and their multiple impacts. Even though climate has not been perceived among major issues among Czech society (Ipsos, 2020), the

⁵¹ <https://cesky.radio.cz/ve-vyrizeni-stavebniho-povoleni-cr-klesla-na-157-misto-na-svete-8116829>

specific manifestation of climate change, such as drought and deforestation, may finally serve as the tipping points. The current expectations thus form the future development (Zenghelis, 2019).

Renewable energy like washing hands

One of the respondents made a suitable comparison by noting that the situation was similar to “150 years ago, when someone proposed hygienic measures (e.g. washing hands). Most people would be reluctant to change as they have been “doing it this way for hundreds of years). However, as soon as they would accept and adopt the new paradigm, the results would be very fast and significant (e.g. lower mortality).

Once the society adopts the measures, they will become an inherent part and contradicting the measures and acting otherwise would feel rather strange (washing hands like producing electricity and heat from renewable energy sources).

Strategic leadership and stabilize the legal and regulatory environment

A key and single most important aspect for the further development of RES is, above all, the adoption of a consistent and long-term scenario of abandoning the use of domestic coal, which would define the framework for the transformation of the Czech energy sector. Stable, transparent, and sufficiently motivating conditions are prerequisites for such transformation.

Given the expected role of RES in the low-carbon transition, these conditions must include in particular:

- Solution of the renewal of the current production capacity in RES (for both electricity and heat production), i.e. support to the existing RES capacity reaching the end of its lifetime.
- Creation of a stable regulatory framework for investments both in larger sources using RES and for small decentralized installations.
- The development of small decentralized RES installations for electricity generation will require a fundamental change in the tariff system for customers at the low voltage level. The tariff system applied in Czechia does not reflect the current and, above all, expected development of decentralized production based on RES, and lacks motivational elements for rational conversation between both investors and electricity consumers.
- Legislative anchoring of new types of entities in the electricity market, such as Energy Communities, Aggregators and entities providing storage services⁵²

⁵² The currently valid Energy Act does not reflect the activity of energy storage. Both the amendment to the Act on Supported Energy Sources and the amendment to the Energy Act are currently being discussed in the Parliament. As of September 2020, the issue of accumulation should be included in the amendment to the law. The factual intention proposes to divide energy storage into two sub-activities - electricity storage and energy conversion (in devices called Power-to-X). Clear conditions

- Creation of legislative conditions for financing investments in the use of RES, which would be valid for a long time both for investors in small decentralized installations and for investors in medium and large-scale sources using RES for both electricity and heat production.
- Enhancing new financing streams from private companies through Power Purchase Agreements and other means.
- Awareness to international obligations that force fossil industries to green their portfolio and output.

At the same time, a clear state commitment plays a key role in the strategy for the development of RES and, above all, in the communication of this strategy to the public.

Decrease administrative burden

Czechia has demonstrated ways to help reduce barriers for the period 2021-2030 by its willingness to gain more access to EU funding as well as expanding its direct and indirect support of RES projects. Specific measures to reduce barriers include financial support, which according to the NECP is divided into three groups (Ministry of Industry and Trade, 2019):

- mandatory installation of RES facilities to meet energy performance of buildings which will be funded entirely by building owners,
- investment support from EU funds,
- expanding operating support for certain types of RES whose production cost is greater than the market price and investment support cannot ensure their development.

Other forms of support to reduce barriers include simplifying administrative burdens related to issuing building and land-use permits (Ministry of Industry and Trade, 2019). This includes creating a single permitting decision for both permit types and that it covers all administrative bodies concerned with a project. Also, building authorities will be able to handle and submit all documents related to the permit electronically through a new IT system, thus increasing the efficiency of public administration.

Net metering

According to the Czech National Action Plan on Smart Grids (Ministry of Industry and Trade, 2016), in the period 2020–2024, 30% of consumption points in low-voltage networks in Czechia should be installed with intelligent electricity meters. By the end of 2029, these should be implemented at all consumption points.

