

# Directing the Energy Policies of CEE-4 Countries towards Climate Change Mitigation

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*Abstract: Climate change is a global challenge that requires a responsible attitude and taking concrete action not only at European, but at global level as well. A realistic approach to this phenomenon requires the cooperation of all international actors in order to identify the optimal course of action and the necessary instruments. The CEE-4 countries, as Member States of the European Union, are involved responsibly in this international effort, and must act swiftly, both to combat the causes of climate change and to mitigate the effects. In this article, we will analyze the energy policies assumed by the CEE-4 countries on their fight against climate change. Therefore, for the Czech Republic, Hungary, Poland and Romania, the constituent elements of the integrated national energy and climate change plans will be analyzed. Also, we will examine the national objectives and contributions to the achievement of the EU targets in the field of combating climate change. Given the current goals set up by the Green Deal, this paper will address the policies in the field of transport, renewable energy, energy efficiency, as well as the directions to be followed in order to achieve future targets in all analyzed CEE-4 countries.*

*Key-words: greenhouse gases (GHG) emissions, climate change, renewable energy sources (RES), policies*

*JEL Classification: Q28, Q48, Q54*

## 1. Introduction

The European Union (EU) has long aspired to be a leader in international climate change policy. Its political activities in this area, dating back to the early 1990s, have had an enormous impact both inside and outside Europe (Rayner et al., 2016). After the EU's accession to the Paris Agreement, followed by the publication of the Energy Union Strategy, the EU has taken on an important role in the fight against climate change through its five main dimensions: energy security, decarbonisation, energy efficiency, the internal energy market and research, innovation and competitiveness.

The EU is committed to lead the energy transition at global level by meeting the objectives set out in the Paris Agreement on climate change, which aim to provide clean energy throughout the European Union. Also, through the European Green Deal, the EU seeks to be climate neutral by 2050. The EU therefore wants a zero-emission greenhouse gas economy.

Each Member State was required to submit to the European Commission a draft of the national integrated energy and climate change plan for the period 2021-2030, by 31 December 2018, which sets out national targets and contributions to the achievement of the EU's climate change targets.

Pursuant to Regulation (EU) 2018/1999 on the Energy Union governance, the European Commission has assessed the integrated national energy and climate plans. The analysis covered the level of ambition of the objectives, targets and contributions aimed at collectively achieving the objectives of the European Union. In particular, have been assessed the Union's 2030 targets in the field of renewable energy and energy efficiency and the level of interconnectivity of the electricity grids to which Member States are aiming (Ministry of Energy, 2020a).

In the following section of our paper, the energy policies regarding the combating climate change for the CEE-4 countries, namely Hungary, Poland and the Czech Republic and Romania are presented and analysed.

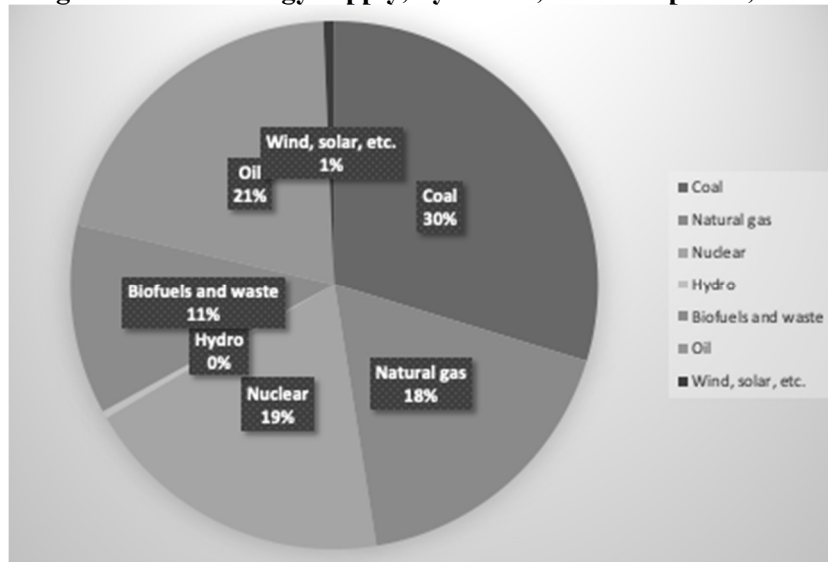
## 2. Czech Republic

The Czech Republic has registered an 18% reduction in total greenhouse gas emissions from 2000 to 2019. The largest reduction was achieved in the energy conversion sector, by 23% since 2000, while greenhouse gas emissions increased in the transport sector. The Czech Republic's climate policy is determined by the EU's Climate Framework Program, and the Czech Republic has pledged to reduce its greenhouse gas emissions by 14% by 2030 (compared to 2005). In addition, the government has set a more ambitious national target for 2030, namely an indicative target to reduce greenhouse gas emissions by 80% compared to 1990.

