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THE RECOVERY AND RESILIENCE FACILITY: INVESTMENTS IN THE ENERGY SECTOR

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Abstract: *In the context of the pandemic crisis beginning in 2020, the European Union (EU) established the NextGenerationEU (NGEU) recovery package to shape the future of Europe recovering from the economic and public health collapse as well as fostering the ongoing efforts to mitigate and adapt to climate change. As part of these efforts, the Recovery and Resilience Facility (RRF) is the key instrument to help the EU and its Member States emerge more robust and resilient from the crisis, face the challenges, and reap the opportunities brought by the green and digital transitions. To access the funding each Member State was asked to develop a National Recovery and Resilience Plan outlining the intended reforms and public investment projects. This paper presents the policy recommendations suggested to support investments in the energy sector as well an overview of the energy-related objectives of the Romanian National Energy and Climate Plan and a few of possible measures for implementing the reforms and the investments in the field of energy as they are formulated in the National Recovery and Resilience Plan of Romania.*

Keywords: *energy efficiency, energy resources, PNRR, RRF, climate change*

INTRODUCTION

The Energy Union strategy — built on the dimensions of energy security, internal energy market, energy efficiency, decarbonisation, research, competitiveness and innovation (see Figure 1) — aims to ensure secure, sustainable, affordable and competitive energy for all its citizens and businesses in the midst of the ongoing energy transition. The 2030 climate and energy framework sets targets for cutting greenhouse gas emissions, increasing the share of renewable energy sources and improving energy efficiency by the year 2030. [1] Under the Energy Union Governance Regulation, Member States were required to adopt Integrated National Energy and Climate Plans (NECPs) for the period 2021-2030, laying out their national contributions to the EU targets as well as their accompanying policies and measures. We have to say that this paper consideres also the new risks added by the energy crisis, after the pandemic one, for the EU goals: for example, while the REPowerEU plan increased the target for the share of renewable energy from 40% to 45% in 2030, big oil companies made huge profits on fossil fuels in 2022 and reduced their targets for renewables. [2]

METHODOLOGY

Regarding the research methodology used, we have to mention that this paper is a descriptive one, the main information being taken from the acts and directives issued by the European Union institutions and from the United Nations and Romanian Government official websites.

THE POLICY CONTEXT

On 10-th of March 2023, The European Commission welcomes the provisional agreement reached with the European Parliament and the Council to reform and strengthen the EU Energy Efficiency Directive. [3] This deal marks a further step in the completion of the 'Fit for 55' package to deliver the European Green Deal and the REPowerEU Plan. It shows once again the EU's determination to become climate neutral by 2050. To reach these targets, it is necessary to have better instruments.

3.1. Energy Efficiency

For the first time, the energy efficiency first principle is given legal strength with a clear requirement for EU countries to take energy efficiency into consideration in policy, planning and major investment decisions in the energy sector and beyond. [4] The agreement establishes an EU energy efficiency target of 11.7% for

2030, exceeding the Commission's original 'Fit for 55' proposal. It requires EU Member States to collectively ensure an additional reduction of final and primary energy consumption, compared with energy consumption forecasts made in 2020. [5] We have to mention here that increasing efficiency can be ensured by four methods: a) legislating energy efficiency standards; b) efforts to inform and raise awareness of the beneficiaries; c) stimulation of producers for the creation of energy efficient products; d) stimulating the natural progress of technologies. The main consequence of a legislation of energy efficiency standards determines that products with efficiency below the minimum allowed value MEPS (Minimal Efficiency Performance Standard) do not exist into the energy market. [6]

3.2. Energy Efficiency Financing

The deal further strengthens provisions on energy efficiency financing to facilitate the mobilisation of investments. Under the new provisions, EU countries will be required to promote innovative financing scheme and green lending products for energy efficiency, by ensuring their wide and non-discriminatory offer by financial institutions. EU countries will have to report on the volume of energy efficiency investments.

3.3. Energy Savings obligation

Under the provisional deal, the annual energy savings obligation nearly doubles to ensure continual progress. EU countries will be required to achieve new savings each year of 1.49% of final energy consumption on average, from 2024 to 2030, up from the current level of 0.8%. They will gradually have to reach 1.9% by the end of 2030. This is an important instrument to drive energy savings in end-use sectors such as buildings, industry and transport.

