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EUROPEAN POLICY ANALYSIS

Energy Efficiency in Central and Eastern Europe: an Elephant in the Room

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Summary

Energy efficiency in Central and Eastern Europe (CEE) is in a critical state and, though the situation is slowly improving, measures to increase the rate and depth of improvement are urgently required. There is significant diversity among the CEE states, but there are also common issues and common solutions, and across the board it is clear that energy efficiency is not being addressed with the necessary ambition. The lower energy efficiency in the region stands in complex relation to the higher energy poverty, higher air pollution, lower industrial competitiveness, unnecessary energy import dependency, reduced energy security and weakened national security.

This paper proposes two tools to tackle the current low level of energy efficiency: the introduction of Emergency Energy Saving Plans and the creation of a Regional Energy Efficiency Financial Platform to facilitate the adoption of more sophisticated and adequate financial instruments. It then discusses further measures that could also support improvement: legislative, financial, industrial and educational. The objective of this paper is not to examine in-depth and in detail the state of energy efficiency in the region but to trigger debate among policymakers and industry at the national and EU level about how it can be improved.

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1. Introduction

Russia's full-scale invasion of Ukraine brought to the foreground a major problem with the energy system of Central and Eastern Europe – the region is very energy inefficient. This has long been a well-known and frequently discussed issue but it has remained a topic for conferences and desktop government strategies rather than a subject for decisive action. The war on Ukraine and Russia's energy war against Europe, which started at least 6 months before the 24th February military invasion, exposed the significant and wide-ranging risks that low energy efficiency brings to the region.

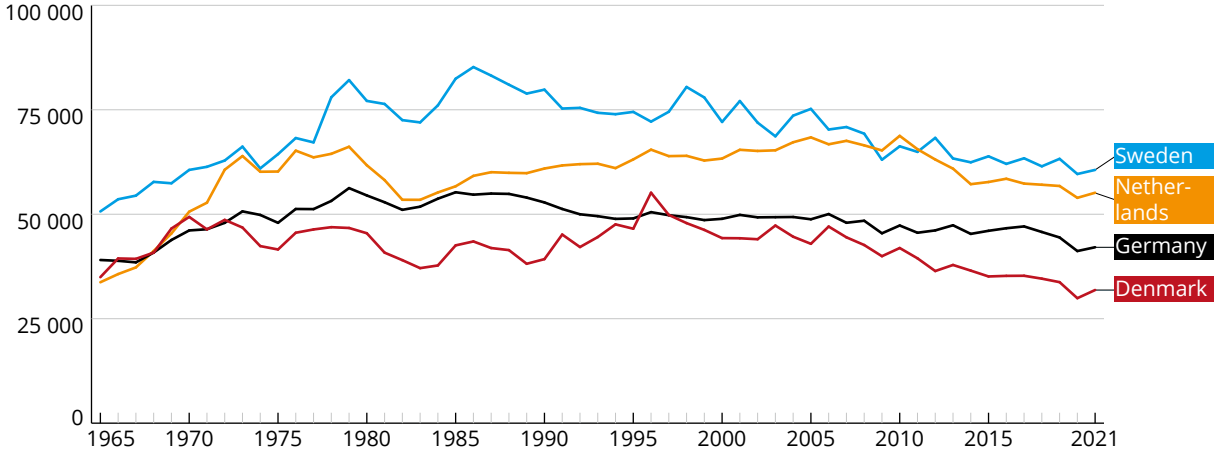
I will examine here some key aspects and consequences of the low energy efficiency of the region, support the findings with reference to existing research and with illustrations from certain countries and propose policy interventions that could alleviate the problem. This is not a comprehensive review of the problem or a detailed policy proposal but rather an invitation for a debate on the need for political intervention to address a problem that has consequences far beyond energy prices.

National and local governments and the European Commission must intervene with urgent and practical solutions which could bring both short and longer term results. The rate at which buildings are renovated needs to increase significantly as must, at the same time, the quality and depth of renovation. Transport must be renovated. The excuse of the 'poorer East' is not valid, because of economic growth and because energy efficiency in most cases offers a good return for business and society if the right policies and financial instruments are in place. Decades of complacency regarding the state of energy consumption have increased the relative vulnerability of CEE countries and there is no reason for this to continue. In most cases, rapid energy efficiency improvement does not even need government subsidies. Instead it needs legislation, higher standards and strict enforcement, as well as adequate training and innovation.

2. Energy efficiency as European policy

Energy efficiency has been recognised as a key policy in Europe for a long time. The 1973 embargo by Arab oil producing states was probably the first hard shock to trigger a wave of consistent policy work for efficient energy use, and it highlighted the close link between energy efficiency, energy dependency and energy security. In the wake of the 1973 crisis, Western countries established the International Energy Agency, and one of its main fields of policy research is, precisely, energy efficiency. Following the oil embargo European countries significantly increased their energy efficiency standards which contributed to the decoupling of economic growth and energy use. After a steep increase, energy demand in many West European countries plateaued and later started declining despite positive economic growth. This trend is particularly well defined in Northwestern Europe where energy demand clearly changed its trajectory at the end of the 1970s (Southwestern Europe was slower in following the trend).

Figure 1. **Energy use per person** (kWh)



Energy use not only includes electricity, but also other areas of consumption including transport, heating and cooking.
Source: Our World in Data

Central and Eastern Europe was not affected by the oil crisis of the 1970s. If anything, the region even benefited economically from higher oil prices because of its integration with the oil-exporting USSR. This might be one of the legacy reasons why today CEE countries are slow in implementing more significant energy efficiency policies.