To achieve these goals, the Czech Republic has introduced a comprehensive protection policy that reflects these ambitions. The Czech government presented its National Energy and Climate Plans (NECP) to the European Commission at the end of 2019 (Czech Government, 2020).

Coal still accounts for half of the fuel used for domestic energy production (Figure 1), and the energy sector accounts for three quarters of national greenhouse gas emissions. In this respect, the creation of a Coal Commission to guide the coal phase-out is commendable, but the government needs to move quickly to take action on the Commission's recommendations.

**Figure 1: Total energy supply, by source, Czech Republic, 2020**



**Source:** Authors' processing, according to IEA data, 2021a (<https://www.iea.org/countries/czech-republic>)

The Czech Republic has prepared several strategic documents to guide its emission reduction policy, but they do not set emission reduction targets for specific sectors, making it difficult for the government to track progress. The government should establish sectoral emission reduction targets for the relevant sectors by 2030, supported by sectoral plans to achieve these goals.

Emissions from the transport sector in the Czech Republic are constantly increasing. Therefore, the government should further strengthen its support for decarbonisation such as electrification, increased quotas for biofuels, and the development of public transport and cycling. At the same time, current policy does not provide sufficient price incentives for decarbonisation. Low taxes and subsidies, such as the supply of cheap coal for domestic consumption, which prevent decarbonisation efforts, are also a challenge that must be addressed by the Czech authorities. Therefore, the government should consider revising energy and climate taxes to make them an effective tool for managing consumer behaviour.

Air pollution is a particular problem in the Czech Republic, mainly due to heating based on coal and firewood in the residential sector along with a relatively old car fleet dominated by diesel vehicles. Therefore, the government should do more to reduce local air pollution. Domestic consumption of coal, timber and diesel vehicles should be priority targets.

In order to speed-up emission reductions in the residential sector, the substitution of inefficient boilers that use coal for cleaner alternatives, was subsidized.

The RES in the Czech Republic is experiencing significant growth: the share of RES in the final energy consumption has increased from 11% in 2010 to 16% in 2019. The Czech government has set itself the goal of reaching the share of RES in gross final consumption of 13% by 2020, which was already exceeded in 2013.

The government expects a marked increase in the production of renewable electricity. The Czech Republic is implementing various support systems and measures to promote the development of renewable energy sources. With regard to support schemes for the period 2021-2030, the government proposes an amendment to Law no. 165/2012, which is designed to relaunch the operational support for renewable energy sources, except solar photovoltaic energy, and other sustained energy sources, such as high efficiency cogeneration.

To supporting investments in renewable energy sources, the Czech Republic intends to use various funds provided by the European Union. In 2018, 92% of renewable energy in the Czech Republic came from bioenergy, thanks to the widespread availability of biomass. Bioenergy will account for two-thirds of all renewable energy sources by 2030, according to NECP. The government should consider exploring a broader range of renewable energy sources and supporting related research and development programs.

In 2018, the Czech Republic RES accounted for 20.6% of energy sources in the heating and cooling sector. There should be taken into account the utilisation of the excess of thermal potential from industry to increase the share of RES in heating and cooling.