3.4. Energy Management Systems Obligation

Companies will be encouraged to be more energy-efficient under the revised Directive. First, energy management systems will become a default obligation for large energy consumers. All enterprises, including SMEs that exceed 85 TJ of annual energy consumption, will have to implement an energy management system. Otherwise, they will be subject to an energy audit (if their annual consumption exceeds 10 TJ). For the first time, a reporting scheme for energy performance of large data centers is also introduced.

3.5. Greater Responsibility to the Public Sector

The revised rules also give a greater responsibility to the public sector to increase energy efficiency. Public bodies will need to systematically take into account energy efficiency requirements in their public procurement of products, services, buildings and works. A new annual energy consumption reduction target of 1.9% is introduced for the public sector. EU countries' obligation to renovate each year at least 3% of the total floor area of buildings owned by the public administration now also covers the regional and local levels.

3.6. Efficient District Heating and Cooling

Under the agreed rules, EU countries will also have to promote local heating and cooling plans in large municipalities having populations above 45,000. Also, with the revised definition of efficient district heating and cooling, minimum requirements will be gradually changed to ensure a fully decarbonised district heating and cooling supply by 2050. Support to new high-efficiency cogeneration units using natural gas and connected to district heating in efficient district heating and cooling systems will only be possible until 2030, whereas any other fossil fuel use will be banned for new heat generation capacities in such systems.

3.7. Alleviating energy poverty and empowering consumers

The agreement includes the first ever EU definition of energy poverty. Member States will now have to implement energy efficiency improvement measures as a priority among people affected by energy poverty, vulnerable customers, low-income households, and where applicable, people living in social housing. The revised rules put a stronger focus on alleviating energy poverty and empowering consumers, including the creation of one-stop-shops for technical and financial assistance and out-of-court mechanisms for the settlement of disputes.

THE NATIONAL ENERGY AND CLIMATE (NECP) PLAN

The National Energy and Climate Plan (NECP) Plan is a ten-year integrated document mandated by the European Union to each of its member states in order for the EU to meet its overall greenhouse gases emissions targets. [7] The Energy and Climate Plan addresses all five dimensions of the EU Energy Union: decarbonisation, energy efficiency, energy security, internal energy markets and research, innovation and competitiveness. The plan establishes the following objectives and measures (see Figure 1):

1) **Decarbonisation** : promoting investments in new low-carbon power generation capacities, using the revenues from the EU ETS Mechanisms and the Structural Funds pertaining to the new Multiannual Financial Framework, implementing the best available technologies (BAT) to reduce GHG emissions and to increase energy efficiency in the industrial sector, fostering the use of rail transport for transport
   of passenger, promoting the use of renewable energy in transport (electromobility in road transport and the use of biofuels);
2) **Energy efficiency**: increasing energy efficiency in the industrial and residential sectors, developing alternative mobility;
3) **Energy security:** encouraging the development of energy storage capacities;
4) **Internal energy market**: liberalisation of energy markets, regional integration of the internal energy market;
5) **Research, innovation and competitiveness**: adopting advanced technologies in the energy sector.

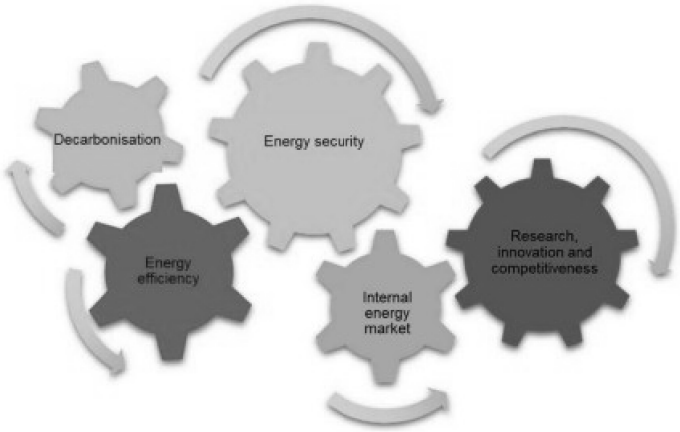

Figure 1: The interlinked and mutually supporting dimensions of the Energy Union (source: EC) [1]