The so-called smart metering (Advanced Metering Management, AMM) will enable the further development of the electricity industry towards greater integration of end

for the performance of these activities will be set for individual entities in the energy market (SP CR, 2020).

consumers into the energy market. AMM allows not only to continuously monitor consumption (and thus obtain information for changes in consumer behaviour), but to introduce new incentives for consumers such as dynamic tariffs (leading to motivation of consumers to use electricity at times of sufficient and therefore lower prices) or so-called demand response, when the consumer at the request of the system is able to reduce his electricity consumption). At the same time, AMM will enable the implementation of new tariffs, where the end user will have an incentive to reduce its electricity input, either in the design phase of the house and its equipment with appliances, or in the operation phase. At the same time, the AMM will enable the development of intelligent charging of electric cars, again with regard to economic aspects and the needs of the system. Last but not least, AMM will enable the further development of small PV installations.

New models of RES implementation

In addition, diverse finance schemes are needed as well as increased aid from financial institutions in financing RES. However, the form of aid needs to be different with respect to the different technologies and forms of RES (Valentová, 2020). It is also important to combine financial instruments used to support RES and EE together.

In the same time, new models of RES development need to be explored and promoted. Good example here is installation of PV panels on rented roofs. This makes it possible to achieve a solution that is advantageous both for the owner of the roof (who either may not have enough funds for the implementation of PV or this investment is not his priority interest) and for the investor who does not have a suitable object available. In particular, this solution is offered for the use of buildings in the hands of municipalities. A similar example of a new approach to investment in RES can be the participation of municipalities, resp. private individuals to invest in the use of RES on site. Participation of the municipality, resp. citizens could thus significantly improve public access to these types of projects, which would also increase the social acceptance.

Additional forms of support will be the encouragement of RES communities through the establishment of a policy framework and financial support for energy community projects (Ministry of Industry and Trade, 2019).

5 Conclusions and policy recommendations

The climate neutrality transition brings about the need for increased investment in GHG mitigation measures. Czechia has set out moderately ambitious targets in energy efficiency and unambitious targets in renewable energy sources for 2030. Yet, in Czechia, the current investment flows namely in buildings and renewable energy sectors remain substantially lower than are the levels of investment needed to reach the 2030 climate and energy targets. Specifically, in the buildings sector the level of investment would have to roughly double in order to reach the 2030 targets, in case of renewable energy supply the investment will have to be approximately six times higher as compared to the 2017 levels.

The report provided an assessment of the existing financial structures, instruments, and sources for climate and energy investment in the two sectors.

The building sector represents roughly a third of the total final energy consumption in Czechia. Energy savings contributed significantly to containing the energy consumption in the sector in the past decade. However, the unitary heat consumption in residential sector remains one of the highest in the EU among countries with similar climatic conditions. Also, the efforts to decarbonise the sector remain modest, with remaining high share of fossil fuel heating. The key source of financing remains the private sector (households, enterprises). The existing support schemes are rarely used by residential sector (less than 10% of renovations of single-family houses), but are much more prevalent in the public sector (three quarters of renovations of municipal buildings were co-financed by a grant). Energy performance contracting as a complementary instrument in building renovations has been growing steadily, but the potential remains largely unexploited.

The RES share on the gross final energy consumption has been growing slowly in the past decade from 10 % in 2010 to 16 % in 2019. However, it has remained nearly unchanged in the last 5 years. Czech NECP expects the share to grow to 22 % in 2030, which has been criticized by both expert public and the European Commission. The main support mechanisms for RES supply in Czechia is the operational support in the form of FIT and FIP, quotas in transport, and purchase obligation of heating from RES. However, its setting and general legal framework did not trigger the substantial investment needed. In addition, there are various investment support schemes specifically for RES integrated in buildings, residential and public.

The following barriers have been identified based on the in-depth interviews and a thorough literature review (Figure 10). We accompany each barrier with a set of recommendations to improve the specific challenge (Table 8).