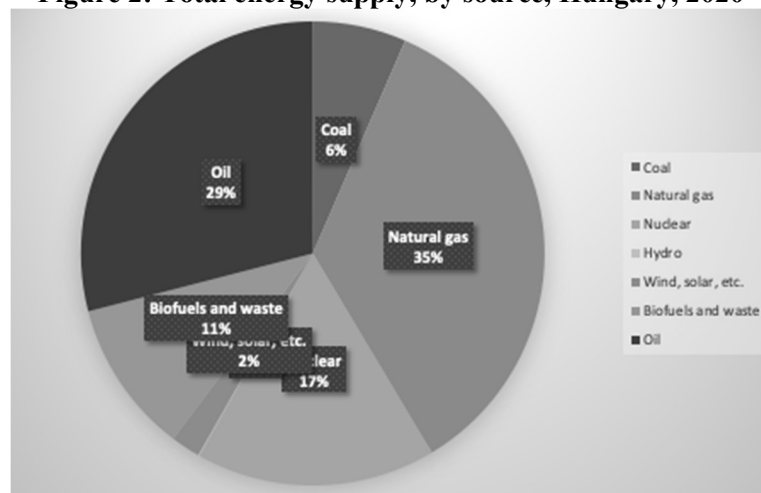
The Czech Republic does not have a specific target for the use of renewable sources in the electricity sector. Since end-use sectors such as transport, buildings and industry are likely to depend on electricity in the future, the government should consider setting a specific target for renewable energy in the energy sector. At the same time, the government must prepare and enact legislation to encourage higher rates of use of low-carbon fuels, renewable and decarbonated gases such as hydrogen, synthetic methane and biomethane to meet climate goals in a cost-effective manner.

### 3. Hungary

In 2019, Hungary's greenhouse gas emissions were 30.93% lower compared to 1990. The Second Hungarian Climate Change Strategy (NCCS II) offers an opportunity to increase ambition for climate change mitigation (Hungarian Parliament, 2017). Achieving further reductions of greenhouse gas emissions will require measures to reduce the growth of emissions in the transport sector, along with support actions for less carbon intensive modes of transport since such measures have been insufficient especially since the age of the car fleet in this country is one of the oldest in Europe. New programs such as the electric mobility program (Plan Jedlik Anyos) and the development of public transport can reduce emissions.

Another important source of non-ETS emissions is the use of coal and waste in households (Figure 2), as they emit carbon dioxide and other pollutants. Financial support and incentives are available to replace old boilers with cleaner, more efficient ones. The government should examine current incentives in the residential heating sector to ensure that this mechanism provides poorer households with the means to move from burning coal or waste to cleaner solutions.

**Figure 2: Total energy supply, by source, Hungary, 2020**



Source: Authors' processing, according to IEA data, 2021b (<https://www.iea.org/countries/hungary>)

One of the policy instruments available to Hungary is the possibility of introducing a carbon tax for those sectors of the economy that are not part of the EU ETS. For emissions from the ETS sector, mainly from electricity generation and industry, the capping system and trade is limiting the emissions at European level.

Hungary has relied heavily on increased electricity imports in recent years to improve the carbon intensity of the energy sector. If further improvements are needed without increasing dependence on imports, more low-carbon energy sources should be developed. Latest estimations are showing that by using natural gas or renewable energy sources instead of coal, which accounts for a fifth of electricity production, greenhouse gas emissions in this sector may be reduced.

The share of renewables in Hungary's energy mix has increased, mainly due to the abundant production of biofuels and biomass. Although the share of renewables was significant, the growth in the annual share of renewable energy use showed signs of slowing down. This was largely a result of reaching the limits of biomass, as this type of RES is the source of over 90% of total renewable energy production, while other forms of renewable energy such as solar, geothermal or wind energy remained negligible.

The government recognizes that solar, geothermal and other renewable energy sources can make a significant contribution to achieving renewable energy targets by 2030. It is worth mentioning that renewables are also playing an important role in the probable Nuclear-Coal-Green Scenario set out in the National Energy Strategy before 2030. In the case of solar power generation, there has been a marked increase over the past 2-3 years, mainly due to the increased disposal of photovoltaic panels to rooftops. However, solar panels are subject to an environmental tax that is high compared to other countries. The current renewable energy policy in Hungary is not conducive to the use of wind energy, as new wind farms face significant regulatory obstacles, such as the requirements for installation far from settlements and residential buildings, limitations for the shaft of the wind turbine not to exceed a certain height and having a capacity not exceeding 2 MW. These types of preconditions are difficult to meet given the geographic location of Hungary and the physical characteristics of the wind turbines available on the market.

The new Renewable Electricity Support System (METÁR) represents a fundamental reform of the electricity tariff system. For the production of renewable energy with a capacity of less than 0.5 MW, the mandatory absorption regime will continue to operate. For generating capacities from 0.5 MW to 1 MW, a premium will be paid in excess of the reference price. For large capacities (over 1 MW) and wind turbines, a competitive bidding procedure will be carried out. The new METÁR system provides operational assistance for renewable sources and complies with the EU State Aid Guidelines (Hungarian Government, 2017).