4.1. National Contribution Towards 2030 EU Target

The Romanian 2030 national contribution towards the EU target has been defined as absolute energy consumption of 25.7 Mtoe and 32.3 Mtoe in final and primary energy, respectively. These represent a percentage reduction of 40.4% (final) and 45.1% (primary) reduction compared to the PRIMES 2007 projections in 2030. In comparison to the WEM scenario projections for 2030, the Romanian 2030 values translate to a reduction of 9.5% in primary energy and an increase of 8.5% in final energy by 2030. In terms of other national targets, the final NECP presents the milestones set as part of the Romanian Longterm Renovation Strategy 2020-2050, which, under the recommended scenario, are expected to yield a reduction of final consumption in 2030 of 0.83 Mtoe compared to the baseline scenario. Regarding the contribution of PAMs and sectors, the Romanian NECP presents a list of 12 current and 40 planned PaMs. Planned PaMs include building renovation passports, restrictions on the sale or lease of buildings in the lowest energy performance classes, energy or CO2 taxes and transport fleet renewal programmes. Many of the planned PaMs focus on the building sector, but some measures also target transport, industry and the supply sector. The NECP does not give any detailed descriptions of their PaMs (e.g. type of policy, sector, implementation period, status, description, etc.). In terms of future PaMs, the information is even more limited, with only general actions rather than concrete and well defined measures. The contribution of PaMs in terms of energy savings is not covered in the NECP.

4.2. Policies and measures

4.2.1. Building renovation strategy

The NECP summarises the main results of a scenario analysis, in which 3 scenarios (Scenarios 1, 2 and 3) are confronted against a baseline scenario. [8] The analysis is based on 3 renovation packages (minimum, medium, maximum) for buildings located in 3 climate zones and calculates the renovation rates under each scenario in three periods: 2021-2030, 2031-2040, 2041-2040. Based on scenario 2 (recommended scenario), annual renovation rates will increase to 3.39 % in 2021-2030, to 3.79% in 2031-2040 and to 4.33% in 2041-2050 (see Figure 2). This is expected to bring a reduction of final consumption in 2030 of 0.83 Mtoe and cumulative GHG emission reduction of 2.34 million tonnes in 2021-2030. Given that the full list of measures to comply with the LTRS (Long-Term Renovation Strategy) is not disclosed in the NECP, it is not possible to evaluate how the various PaMs will actually contribute towards these milestones, and hence review how realistic and achievable these milestones are.

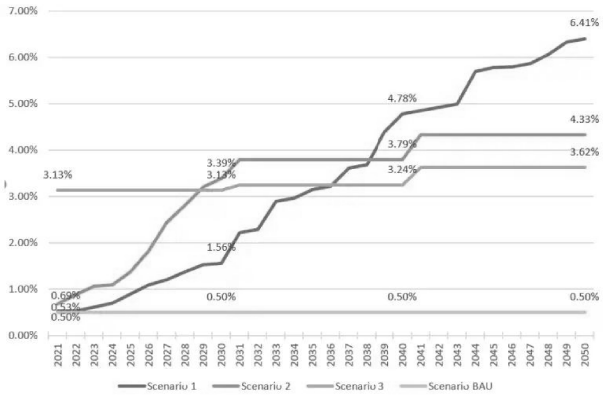

Figure 2: Annual building renovation rates per scenario (source: World Bank Assessment), [8]

4.2.2. Energy Efficiency Obligation Schemes

Romania has stated that it will achieve cumulative new energy savings equivalent to 10.12 Mtoe in the period 2021-2030 to meet the Article 7 requirement. In the process of drawing up the National Energy Efficiency Action Plan, the introduction of an obligation scheme was not considered optimal in Romania, as the conditions are not met for such schemes, e.g. compliance with the certification requirements of energy savings achieved and the economic justification of the conditions imposed. Romania presented its long-term renovation strategy as the way to achieve the Article 7 requirement. The strategy does not present any concrete measures (see previous section) but the estimated cumulative savings of 3.4 Mtoe expected to be reached by 2030 through this strategy will not be enough to meet the Article 7 savings requirement, highlighting the need of further actions.
The NECP does not provide any new information with regards to Article 5 on central government renovations and does not include the total floor area to be renovated or equivalent annual energy savings to be achieved 2021-2030. This could be due to the fact that Romania plans to continue to meet Article 5 requirements through the default approach (as it did so in the period 2014-2020), but this is not explicitly stated in the NECP. Despite this, Annex II includes "P8 Energy efficiency in government buildings and public services" in the list of current measures. It is not clear if the measure will continue beyond 2020, and if Romania will indeed carry on with the default approach for the period 2020-2030.