Energy efficiency is today one of the key ambitions of the European Union in the field of energy policy. In 2002 a directive on the energy performance of buildings was adopted and in 2012 the Energy Efficiency Directive was introduced. The Energy Union was initiated following the annexation of Crimea in 2014 and became a flagship policy of the European Union, with energy efficiency as one of its five pillars. In 2020 the European Commission published a new initiative, the 'Renovation Wave', which aimed to double the rate of building renovation by 2030. CEE countries played their part in these legislative and campaigning initiatives, and the energy efficiency of buildings, industry and transport in the region has improved but the gap to the rest of Europe still remains significant. It is especially so if we consider that even the best performing Northwestern European countries are still far from the best possible standards in energy efficiency performance.

3. The state of energy efficiency in the CEE region

Energy efficiency is a slippery concept, especially when applied not to a single process, installation or building but to a whole city, region, or state. One can identify many cases of energy waste and opportunities for energy savings, but we will always find ourselves somewhere between generalisation, simplified assessments and anecdotal evidence. Inevitably we will hover between these three posts but we must try at the same time to bring sufficient data to support proposals, such as those in this paper.

We can say broadly that Central and Eastern Europe is energy inefficient. Or, more correctly, it is more inefficient than Western Europe, since the West is very far from what we could call an energy efficient region. One way to get the general picture of the relative energy inefficiency of the East is to examine energy consumption per capita and compare it to GDP per capita. This approach can be misleading, and we will address this later, but for now, let us briefly consider these figures.

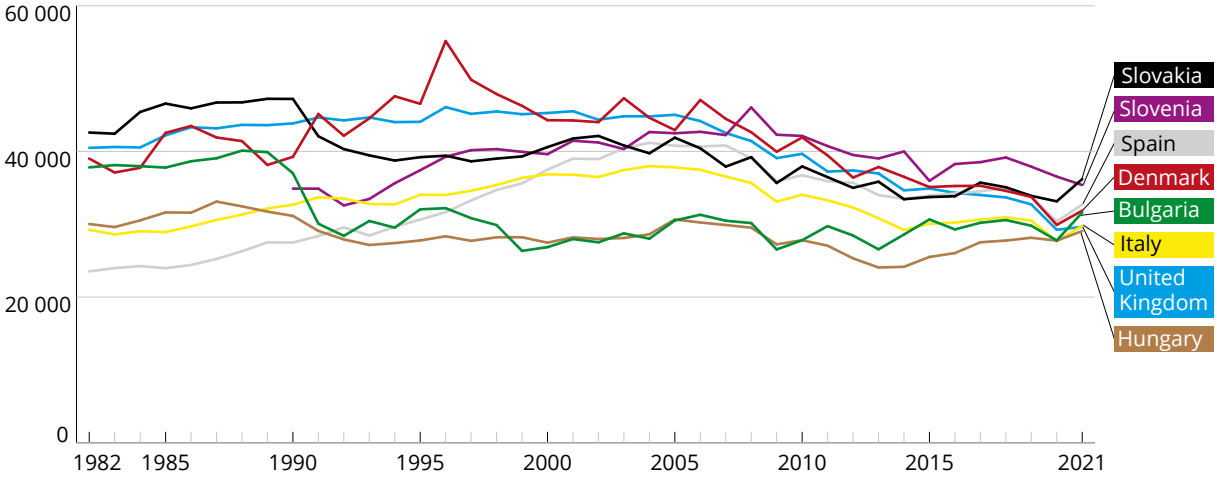
If we select a few economies from the East and the West, we can see that, while energy use per capita is quite similar, living standards and GDP per capita are quite different. In other words, with less energy, the West tends to produce more and thereby satisfy more human needs. Slovakia, Slovenia, Bulgaria, Hungary, on the one hand, and Italy, United Kingdom, Denmark and Spain, on the other, have quite similar energy consumption per capita, around 29–36 MWh per annum. Bulgaria, the poorest EU country, and Denmark, one of the richest, have very similar energy consumption per capita. Switzerland is four times richer (as measured by GDP per capita) than the Czech Republic, but they use the same amount of energy per capita.

The values in these comparisons do not give us the full picture because they depend on purchasing power, the structure of the economy, demography, climatic zones and other factors that must be taken into account if we are interested in a more exact comparison, but they do point to a general trend. Critics of such comparisons often claim that the Western European economy is much more service-based, while Eastern Europe is still the industrial part of the continent. It is true that the share of industry in the GDP of CEE states is a little bigger, but the difference in GDP per capita is bigger still: Eastern Europe uses significantly more energy per unit of production.[1]

Another reason occasionally mentioned is that the East has more energy intensive industries than the West. While such claims might be correct to some extent it is also not sufficient to explain the East-West energy use discrepancy. Also, the claim for more energy intensive industries often refers to industries with lower added value, for instance, extractive industries or agriculture that export raw products rather than keep a bigger part of the value chain in the country.

