Which energy investments can address energy poverty and climate change at the same time?

A new cost-benefit analysis shows which investments are needed in Central and Eastern Europe to help the people, the environment and the economy

Briefing for media and policy makers

GREENPEACE

"...gas investments bring the lowest benefit and greatest losses to the national economy. In contrast, zero-energy buildings are everywhere the most cost-efficient option."

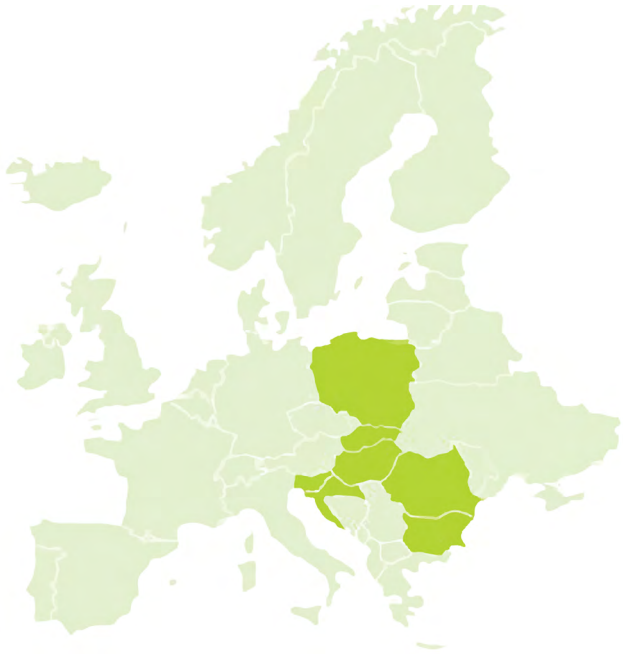
Greenpeace Central and Eastern Europe (CEE) has commissioned the Institute for European Energy and Climate Policy (IEECP) to prepare the ***Cost-benefit Analyses of Investments in the Energy Saving Measures of the Residential Sector in Central and Eastern Europe***. The cost-benefit analysis was prepared for seven countries, namely Bulgaria, Croatia, Hungary, Poland, Romania, Slovakia, Slovenia.

The analysis shows that from an economic perspective, support for a fossil fuel infrastructure has the lowest cost-benefit ratio in all the examined countries, while the most socially and economically profitable solutions are the renovation of building stock, concurrently promoting the installation of both heat pumps and photovoltaics.