4.2.3. Energy Poverty Measures

Various measures are presented under the dimension of Internal Energy Market, with the aim to reach the national objective of reducing energy poverty and protecting vulnerable consumers, having in mind the achievement of the average energy poverty level at EU level in 2015. The main measures include: — Regulation on definition of vulnerable consumers and ways of financing — Provision of non-financial support to low-income vulnerable consumers through the possibility of payment by instalments (payment of electricity bills in instalments) — Implementation of the National Social Assistance Information System — Grant relief for domestic heating under Government Emergency Ordinance No 70/2011, repealed and replaced by Law No 196/2016 (taking effect on 1 April 2021)
Funding of PaMs and required investments Cumulative investments needed over the period 2021-2030 to meet the proposed objectives (WAM scenario) are estimated to be around EUR 150 billion. In terms of the building sector, it is estimated that investments of EUR 12.8 billion will be necessary according to Scenario 2 under the Romanian Long Term Renovation Strategy. An estimated EUR 1 million should be committed to cover

technical assistance costs and investments should stem from various sources: — EUR 3 million from grants from the State budget or EU funds — EUR 6-8 billion financed through repayable financial mechanisms including repayable grants — EUR 1.8 billion secured by own funds of building owners participating in co-financing schemes.
The national contributions to the EU target, as reported in the final NECPs, stand short of the existing 32.5% ambition, with current ambition levels being equivalent to a 29.6% primary and 29.4% final energy reduction in 2030 compared to PRIMES 2007 projections. The assessment of the NECPs has identified a mixture of various types of policies and measures targeting all sectors of the economy from buildings to transport, and industry to energy supply. Intensified efforts in the transport and building sector have been identified, with several countries setting specific targets or milestones for these sectors. Several improvements have been found in the final NECPs, both in terms of the details provided and set ambition, reflecting the additional efforts put in place by the Member States following the recommendations issued by the European Commission on the draft plans. Despite this, just less than a half of the EU Member States have notified sufficient cumulative energy savings of measures in line with the EED Article 7 energy saving requirements (see Figure 3).

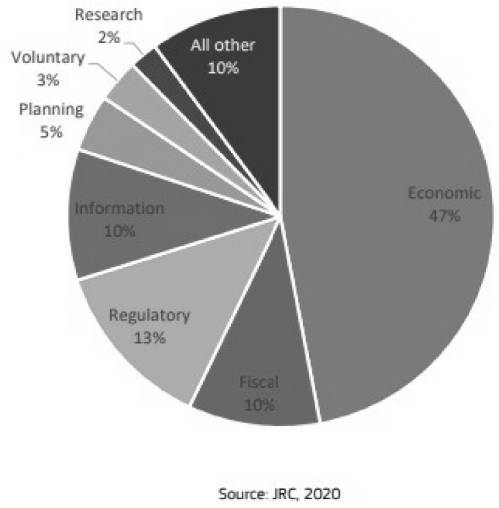

Figure 3: Types of policies and measures contributing to EED Article 7 in the period 2021-2030 **(**Shares (%) are expressed in number of measures) (source: JRC - Joint Research Centre, EC) [7]

4.3. Key updates and improvements

4.3.1. Main changes and improvements in relation to draft NECPs 2019

One of the most notable improvements in the final NECP is the increase in the ambition of the Romanian contribution towards the EU target by lowering the primary energy consumption in 2030 from 36.7 Mtoe to 32.3 Mtoe. New information is given also on Article 7 saving requirement and indicative milestones for 2030, 2040 and 2050 set in compliance with the Long Term Renovation Strategy, as well as estimates on investments needs and expected savings.

4.3.2. Main updates in relation to 2020 timeline

In light of the assumptions and calculations used by Romanian authorities, primary energy consumption is expected to reach 32.3 Mtoe in 2030, compared to 32.1 Mtoe in 2020. The 2030 target represents a 45.1% (primary) and 40.4% (final) reduction against PRIMES 2007 projection, while the 2020 target represents 36.0% of primary and 31.1% of final energy reduction against the PRIMES 2007 projections for 2020. Primary and final energy consumption trajectories indicate a slower reduction over the period 2020-2025, with a drop of 2.4 % for primary consumption and 2.9 % for final consumption.