Figure 10 Main barriers to EE and RES development in Czechia

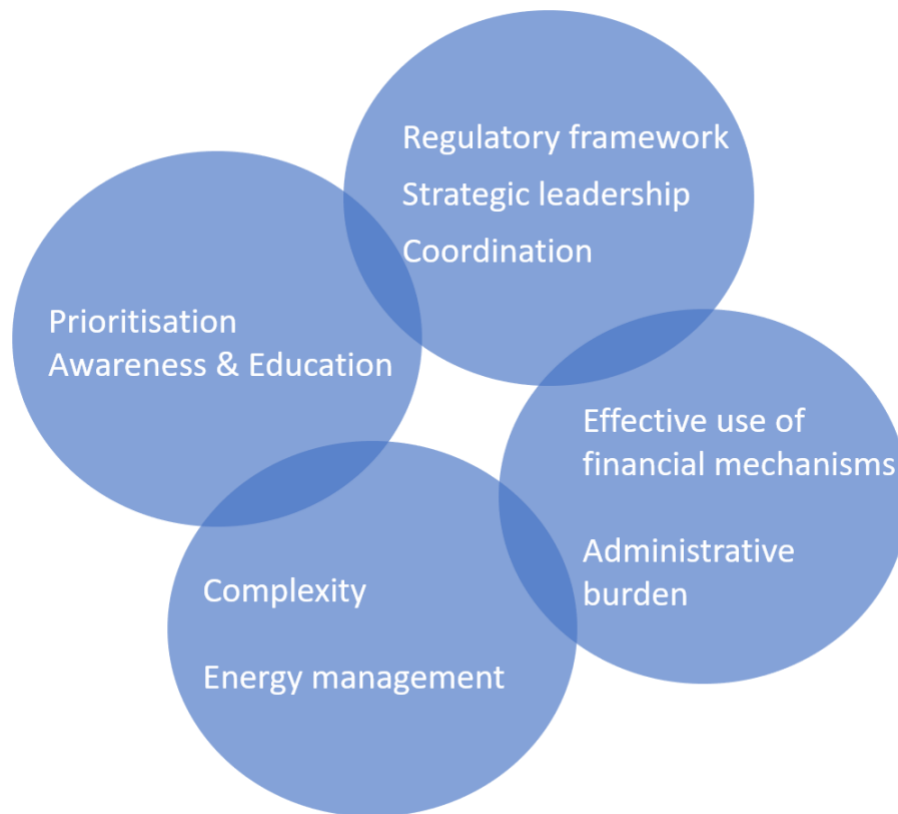


Table 8 Summary of the key barriers and recommendations

	Barrier	Summary	Recommendation
1	Lacking prioritisation of EE and RES	<p>Energy efficiency and renewables not widely acknowledged as significant.</p> <p>Lack of clear prioritisation among policy makers, enterprises, households.</p>	<p>Communication campaigns at national level to send a clear message that wasting energy is not acceptable. Good quality, complex, deep renovation projects should be widely communicated, as well as simple, behavioural, low-cost solutions⁵³.</p> <p>Create a positive, motivating narrative for energy savings and renewable energy together with the overall vision of where we want to get in 10, 20, 30 years' time and how energy efficiency and RES development fits in this vision.</p> <p>Even though the benefit of energy cost savings prevails as the decisive factor, the other, multiple impacts should also be highlighted and promoted. They can serve as the tipping point.</p> <p>Encourage sharing good practice examples at regional and local level.</p>
2	Low strategic leadership and coordination	<p>Unclear strategic vision and subsequent coordination of policy mechanisms.</p> <p>Dispersed, fragmented institutional framework and insufficient capacities.</p>	<p>Support development of regional and local strategic documents and action plans, which ensure continuity and points of reference, especially in the public sector.</p> <p>The NECP should be used to its full potential as the main guiding document to navigate the low-carbon transition pathway. Monitoring the progress of the main targets and indicators needs to be put fully in place and guide the ongoing adaptations of the</p>

⁵³ Tips on easy energy saving measures at e.g. <http://www.uspornespotrebice.cz/private> (in Czech) and <https://energysavingtrust.org.uk/energy-saving-budget/>