The source of operational assistance will be a renewable premium that will be paid by end users other than households, as households are entitled to benefit from universal service provision and to pay regulated electricity prices. However, METÁR represents a progress after several years of delay in reforming the renewable energy support regime. The new support system entered into operation on January 1, 2017.

The European Commission's Operational Program on Environment and Energy Efficiency has significant financial resources for investments in renewable energy sources. However, the relatively long age of the Hungarian car fleet makes it technically difficult to further increase the share of biofuels. However, Hungary is promoting e-mobility infrastructure and alternative fuels, which will help increase the share of renewable energy sources in the transport sector.

## 4. Poland

Poland is the fifth largest emitter of greenhouse gases in the European Union, but the intensity of emissions in Poland has been steadily decreasing since 1990. However, in terms of greenhouse gas emissions in relation to GDP, Poland ranks fourth in the OECD and third in the European Union. As a member state, Poland has pledged to contribute to the EU's 20% emission reduction target by 2020 by cutting emissions by 16.64%.

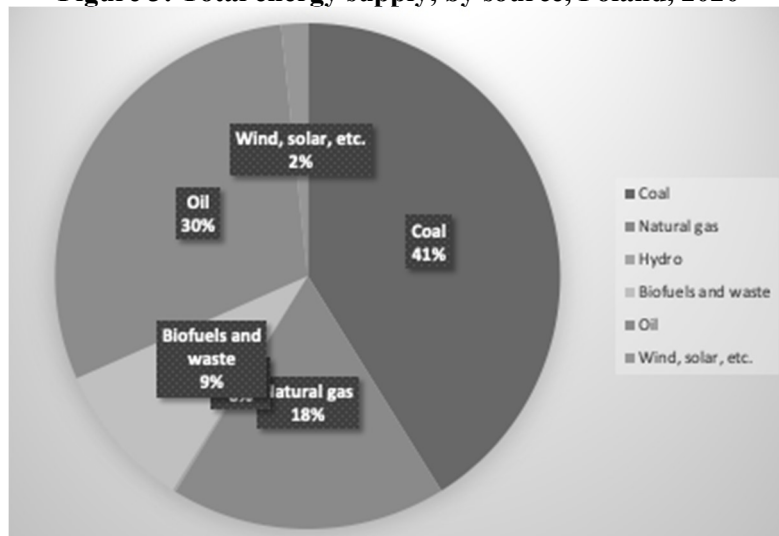
Climate policy and emission reduction targets in Poland are almost entirely determined by EU policies and targets. Continuous improvement of energy efficiency is usually seen in Poland as a priority task with the aim of maintaining "energy-free" economic growth. Poland has also prepared and adopted a Climate Change Adaptation Strategy (NAS 2020) and an Energy Security and Environment Strategy (SEE). The government is committed to adopting adaptation measures in the most vulnerable sectors and areas to avoid the costs of inaction on adaptation and reduce the social and economic risks associated with climate change.

Residential heating is the main source of air pollution in Poland and emissions from this sector are difficult, if not impossible, to regulate. Low combustion efficiency and aging heating systems and, to a lesser extent, the behaviour of residential consumers are key factors for which the residential heating produces about 40% of particulate matter emissions. The government provided financial support and incentives to replace old stoves with cleaner, more efficient stoves, as well as aid for people to insulate their homes. The government should study and adapt incentives in the residential heating sector to ensure that the mechanism provides less wealthy households with the means to stop using coal.

In Poland, the demand for transport is expected to increase significantly both on the medium and long term. Implementation of measures aimed at road transport should be a priority for Poland. New programs such as the recently proposed electromobility program and increased use of gas vehicles could reduce emissions in the transport sector.

Coal is the main source of greenhouse gas emissions in Poland (Figure 3). Forecasts show that this fuel is expected to continue to play an important role in the long-term energy mix. In this regard, it is necessary to diversify energy supply, including through the introduction of nuclear energy, an increase in quotas for renewable energy sources and natural gas.

**Figure 3: Total energy supply, by source, Poland, 2020**



**Source:** Authors' processing, according to IEA data, 2021c (<https://www.iea.org/countries/poland>)

RES have made significant progress in Poland in recent years. The share of RES in energy mix increased from 6.9% in 2005 to 12.2% in 2019. The main regulatory measure was a quota system compelling electricity suppliers to buy energy produced from renewable sources through a system of certificates of origin. With the adoption of the Renewable Energy Law in 2015, Poland revised its regulatory framework for renewable energy, moving from a quota-based system to a tender-based system.