Following an unprecedented crisis due to the pandemic, Romania's Recovery and Resilience Plan (PNRR) responds to the urgent need of fostering a strong recovery and making Romania future ready. [9] The reforms and investments in the plan will help Romania become more sustainable, resilient and better prepared for the challenges and opportunities of the green and digital transitions. To this end, the plan consists of 107 investment measures and 64 reforms. They will be supported by an estimated €14.24 billion in grants and €14.94 billion in loans. 41% of the plan will support the green transition and 20.5 % of the plan will support the digital transition. (see Table 1)

Table 1. The Investments by PNRR
(in percentage points relative to the total amount – grants and loans)

No.	Category	Percentage (%)
1.	Climate	41
2.	Digital	20.5
3.	Social	24.8

The European Commission will make available a pre-financing of 13% of the loan (about €1.94 billion), after the agreement enters into force. Under the PNRR, Romania has EUR 1.6 billion for the energy sector, of which EUR 460 mln is allocated for Renewable Energy (950 MW by 2024) and EUR 300 mln for High-Efficiency Cogeneration. Under the Modernization Fund, transmission system operator Transelectrica will receive EUR 400 mln to strengthen the grid. One of the projects is the modernization of the Constanţa Nord – Medgidia Sud power line to enable the connection of wind and solar power projects with an overall installed capacity of 600 MW.

5.1. The Green Transition

In the area of climate and environmental policies, Romania faces challenges related to the greenhouse-gas emissions that are set to increase and could negatively influence the achievement of 2030 and 2050 energy and climate targets. In addition, while Romania's circular economy has potential, there is a particular need to improve infrastructure and increase investments in water, waste, wastewater and air pollution infrastructure. Through its positions and comments on the National Integrated Energy and Climate Change Plan, WWF supported the need for a timetable for removing coal from the energy mix. Through the PNRR (NRRP), the government has set 2032 for the phasing out of coal and 2026 for the decommissioning of 3780 MW of installed capacity for the production of electricity from coal and lignite. In parallel, the installation of the new 3000 MW capacity by 2026 will increase the capacity to produce renewable energy by about 70% and can bring us closer to the targets for 2030.
Plans for a pilot project on gas and hydrogen distribution infrastructure - though improved compared with the first draft submitted by the government - is still problematic. It is not very clear how the transition from a 20%-80% hydrogen-gas mix in 2026 to 100% hydrogen in 2030 will be made. Moreover, it should be granted priority for direct electrification with renewable energy sources, and the use of green hydrogen should be limited to sectors where decarbonisation cannot be achieved in other ways (e.g. steel and chemical industry).
Achieving the objectives of the Paris Agreement would have required the earlier elimination of coal and significant investments in new electricity generation capacity from Renewable Energy Resources (RES), in storage capacity (over 400 MW), as well as in energy transmission infrastructure, which is one of the main obstacles to the construction of new capacities for the production of electricity from renewable sources. We have to mention that, in the context of the energy crisis that followed the pandemic period, to enhance strategic energy autonomy, the EU should address four big challenges. [2] From its beginnings as an economic crisis of increased prices, the energy crisis has evolved into a supply security crisis. A short-term focus on diversifying fossil fuel supply could risk achieving the climate goals, set globally by the Paris Climate agreement [10] and in the EU by the European Green Deal (see Figure 4).

5.1.1. Key Measures for the Green Transition

The plan supports the green transition through investments in modernising railway infrastructure, including electrified or zero-emission railways and rolling stock (€3.9 billion). Furthermore, €1.8 billion will be invested to support urban mobility through infrastructure for a green and safer urban transport. Reforms and investments amounting to €855 million will support clean energy production by phasing-out of coal and lignite power production, deployment of renewables, and hydrogen. In addition, €2.7 billion will be invested for energy-efficient renovation and seismic renovation of buildings. Biodiversity and environmental protection measures include afforestation and reforestation and forest nurseries, as well as other biodiversity measures for ecological reconstruction and species protection, with investments amounting to €1.1 billion