Summary of the findings of the report with EU-level demands

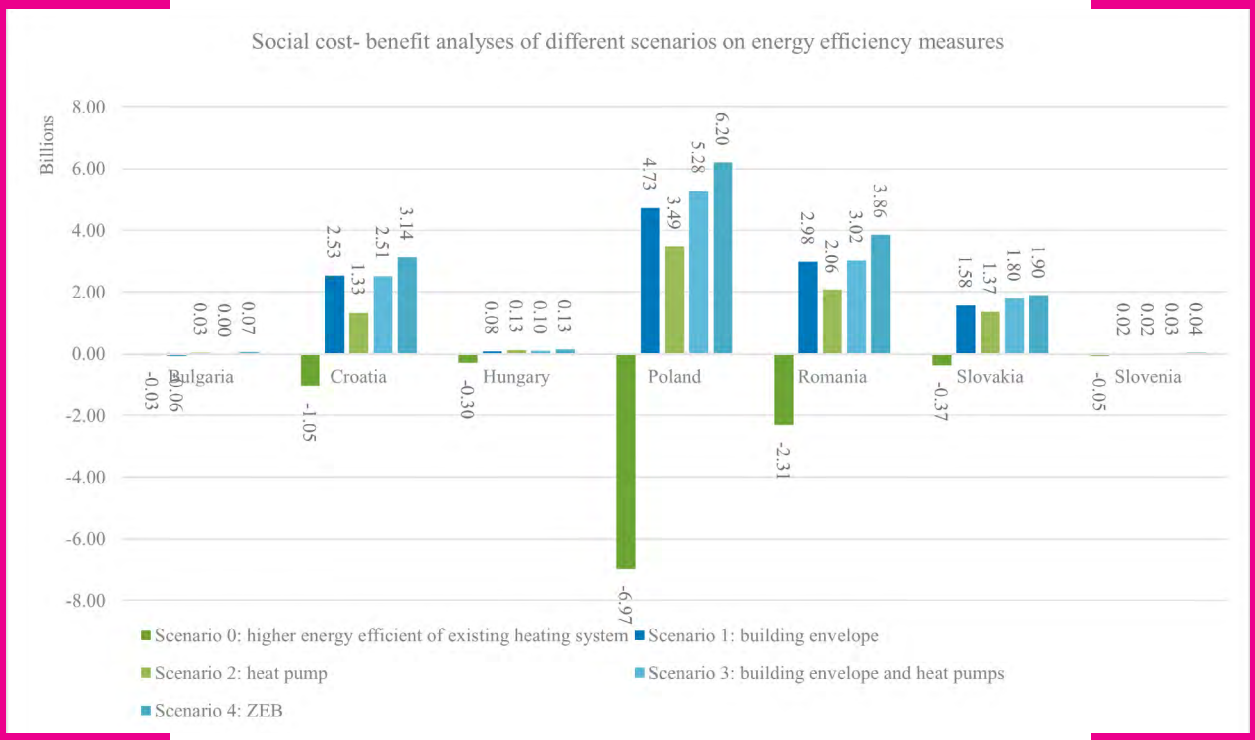
The purpose of the report is to examine, through simulating different policy measures, how the European Union's (EU) Energy Efficiency First principle is implemented. The study demonstrates how budgets devoted to fossil-fuels infrastructure and supply to different countries in Central and Eastern Europe could be utilised in an alternative way in order to achieve energy-efficient improvements through the implementation of different policy measures. These include ones suggesting the utilisation of renewable energy sources, specifically focused on space heating. The countries examined are Bulgaria, Croatia, Hungary, Poland, Romania, Slovakia and Slovenia.

Four scenarios were delineated to show different types of investment on the demand side, in addition to the baseline scenario where an improvement to existing fossil-fuel boilers was considered. The first scenario was the energy retrofitting of the building envelope, the second was the installation of heat pumps. The third scenario was the combination of the first two scenarios (energy retrofit and heat pumps). The final one was the combination of the first two, plus the implementation of solar photovoltaics to obtain zero-energy buildings.



The IEECP compared the financial, social and environmental benefits of different investment scenarios, as outlined by the EU's Energy Efficiency First Principle, through a social cost-benefit analysis, following a methodology developed as part of the EU funded Horizon 2020 programme PRODESA.

The results of the analysis show that energy efficiency and investment in renewables would create a substantially greater benefit for households, businesses and the overall national economy than investing in gas infrastructure. Outcomes were always negative across the region for the planned fossil-gas investments.



Based on the results of the study, Greenpeace CEE calls on the governments of the region to cancel their planned fossil-gas infrastructure projects, and instead launch ambitious programmes for the energy upgrade of residential buildings. This would accelerate energy-efficient upgrades and increase the number of zero-energy buildings.

In addition, Greenpeace calls on the EU to phase out fossil gas by 2035 at the latest and rapidly introduce sufficient measures for member states to align with the EU's Energy Efficiency First Principle, such as new programmes to hasten the rollout of deep renovations and renewable heating, like heat pumps, across the EU. In particular, negotiations on the Energy Performance of Buildings Directive (EPBD) must lead to mandatory renovation of buildings, ensuring that this is done fairly and that EU governments put in place supporting schemes and subsidies to prevent citizens from bearing the cost of these renovations. The directive must also pave the way for a full phase-out of fossil heating, leaving no space for costly false solutions like hybrid or hydrogen boilers. The EU must also make ending energy poverty a priority of current and future energy legislation starting from measures that can be easily implemented across member states like an EU wide ban on energy disconnections.