			<p>key indicators (which will need to be strengthened along the way to align with the climate neutrality goal) and the policy framework.</p> <p>Clear responsibility and related capacity should be clearly defined. The energy and climate are cross-sectoral issues. The more the coordination and interaction of working processes between various resorts needs to be set up and followed.⁵⁴</p> <p>At the regional and municipal level, the respondents called for a “carrot and stick” approach, ideally providing clear regulatory framework complemented with appropriate support mechanisms.</p>
3	Unstable legal and regulatory framework	Especially in case of RES as the most important hindering factor for RES development	<p>Stable, transparent, and sufficiently motivating conditions are is a “sine qua non” for the transformation of the Czech energy sector.</p> <p>Legislative anchoring of new types of entities in the electricity market, such as energy communities, aggregators, and entities providing storage services.</p>
4	Low public awareness and education	<p>The EE measures and their value have not been clearly communicated.</p> <p>Persisting poor reputation of RES and clear distinction over other energy sources.</p>	<p>Communication campaigns with a clear message and acknowledgement of the value of energy savings.</p> <p>Sustainability and energy literacy in curricula at all stages of the educational system.</p> <p>Showcasing and visualising the good practice examples will help engaging the target groups (citizens, municipalities, and other).</p> <p>Make use of the peer-to-peer messages and good practice sharing (especially in the municipal sector). The stakeholder engagement</p>

⁵⁴ Given the interdisciplinarity of the climate neutrality transition, e.g. establishing a high-profile, expert Climate Change Committee, (such as e.g. <https://www.theccc.org.uk/>), directly under the Office of the Government or Prime Minister, would provide the needed emphasis, together with a high-profile.

			may include dedicated platforms ⁵⁵ , workshops, and direct communication of the results (interactive info panels) at the site of the EE and RES measure.
5	Low shares of energy management	Low penetration of energy management in both public and private sectors.	<p>Financial and educational support to introduce energy management as a form of quality management.</p> <p>Continuous work on day-to-day energy demand, including behavioural factors. Specific focus should be on the low level of implementation of energy management at small and medium enterprises as well as municipalities, which tend to lack the personal and financial capacities to introduce energy management.</p> <p>Increase awareness about the necessity of proper training, monitoring and evaluation after implementation of energy efficiency measures.</p>
6	Complexity of energy efficiency projects	<p>Energy saving projects are complex. The planning and preparatory phases of the projects are crucial, while experience and capacity remain inadequate.</p> <p>Lack of skills to develop complex projects.</p> <p>Project pipeline does not exist, especially at regional and local level, and the projects are not prepared in a</p>	<p>Technical assistance to help prepare the project pipeline should be widely available. Fully using the potential of InvestEU Advisory Hub in this.</p> <p>It can take form of one-stop shops, ideally independent bodies such as regional energy agencies, which will facilitate energy efficiency and renewable energy projects and guide the project developers through the whole process.</p> <p>The various channels, including EIB technical assistance and other national sources, should be widely communicated.</p> <p>Strengthen the institutional capacities.</p>

⁵⁵ The MoIT created the webpage <http://usporysrozumem.cz/>, which could serve as the basis.

		sufficient level of quality and fully using the energy efficiency potential.	
7	Ineffective use of financing mechanisms and budgetary constraints	<p>Investment grants largely prevail in the Czech support system, at the expense of other, more efficient, financial instruments.</p> <p>Budgetary constraints may prevent development of capital intensive low-carbon projects.</p>	<p>With the new multiannual financial framework and Recovery and Resilience Facility, Czechia has to start utilising a much broader portfolio of financial instruments to increase the leverage of public finance and thus effectiveness of public spending while enhancing the low-carbon transition. The Recovery and Resilience Plans offer a basis to write a country strategy and link it to MFF sources. Support from the Structural Support Programme could accompany this step.</p> <p>Investment grants should target only very specific (sub) sectors (e.g. vulnerable households) and measures (e.g. innovative technologies),</p> <p>Alternatively, they should serve as an additional/accompanying support mechanism rather than stand alone.</p> <p>Fiscal instruments should be taken into consideration, including carbon tax and tax rebates/exemptions. For instance, tax rebates for commercial/industry sector may provide much clearer and more transparent incentive with potentially lower administrative burden.</p> <p>In the same time, any form of fiscal instruments must be accompanied by supporting instruments to compensate for potential negative distributional effects.</p> <p>New models of RES development, such as PV on rented roof and RES community projects, should be supported by appropriate legal framework.</p>