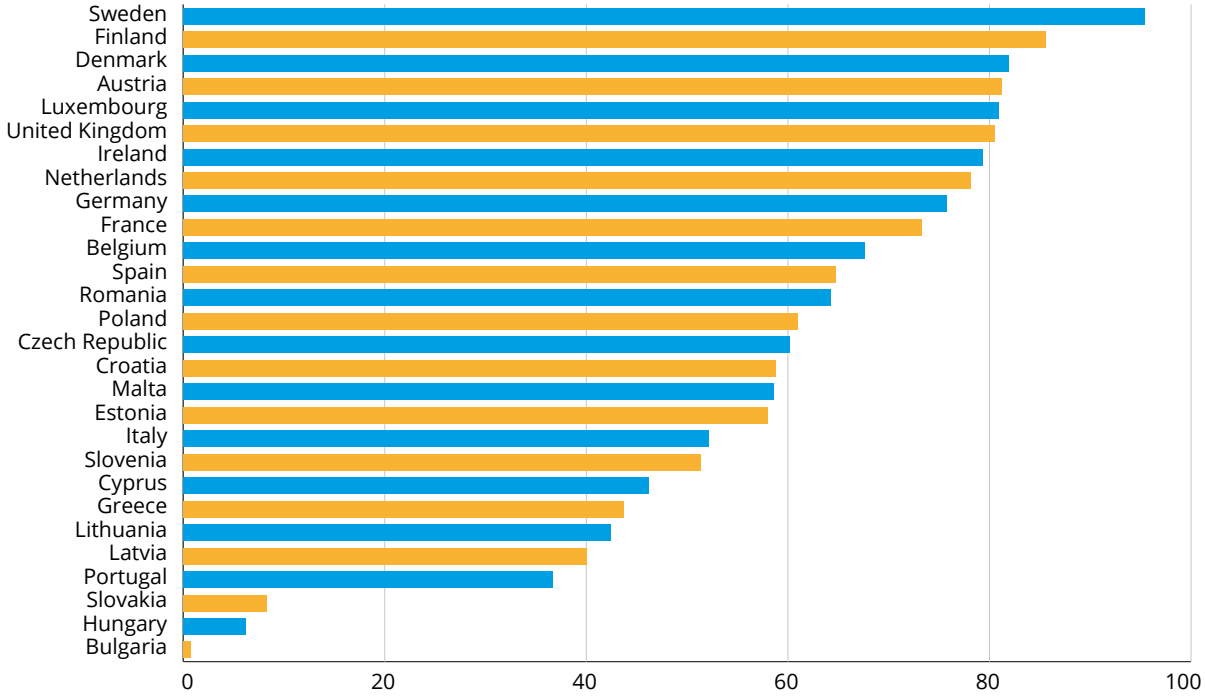
[1] The share of industry in the GDP of Czechia is 31.2%, Poland 27.9%, Romania 27.8, Bulgaria 23%. For Germany it is 23.5%, Italy 22.5%, Denmark 20.2%, Belgium 20.9% and Spain 20.4% (Statista, 2021).

Figure 2. **Energy use per person** (kWh)



Energy use not only includes electricity, but also other areas of consumption including transport, heating and cooking.
Source: Our world in data

Figure 3. **EDEPI 2016** (European Domestic Energy Poverty Index)