Poland has also passed separate legislation changing the basis for the development of onshore wind energy projects. The new law establishes the conditions and procedure for the location and construction of wind farms near existing or planned residential complexes.

The renewable electricity industry has argued strongly that the new legislation will halt the development of wind power in Poland and make the country a less attractive destination for wind energy investments, while reducing the profitability of existing investments. In addition, the Polish government argues that the new law clearly defines the requirements for the location of wind turbines and is not intended to discriminate or stop the further deployment of onshore wind farms.

The new regulations applicable to the installation and operation of new onshore wind farms appear prohibitive as they exclude most of the country from developing such facilities and significantly increase their operating costs.

Lack of clarity on recent legislative changes is hampering new investment in renewables. While some regulations need to be flexible and take into account changes in the market, the government should strive to offer a stable, transparent and detailed set of rules to improve the investment climate.

In mid-2015, the government began consultations on a new energy strategy that will guide the energy sector until 2050 with the aim of replacing the EPP (Energy Policy of Poland) 2030. This new long-term strategy

should take into account the role of renewables in the broader energy policy framework and their role in sectors such as heating, transport and air quality. The stability of such a long-term strategy is important: therefore, the government must enlist the support of various parties and open public consultations with all stakeholders in the sector.

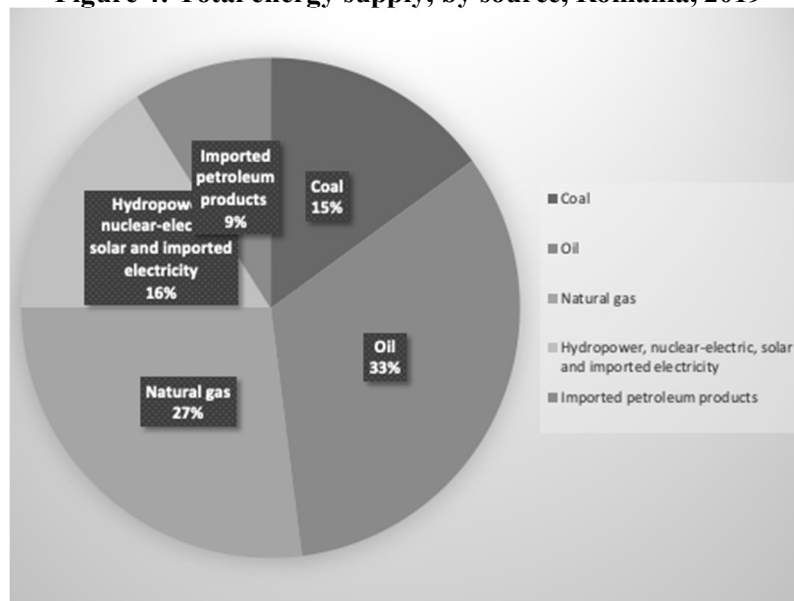
## 5. Romania

Romania must act quickly both to combat the causes of climate change and to mitigate the effects. Therefore, as a Member State of the European Union, Romania has been responsibly involved in this international effort. By the nature of its activity, the Ministry of Environment Waters and Forests plays an important role in fulfilling its obligations. Conceived as a starting point in this mission, the National Strategy on Climate Change has as main objective the mobilization of private and public actors in order to reduce greenhouse gas emissions (GHG) from economic activities in accordance with EU targets and to adapt to the impact of climate change. As regards the GHG emissions reduction process, this strategy adopts quantifiable targets in line with the EU 2030 commitments. As far as the adaptation to climate change is concerned, the aim is to support and promote the protection of the environment, population and economic activities from the effects of climate change, especially from extreme phenomena.

The promotion of renewable energy sources is an important objective for Romania for 2030, in the context of the transition to clean energy. Romania has assumed the objective of reaching a share of energy from renewable sources in the gross final consumption of 30.7% for 2030, taking into account national particularities, compared to a share of 24.3% registered in 2019 (the last year for which data are available).

In Figure 4 is shown Romania's energy mix in 2019. As it can be seen, this mix it is mainly based on oil (33%), followed by natural gas (27%), hydropower, nuclear-electric, solar and imported electricity (16%), coal (15%) and imported petroleum products (9%).