			Increased investment from the private industry (heavy industry, IT and others) into RES projects through Power Purchase Agreements as a consequence of international climate obligations should be enhanced and promoted as they will allow for effective and efficient investments in green projects.
8	Administrative burden	The administrative burden of many support programmes has grown considerably ⁵⁶ , decreasing the effectiveness of public spending and decreasing the absorption capacity of the programmes.	<p>An early thorough preparatory phase of a programme is crucial for the effectiveness of the programme.</p> <p>Stability of the institutional environment throughout the course of the programmes increases absorption capacity.</p> <p>The administrative processes need to be differentiated according to the size of projects, with simplified procedures for smaller projects.</p> <p>Verification, monitoring and evaluation has to stay in place. In some cases, it may take form of selected sample ex-post evaluation, instead of ex-ante.</p> <p>Simplification of administration with respect to issuing building and land-use permits, including creating a single permitting decision for both permit types and covering all administrative bodies concerned with a project.</p>

⁵⁶ See e.g., (Valentová et al., 2020a).

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7 Annexes

ANNEX 1: List of interviewed sector experts & financing institutions in Czechia

Type of actor	Institution	Expert Name
Policy	Ministry of Industry and Trade	Tomáš Smejkal
Policy	Ministry of Industry and Trade	Vladimír Sochor
Financial institution	Czech Moravian Guarantee and Development Bank	Ondřej Ptáček
Financial institution	Traficon Advisors, s.r.o.	Ira Saul Rubenstein
Project development	City of Žďár nad Sázavou	Michal Bačovský
Project development	City of Rožnov pod Radhoštěm	Jan Cieslar
Project development	Association of Municipal Energy Managers	Jaroslav Klusák
Project development	JRD	Jan Řežáb
Project development	HE Consulting	Arne Springorum
Project development	City of Prostějov	Kateřina Vosičková
Project development	Regional Authority of the Central Bohemian Region	NN*

Project development	Municipality representative	NN*
Other	Chamber of Renewable energy sources	Štěpán Chalupa
Other	SEVEN, The Energy Efficiency Center	Jiří Karásek
Other	International Sustainable Finance Centre	Linda Zeilina
Other	District Heating Association	NN*

* The expert(s) did not wish to be identified by name.

ANNEX 2: Questionnaire for interviews

General Questions

- 1) Does your institution acknowledge climate change/adaptation as a significant issue?
- 2) Do you think that climate change and adaptation will become less or more important for your institution in the future? Please explain.

Investment vehicles to finance Renewable Energy & Energy Efficiency Projects in Czechia

- 3) What is the key limiting factor for renewable energy & energy efficiency projects in Czechia?
- 4) What kind of financial instruments are missing to improve framework conditions for renewable energy and energy efficiency projects? Where should the project financing preferably come from (local/national/international)?
- 5) Did your institution invest in renewable energy and energy efficiency projects in Czechia over the last 2 years and/or does it plan to invest in the coming year? *(Only for project developers and financial institutions)*

If yes, please answer the following questions:

What kind of investments did you invest in?

What is the volume of your portfolio investment?

What kind of financing tools do you use? Why?

What are positive and/or negative experiences?

Only for financial institutions

Energy Efficiency	Renewable Energy
To which degree can the technical equipment (assets) be used for (additional) collateralisation?	What kind of project/clients are you looking for when financing renewable energy projects?
Does your institution consider cash flow generated through energy savings in your cash flows models and DSCR (debt-service cover ratio analysis)?	What are the three top aspects that you look at, when a client presents renewable energy projects to you?

Barriers that prevent more capital investments for Renewable Energy & Energy Efficiency Projects in Czechia

- 6) What specific barriers and risks do you see as inherent to renewable energy & energy efficiency projects in Czechia?
- 7) What are your recommendations to improve framework conditions for renewable energy & energy efficiency projects?
- 8) What institutions do you consider as most effective/capable to remove the barriers? Why?

Final Question

- 9) Whom else would you suggest contacting to get a full picture on energy efficiency and renewable energy financing in Czechia?