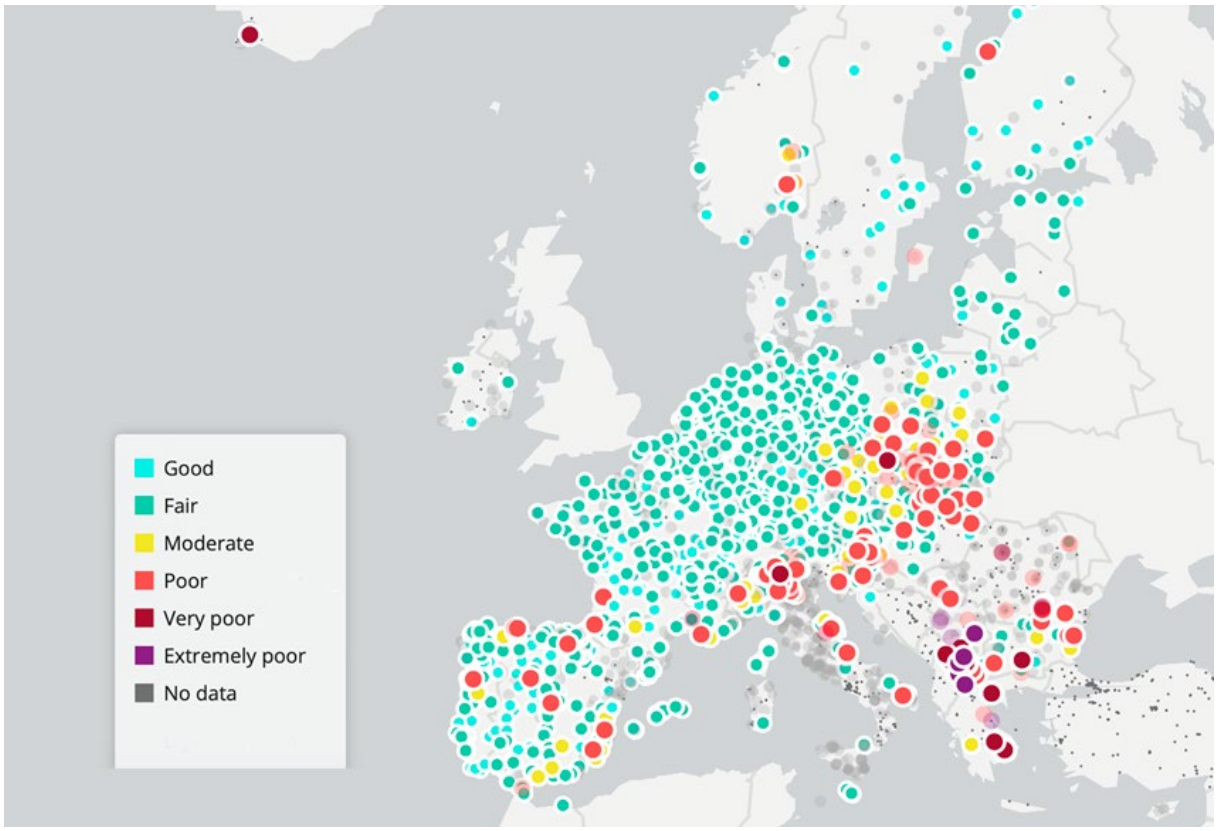


Source: https://eepi.zone-c.eu/eepi.html#scores

We can say that, in general, the East uses more energy for lower economic output and lower living standards. Such a statement is further supported by data on energy poverty and air quality, two aspects of health and wellbeing closely related to the low energy efficiency of buildings. Energy poverty is often the result of low energy efficiency of buildings while poor air quality is often also the result of poor quality of buildings, the need for more energy and the use of cheap wood, coal or waste as fuel, which are inefficiently burned. The European Energy Poverty Index (which measures domestic and transport related energy poverty) shows that most of the countries at the bottom of the scale (i.e. which experience greater energy poverty) are from the East, while most of those at the top of the scale are from the West.[2]

[2] https://www.openexp.eu/sites/default/files/publication/files/european_energy_poverty_index-eepi_en.pdf

Figure 4. **European air quality index**



Source: European Environment Agency, https://www.eea.europa.eu/themes/air/air-quality-index

On most winter days, a cursory look at the European Environmental Agency's 'Air Quality Index'[3] will show what we might call an 'air quality iron curtain' between East and West. This divide is mostly the result of the burning of solid fuel, which heats inefficiently and, to smaller extent, of the older inefficient cars driven in the East. Once more, we must make the disclaimer, that East and West are very general terms and there are big differences among the countries in the East, as well as among the countries in the West.

4. Energy efficiency and energy security

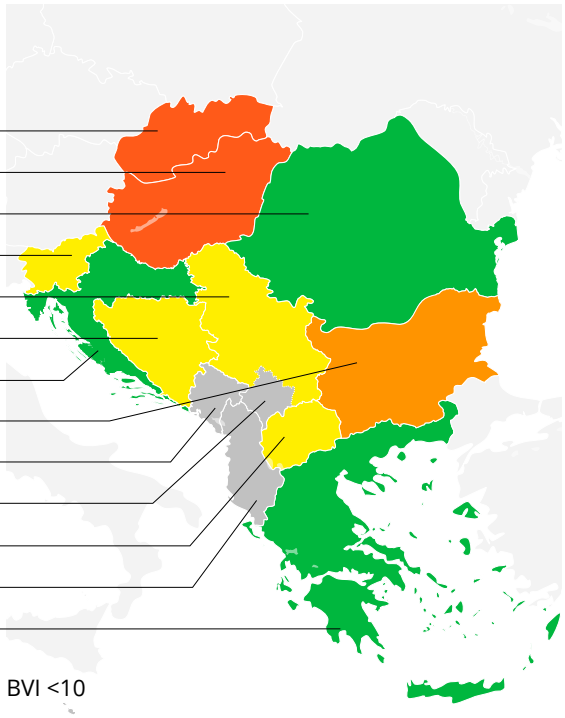
The low energy efficiency of CEE also leads to lower energy security since most definitions of energy security include the criterion of affordability. The aggregated result of energy inefficient buildings, industrial installations and transport leads to weakened energy security on a national level. Since energy exports can be weaponised, as we see in the case of the energy-trade war between Russia and Europe, and as we have seen many times in modern history, low energy efficiency is a risk to national security. Ukraine is an example of a country that, with the right investments, could have been energy self-sufficient and developed transparent commercial energy relations with its neighbours and the rest of the world. Its high energy inefficiency facilitated waste and energy dependency, which in turn fuelled corruption. It has even been suggested that the high energy inefficiency, along with the building of the Nord and Turkish Stream gas pipeline (which facilitated the bypassing of Ukraine by the Russian gas supply to Europe) should be seen as contributing factors to the Russian invasion, although it goes without saying that responsibility for a war of aggression lies squarely with the aggressor.

This is a story that needs to be extensively analysed if we want to make a more convincing and conclusive argument for the precise relationship between energy efficiency and national security,

[3] https://www.eea.europa.eu/themes/air/air-quality-index

Figure 5. **Building stock vulnerability**

	BVI	Vulnerability level
Slovakia	39	Severe
Hungary	34	Severe
Romania	1	Low
Slovenia	6	Moderate
Serbia	7	Moderate
Bosnia & Herzegovina	5	Moderate
Croatia	4	Low
Bulgaria	12	Substantial
Montenegro	0	Not applicable
Kosovo	0	Not applicable
FYROM	5	Moderate
Albania	0	Not applicable
Greece	3	Low



Scale:
Not applicable BVI = 0 Low: 0< BVI <5 Moderate: 5< BVI <10
Substantial: 10< BVI <20 Severe: 20< BVI <40
Source: BPIE

but for now, we could agree that there is such a relationship and that by increasing national energy efficiency we reduce national energy dependency, reduce energy poverty, increase disposable income and strengthen the overall resilience of the country.