**Figure 4: Total energy supply, by source, Romania, 2019**



**Source:** Authors' processing, according to Romanian Energy Minister data, 2021b (<http://energie.gov.ro/strategie-nationala/>)

In terms of energy efficiency, the highest potential for increasing energy efficiency in Romania is found in the heating of buildings, in the transformation of primary energy resources into electricity in thermoelectric power plants, in the transmission and distribution of electricity and natural gas, respectively in transport and industry.

The policies and measures that Romania aims to adopt in order to achieve its consumption targets have a wide scope and require, where appropriate, a longer period of confirmation of the generated effects. For this reason, most of the consistent effects in the sense of reducing energy consumption will be felt starting with 2025, when the trend of reductions will be clearer, being influenced by the effects of the investments made between 2020 and 2025. Thus, the projected trajectory indicates an increase in savings from 38.4% in 2025 to 45.1% in

2030 for primary consumption, respectively from 34.0% to 40.4% for final consumption in the same period, compared to the PRIMES reference scenario for 2007.

The most important potential for increasing energy efficiency is in the residential sector, where the Long-Term Renovation Strategy proposes measures to improve energy efficiency, reduce greenhouse gas emissions, as well as to increase the share of renewable energy in total energy consumption by rehabilitating the national building stock. With regard to the necessary measures within other sectors, the aim is to continue the actions laid down in the National Energy Efficiency Action Plan, especially in the field of industry and transport, the sectors with the highest share in final energy consumption after the residential one.

Similarly, in the field of transport, new annual savings of about 0.6 Mtoe are needed between 2021 and 2030. In order to achieve the annual objectives, new measures will be needed in the modernisation of urban and rail public transport. Last but not least, encouraging alternative mobility can make a significant contribution to reducing the final energy consumption in transport.

Romania considers the energy supply from primary resources an important objective for ensuring national energy security. Romania aims to maintain a diversified energy mix by 2030, taking into account both the decarbonisation objective of the energy system, as well as ensuring its flexibility and adequacy.

In order to ensure energy consumption, the installed capacity on RES will increase by approximately 35% in 2030 compared to 2020, due to the installation of new wind and solar energy capacities, which will lead to an increase in domestic energy production, thus ensuring a higher degree of energy independence. The positive impact will be seen in particular in the reduction of dependence on imports from third countries, from a level of 20.8% in 2020 to 17.8% in 2030.

Ensuring the flexibility and adequacy of the national energy system is an important objective for Romania in the field of energy security. In connection with the objective of ensuring a diversified energy mix, Romania aims to replace the electricity production capacities that will go out of operation with new, efficient and low-emission capacities by 2030. Until coal-fired capacities are replaced by new capacities based on low-emission technologies, rehabilitation works and increased energy efficiency of existing capacities are envisaged. These will remain in operation for reasons of ensuring Romania's energy security.

Romania also aims to encourage dispatcher consumption to respond to varying demand as well as targets for energy storage. The development and use of the technical and economic potential of renewable energy sources in the national mix depends on the development of storage capacities, as well as on the development of technologies for injecting hydrogen in the form of syngas from RES and on the use of hydrogen in industrial processes.

In order to allow the integration of renewable energy into the national energy system, a transition from coal-fired to natural gas-based capacities will start from 2024, as this fuel has the advantage of allowing flexible operation. This can ensure system balancing, taking into account the intermittent nature of RES. In this regard, the installation of new natural gas capacities of at least 1,400 MW is foreseen at the level of 2030.

## 6. Conclusion

The overall objective of climate change mitigation can only be achieved through transformative actions and measures at global level. A main course of action will be to accelerate the energy sector's transition to technologies that reduce GHG emissions. Many of the long-term transformations of the energy sector can be anticipated, given the slow pace of energy infrastructure replacement.

The main development trends at European and national level refer to: increasing the role of biomass in the energy mix; supporting electromobility; increasing the share of RES in the electricity mix and the use of CCS technologies; encouraging investment in energy storage infrastructure; increasing energy efficiency, especially in buildings; the opportunity of using heat pumps in heating/cooling.

All CEE-4 countries have significantly reduced their greenhouse gas emissions compared to 1990, and also all these countries have increased their share of renewable energy in their final energy consumption. Despite that, the period 2020-2030 is expected to bring moderate increases in RES energy generation capacity, in particular wind and photovoltaic.

However, the evolution of the GHG cost in conjunction with an increase in the performance of renewable energy generation technologies, mainly wind and photovoltaic, in relation to investment and operational costs, will accelerate the energy transition, by increasing the pace of expansion of wind, photovoltaic and other low-GHG technologies, after 2030.

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