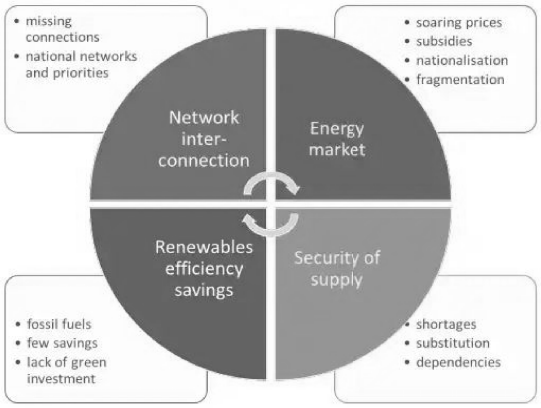

Figure 4: Challenges to the EU energy policy (source: EPRS - European Parliamentary Research Service)[2]

5.1.2. Renovation Wave Fund Project

The fund worth €2.7 billion aims to increase the energy renovation rate of multi-family buildings and public buildings in Romania. Given that energy consumption in the household sector and the tertiary sector represents 45% of the total final energy consumption in Romania, the renovation wave will enhance energy efficiency of buildings, benefiting the environment and lightening households' energy bills. In addition, Romania is one of the European countries most exposed to seismic risk. Renovation works will increase the resilience of buildings to earthquakes and their accessibility to persons with disabilities and ageing population.

5.2. Digital Transition

Digital challenges for Romania include connectivity especially in rural areas, lack of digital skills, below EU average digitisation of schools, households, companies and public services. Existing capacities are not sufficient to ensure a high level of network security and adequate cyber risk management.

5.2.1. Key Measures for the Digital Transition

Romania's recovery and resilience plan supports the digital transition with investments and reforms for the digitisation of public administration in key areas, while building a secure government cloud infrastructure and supporting ID deployment. Public administration digitalization investments amount to €1.5 billion. In addition, digitalization of health includes €470 million investments for developing an integrated e-Health system, connecting over 25,000 healthcare providers and developing telemedicine systems. Moreover, investments for digitisation of education (€881 million) aim at improving digital pedagogical skills, educational content and equipment and resources, including in universities.

5.2.2. Sensors for Energy Efficiency

In a time of severe energy crisis and in which the ecological transition and decarbonisation are priorities, the issue of managing energy efficiency is becoming increasingly important. The key point is the energy monitoring and therefore consumption control, the starting point for starting any efficiency improvement operation. To carry out this check, precise data and information are needed. Typically, with a single electricity meter it is possible to understand if there are inefficiencies (for example unexpected night-time consumption), but it is not possible to identify the cause of the problem. By means of energy efficiency sensors, which are real electricity meters, it is possible to carry out a more distributed monitoring. Furthermore, the data can be collected and aggregated through a single monitoring center to identify where to direct any energy efficiency activities. The energy efficiency monitoring module, being a real electricity meter, can be applied not only to monitoring consumption, but also to control the electricity production of renewable energy plants. Being a low-cost module, it can also be used on small photovoltaic systems (domestic or industrial) allowing, by accessing a supervision platform, to verify the correct functioning of the system respect to the project specifications and on the basis of the variables that determine the production efficiency (solar radiation and temperature). In this way, real-time control of the system is possible with a reduction in maintenance costs as it is possible to intervene only if and when it is actually necessary to restore optimal operating conditions.

CONCLUSIONS

The revision of the Energy Efficiency Directive is one of the 'Fit for 55' proposals presented by the Commission in July 2021 to make the EU's climate, energy, land use, transport and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. Achieving these emission reductions in the next decade is crucial to Europe becoming the world's first climate neutral continent by 2050. Energy efficiency is also a key pillar of the REPowerEU plan, which is the EU's strategy to get rid of Russian fossil fuel imports as soon as possible. In May 2022, the Commission proposed as part of the REPowerEU Plan to enhance long-term energy efficiency measures, including an increase of the binding Energy Efficiency Target under the 'Fit for 55' package of European Green Deal legislation.
In light of the recent Commission proposal for increased ambition by 2030 and the shortcomings identified in this report, it is therefore imperative to intensify efforts and align national ambitions with EU goals as well as to demonstrate the importance of energy efficiency in the clean energy transition and the Paris agreement goals. In doing so, more transparency should be established at identifying the level of ambition of additional measures to attain the overall energy efficiency ambition under the various provisions of EU energy efficiency law, including the EED Article 3.
Finally, the implications of the COVID-19 crisis on the energy and climate package should be further explored, including the role of energy efficiency dimension in the post-COVID 19 recovery.

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