In 2016 the Buildings Performance Institute Europe (BPIE) studied the energy efficiency of the buildings of South East Europe and prepared an energy security rating based on their gas dependency, supply diversification, and efficiency.[4] It concluded that, of the analysed countries, Hungary and Slovakia had a severe vulnerability to gas supply disruptions and Bulgaria a substantial vulnerability. Six years later these three countries were among those that opposed or sought derogations from the EU sanctions against energy imports from Russia.[5] The study went on to suggest that the 'energy security' scenario can dramatically reduce the vulnerability to gas supply interruption.

The low energy efficiency of Central and Eastern Europe is a significant energy security risk and contributes to the national security vulnerability of the countries in the region. For that reason, energy efficiency improvement should not be only a subject of energy, social and climate policy but also an issue for the security and defence policy of the countries in the region. Improved energy efficiency will have a positive effect on the overall security of Europe. Lower energy demand and higher energy productivity will increase European resilience and will reduce the vulnerability of the union and the neighbouring countries. For that reason, the energy efficiency of CEE states should be included in the security debate and the security policies of the European Union and individual European states. Energy efficiency is also closely linked to climate resilience. When building renovation is combined with improvement of heat, cold and flood resilience, the building stock is much better equipped to withstand the extreme weather events that are occuring with higher frequency and magnitude.

CEE is also missing out on industrial innovation related to energy efficiency. Reducing the energy use of buildings, industry and transport is increasingly achieved through industrial

[4] https://www.bpie.eu/publication/safeguarding-energy-security-in-south-east-europe-with-investment-in-demand-side-infrastructure/
[5] https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_7653

innovation. Demand response is based on the wide use of smart metering and automatisation. The development and production of new building materials could push forward the industrial development of CEE states. By delaying action on energy efficiency, they are also delaying industrial progress and missing opportunities to attract investments in higher value production.

5. Energy efficiency and European policies

The European Union institutions and member state governments have advanced a number of policies that are facilitating the faster and easier deployment of energy efficiency measures. Some of them are set out in legislation at national and EU levels, while others offer guidance or financial facilities. This brief will not examine the well-known and widely discussed Building Performance Directive and the Energy Efficiency Directive. It will merely point at the fact of their relatively slow and incomplete transposition into national law and also to the limited knowledge of new legislation among contractors, and local – and even national – authorities.

In 2018 an important change was made to how borrowing related to Energy Performance Contracts is counted.[6] The new rules allow more freedom for public authorities in borrowing for energy efficiency measures. However, it appears that local authorities have limited knowledge of the rules and are reluctant to use to borrow money for energy efficiency improvement.

The National Energy and Climate Plans (NECPs) 2021–2030 were an opportunity for the CEE countries to set high ambitions for their energy efficiency improvement.[7] They did not do so. In the European Commission's assessment of the draft National Energy and Climate Plans, most of the energy efficiency sections of the CEE plans are assessed as not ambitious. Of the Czech NECP, the Commission says 'in the energy efficiency dimension, the contribution of Czechia for primary energy consumption represents a low level of ambition'. The verdict on Hungary is the same: 'the ambition level of the proposed contribution is very low and does not exploit opportunities for growth and job creation.' Poland's plans are 'modest', Croatia's ambitions are 'low', and the same assessment is made of Bulgaria, Slovenia, Estonia and Latvia.

Following these critical comments, Bulgaria revised its plan, but offered *even lower* ambition, Croatia did not change its level of ambition, Estonia presented an unclear overall plan on energy efficiency but strengthened its ambitions regarding buildings, Latvia set higher targets but only subject to more EU funding, Poland did not change its level of ambition and in the final NECP of Hungary the section on energy efficiency remains 'very low ambition compared to the EU level of efforts'. NECPs are undergoing a continuous assessment and we must hope that energy efficiency policies in the CEE countries will be significantly improved and clarified.

6. Is EU money used wisely for improving energy efficiency?

EU funds are regularly used for the improvement of energy efficiency in Central and Eastern Europe. The problem is that these funds are often used inefficiently. Commercial budlings and industry are generally more agile when it comes to energy efficiency improvements. Commercial entities are used to dealing with investment, borrowing and cost saving. Much more could be done in the commercial sector and significant EU funds are allocated for this work. The retrofit of residential building stock, however, is likewise a massive task but a much more complex one. Buildings are different, owners are different, and the legal entities that represent owners do not have the assets needed to secure loans. EU funding is often used for demonstration projects or as grants that cover up to 100% of the cost of renovation. The result is small scale renovation and deep separation of privately and publicly funded projects.

Another problem is that banks and other financial institutions are often reluctant to get engaged with large scale renovation. EU funds are rarely

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[6] https://ec.europa.eu/eurostat/documents/1015035/8885635/guide_to_statistical_treatment_of_epcs_en.p%20df/f74b474b-8778-41a9-9978-8f4fe8548ab1

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

used to incentivise financial institutions to enter the building renovation scene. EU requirements and government policies and national legislation are not sufficiently focused on the aggregation of small projects, engagement of private investment and using public funds as leverage for attracting investment, including by house owners.

Recently, the European Commission announced two initiatives that were expected to boost building renovation – the 'Renovation Wave' and the 'New European Bauhaus'. Both have failed so far to deliver significant results.

The COVID-19 crisis brought two opportunities – the generous Resilience and Recovery Facility (RRF) and a surplus of consumer savings.[8] Not being able to spend at the usual level, many households increased their level of savings. At the end of the lockdowns and immediately after, a large share of these savings were directed towards residential household spending. Governments could have used this trend to incentivise residential renovation, but they did not do so. The European Commission also failed to act on this opportunity.

The commonly suggested reason for failing to make progress on energy efficiency – lack of funding – was lavishly addressed by the Recovery and Resilience Facility which was intended to help EU countries with their economic recovery, post-pandemic. The EU economies recovered before the RRF funds were dispersed. One would have expected that CEE countries (and not only those countries) would use these funds to develop a resilient and more advanced system for addressing one of the most capital intensive and serious ills of the region. Not quite. Billions have indeed been directed to energy efficiency. However, there is no sign for these funds to be really used as leverage for attracting large private investments through a variety of advanced financial instruments.

The RRF was an opportunity to fix, at least partially, the building renovation funding gap and to place the energy efficiency funding on a long-term sustainable route. Unfortunately, this is not likely to happen. The Recovery and Resilience Plans (RRPs) do include significant building renovation components. However, that might not lead to a more complex financial toolbox that would be able to attract the necessary capital investment for a large-scale, long-term and high-quality renovation. A billion euros will be spent in Bulgaria for grants that will cover 100% or nearly 100% of the cost of renovation. This is a missed opportunity to introduce a funding scheme that could have increased this funding 3, 4 or even 5 times. This would be possible if the grant funds were used as leverage for attracting investments and a system of energy performance contacts were introduced. That would bring future savings forward as an upfront investment. The growing personal wealth and the savings generated during the COVID-19 lockdowns are also resources that could have been mobilised with the use of the grants through subsidised low interest loans and blended funding. The European Commission did not press for such a requirement. The expected result in energy saving is 30% of current energy use. This is insufficient and also an unclear target since in many cases there is an increase in energy use for filling a thermal comfort gap. If 30% is really achieved, then the plan is missing the opportunity to transform this 30% into an energy performance contract component and transform the saving into an upfront payment.

'The RRF was an opportunity to fix, at least partially, the building renovation funding gap and to place the energy efficiency funding on a long-term sustainable route. Unfortunately, this is not likely to happen.'

In the RRP assessment by the Commission Czechia is assessed as a country with very highly energy intensive economy. When it comes to the energy efficiency of Czech buildings the same 30% energy savings appear and that brings the same flaw as in the case of Bulgaria. The Romanian RRF plan envisages €2.15 billion for building renovation but it is unlikely that this funding will be properly used as leverage for significant additional investment. In Poland the RRP spending on energy efficiency

[8] https://commission.europa.eu/business-economy-euro/economic-recovery/recovery-and-resilience-facility_en

focuses on air quality, and this is sensible: air quality is a serious problem in the country as a result of domestic use of coal for heating. In summary, the RRF is likely to be a missed opportunity for changing the principle of financing of building renovation and other energy efficiency measures in the CEE.

At the same time the European Commission, the European Parliament and the member states are debating the establishment of a Social Climate Fund (SCF) and ETS II – an emissions trading scheme that should cover transport and buildings.[9] The debate is not over. ETS II and the SCF will lead to significant financial redistribution. While the general decision is that revenue from ETS II should be directed 100% to climate-related action, there is no clear sign of a strong requirement for the part of the funding to be used as leverage for attracting additional investment.

7. What should be done

Since 24th February 2022, the EU has shown resilience and solidarity, on the one hand, and, on the other, resistance to change, with politicians unwilling to challenge the comfort zone of their voters. Europe did a lot, both as a collective and as individual member states, to support Ukraine, sanction Russia and cut imports of Russian energy and, consequently, the supply of money for Russia's war. At the same time, Europe was very reluctant to do the most natural thing in a war – to save resources. This reluctance is difficult to explain rationally since most of energy saving measures are also good for the economy and good for individual comfort and disposable income. Meaningful energy saving measures started being promoted by governments only at the end of 2022, many months after the war began, whereas they should have been triggered a year earlier, when it was already clear that Russia is manipulating the gas supplies for Europe. Nevertheless, perhaps on the principle of 'better later than never' Europe started introducing energy-saving measures by law or by nudging and communication. Germany introduced a new energy saving law in October 2022.[10] The UK initiated an energy saving campaign in November 2022.[11] But the countries of Central and Eastern Europe are again lagging behind, even compared to these very late reactions.

In this context, this briefing suggests two key actions and, separately, a set of more specific measures that could play a role in accelerating the energy efficiency progress of CEE states.

7.1 Two Key Actions

The first action is the preparation and instant implementation of emergency energy saving plans and the second is the establishment of a Regional Energy Efficiency Financial Platform.

7.1.1 Emergency energy saving plans

It is logical for each country in Europe to have an emergency energy saving plan ready to be implemented in case of an energy supply crisis. The energy crisis started in the autumn of 2021 when it became clear that Russia was withholding gas supplies needed by Europe. With the invasion of Ukraine, at the latest, these plans had to be triggered with substantially greater levels of ambition. The energy inefficiency and high energy intensity of the economy in CEE states are an even stronger reason to have such plans in place.

Governments should prepare short-term emergency energy saving plans that should include: public campaigns for energy saving; public education for quick energy saving solutions; rules for the operation of commercial buildings; guidance or restrictions on the heating and cooling of office and commercial spaces; a schedule limiting the use of lights for advertising; a schedule for the temporary stoppage of industrial installations, and fast building efficiency solutions such as loft insulation, adjustment of thermostats, regulation of condensing boilers.

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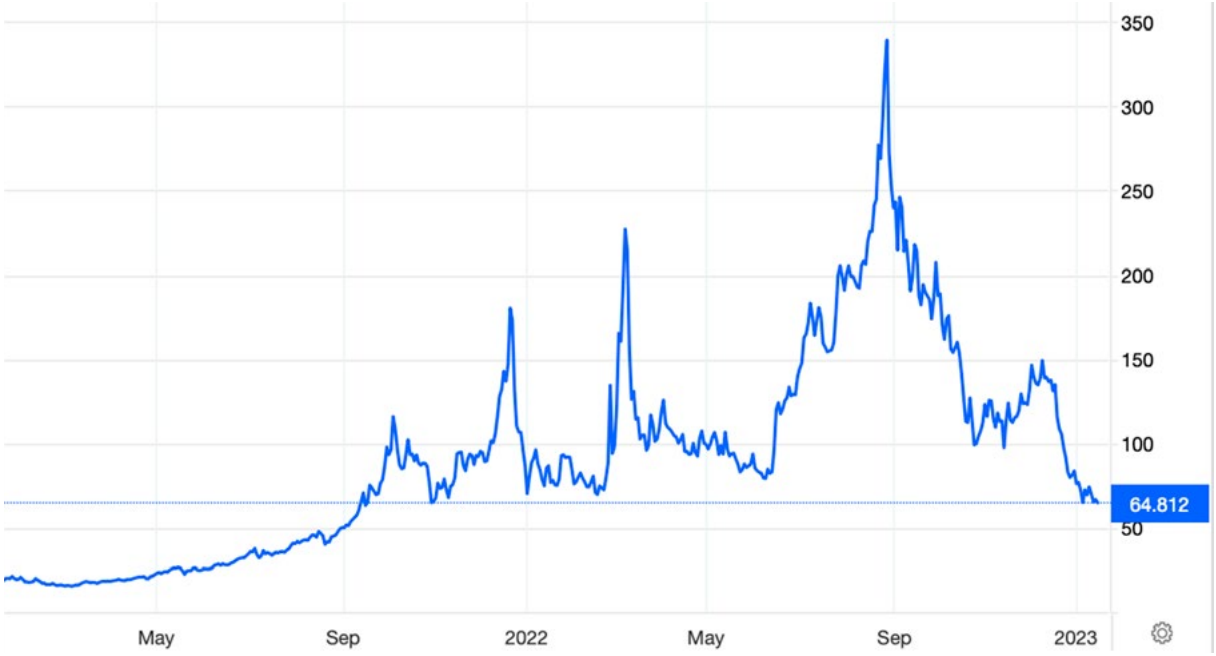
[9] For the Social Climate Fund (SCF) see https://www.europarl.europa.eu/doceo/document/TA-9-2022-0247_EN.html and for ETS II see https://www.europarl.europa.eu/legislative-train/package-fit-for-55/file-revision-of-the-eu-emission-trading-system-(ets)

[10] https://www.euractiv.com/section/energy/news/germany-moves-ahead-with-energy-efficiency-law-amid-ongoing-eu-talks/

[11] https://www.businessgreen.com/news/4060712/reports-government-poised-launch-gbp25m-public-energy-saving-campaign

Figure 6. **Natural Gas EU Dutch TTF (EUR/MWh)**



An unusual growth in gas prices, later attributed to a probably deliberate reduction in supplies, began in August 2021.
Source: Trading Economics, TTF gas prices

These plans should be part of the risk management toolkit of each national and local government in the same way as fire evacuation plans are part of the management toolkit of every single public building. The European Commission should initiate and support the preparation of such plans. Thus far, when it comes to emergency energy saving, European governments have followed the principle 'don't mention the war'. This is understandable from a populistic political point of view since energy saving is often seen as an intervention against the most precious thing voters demand – consumerist comfort. Nevertheless, there is a war, the war should be discussed in all its dimensions, including the need for a wartime energy and economic policy. And that means resource efficiency.

7.1.2 Regional Energy Efficiency Financial Platform

The idea of a Regional Energy Efficiency Financial Platform has been discussed in different forms and formats many times, but it has not advanced very far. To capture the opportunities for improvement in the field of energy efficiency, the CEE region needs higher financial competence and much more proactive project-focused expertise that can structure financial proposals, design adequate financial instruments, aggregate small projects into large bankable projects and bring financial institutions and clients together.

Such a platform could be run, or be an extension of, the European Investment Bank. It could be run jointly with, or separately, by the European Bank for Reconstruction and Development. It could be tendered to other public or private financial institutions, or it could be set up as a new institution. What is important however is that such a platform must have commercial agility, access to best practices, local presence, and high technical and financial competence. The Platform should be able to significantly accelerate energy efficiency improvements as well as innovation in the building sector; in CEE states this is currently very far from the cutting edge of technology (with the exception of some individual high-profile buildings which do not pass this experience to the rest of the sector.)

7.2 Further measures

In addition to the emergency energy saving plans and the Regional Energy Efficiency Financial Platform, this paper suggests some further measures

that could also increase the rate of energy efficiency improvement in the region. These are general recommendations that could be implemented on a local or national level and could be also integrated into EU level actions, including as part of EU funding conditionality. They are grouped into four themes: legislation, finance, industry and education.

7.2.1 Legislation

- Adopt or amend **climate legislation** to include clear, ambitious, measurable and verifiable annual targets for reducing emissions through energy efficiency improvements.
- Adopt separate **legislation for energy efficiency** improvement, that would incentivise utility companies, other businesses, building owners and tenants to increase their ambition.
- Introduce mandatory '**green roofs**'[12] for all new buildings and all buildings undergoing substantial renovation.
- **Remove all indiscriminate subsidies** of energy prices and replace them with targeted support for energy-poor and vulnerable institutions. Include the option of converting energy poverty support into energy efficiency improvements.
- Introduce **a ban on gas boilers** in new buildings and legislative incentives for the replacement of local and centralised gas heating systems with heat pumps, solar heating and other alternative solutions.
- Introduce a special programme for a mass installation of **heat pumps** on local and district levels. Support national R&D and learning in the field of heat pump development.

7.2.2 Finance

- There should be no 100% grants. All programmes for 100%, or near 100%, financial support for energy renovation of buildings should be replaced with financial instruments to capture future energy savings. Public authorities should offer long-term low or zero-interest loans, on-the-bill repayment loans, and other instruments that could attract significant additional investment in energy efficiency improvement.
- Aim for a 1-to-5 ratio of financial leverage: public grants should produce on average 5 times higher level of external investments.
- Introduce large-scale and variety of Energy Service Company (ESCO) and energy performance contracts in building renovation.[13] ESCO-type contracts should also be able to cover (at least partially) the initial investment, especially in the amount of the real financial savings expected as a result of building renovation.
- Blended finance should be mandatory when it comes to financial sources and instruments.
- Develop adequate proposals for utilisation of financial flows from ETS II. ETS II, specifically emission trading for the buildings sector, could be a strong and ongoing source of funding for improvement of building efficiency and quality.

7.2.3 Industry

- Most building materials are local; you do not usually import bricks from Denmark to Romania. Advanced manufacturing is important for the implementation of best practices, and CEE states should support the development of a building materials manufacturing base.
- While you can import heat pumps or air-conditioning units from Japan or elsewhere, it is important for the building industry ecosystem to have heating and cooling engineering knowledge on a national level.

[12] In this case 'green roof' should be understood as a roof of a building that has good insolation, optional soil and grass cover, PV panels and/or solar collectors.

[13] ESCOs supply and install energy efficient equipment, and 'accept some degree of risk for the achievement of improved energy efficiency in a user's facility and have their payment for the services delivered based (either in whole or at least in part) on the achievement of those energy efficiency improvements.' https://joint-research-centre.ec.europa.eu/energy-efficiency/support-energy-efficiency-directive-eed/energy-service-companies_en

- The IT sector is booming in the CEE region, but it is rarely linked to the opportunities it presents to the building's performance and generally to reducing energy use. Policies and incentives to encourage the talent in the region to address the energy efficiency question through IT are needed.

7.2.4 Education

- Expand and deepen vocational and adult training related to the full supply chain of buildings retrofit. Invest in apprenticeship, international exchanges, application of new materials, IT applications in the building sector, and modern cooling and heating technologies.

- Invest in research, understanding, applying and developing new materials for the building sector including materials and components for offsite building preparation (widely used in the region in the past), and low carbon footprint materials.

- Media can play a critical role in the improvement of the energy performance of residential buildings since this is a sector where lack of information and natural resistance to change are major barriers to action. EU funds should not be spent on media promotion and advertising of EU spent funds, but rather on informing people how to accelerate the promised renovation wave.

- Building retrofit is a complex social process that involves parts of society far beyond companies and clients. Mass education to help the public understand the value of building improvement and the benefits of better building performance is essential if there is to be widespread support for and participation in energy efficiency policies and their implementation.

- Invest in building performance innovation. The building sector is both highly innovative and very conservative. Innovation might be high in selected locations and buildings but otherwise, it travels very slowly.

8. Conclusion

Energy efficiency in Central and Eastern Europe is to a large extent politically ignored, whereas it should be an essential subject of these states' social, climate, energy and security strategies. Local and central governments and the EU institutions must engage much more decisively with policies for improving the energy efficiency characteristics of the CEE countries, especially in residential and public buildings and transport. While we frequently preach the 'efficiency first' principle, in fact, efficiency often comes last. This must change if we want to see the East-West divide narrowing rather than widening, and if we want to see a more cohesive and stronger Europe.

'Energy efficiency in Central and Eastern Europe is to a large extent politically ignored, whereas it should be an essential subject of these states' social, climate, energy and security strategies.'

This paper has put forward two key policies to accelerate the improvement of the energy efficiency level of the region: introducing emergency energy saving plans, which should mitigate sudden energy supply shocks and setting up a regional energy efficiency financial platform to facilitate investments in energy efficiency projects in the region. And it has suggested a series of further legislative, financial, industrial and educational measures to speed up the energy efficiency improvements in the region.

In doing so the aim of it is not to offer complete solutions for the energy efficiency 'curse' of the CEE region, but to trigger a debate and attract more attention – and ultimately, more expertise and resource – to a serious problem for the European Union.