This year, EU governments will update their National Energy and Climate Plans. The European Commission must, in its assessment of EU countries' plans, prioritise energy savings measures and conditions which support the energy transition, such as public funding for insulation, renewable heating, and the phase-out of fossil fuel subsidies. Finally, the Resilience and Recovery funds and REPowerEU funds should go towards deep renovations and energy demand reduction, not fossil fuel investments.

Context

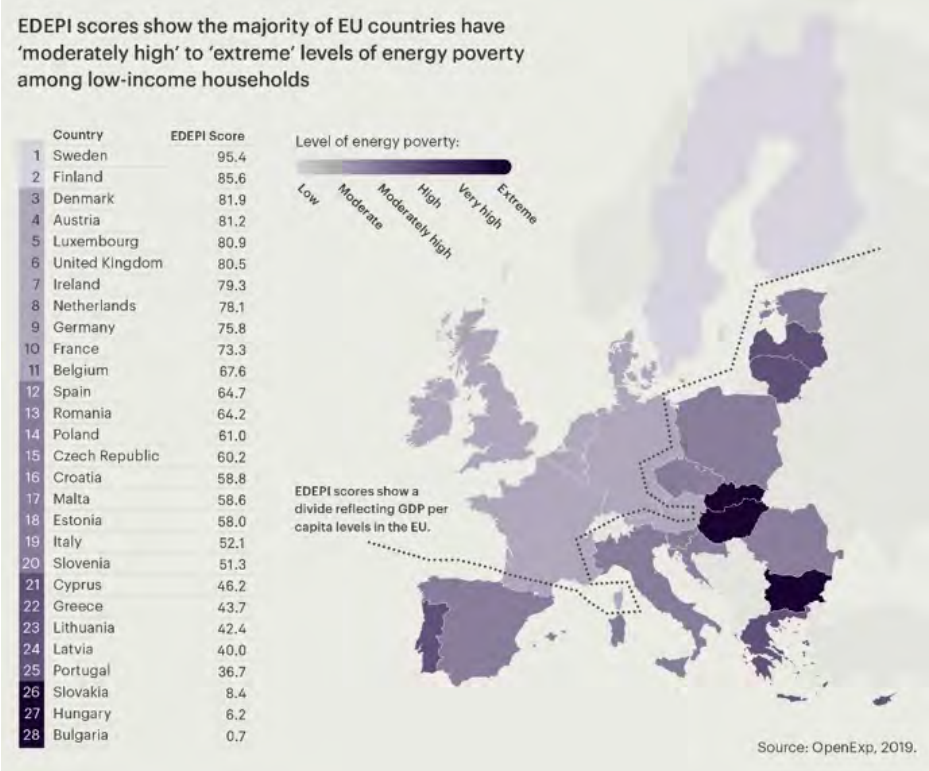
All over Central and Eastern Europe, governments have been planning to extend their fossil-fuel infrastructure since 2021, primarily investing in fossil gas and biomass, according to what is outlined in the National Investment Programmes, the National Recovery and Resilience Plans, the Large Infrastructure Operational Programmes, the Sustainable Development Operational Programmes and the Modernisation Funds submitted by the governments of the seven countries examined in the report.

The total amount the governments were planning to spend on fossil-fuel infrastructure is a little over €21 billion. Such investments would clearly derail Europe from the path to climate neutrality by 2050.

Fossil fuels are expensive and predominantly imported into these countries. In addition, they are largely responsible for this past winter's spike in energy prices. Yet Europe's quest for gas and other fossil fuels is often being falsely framed as necessary to solve the current energy crisis and achieve energy security.

The cost-benefit analysis examines whether these proposed projects make sense in financial and energy terms, and investigates whether they deprive Central and Eastern European countries of valuable economic resources for other, more meaningful and necessary energy efficiency, and renewable energy projects.

The report considers the specific challenges faced by the region regarding the lack of energy efficiency in the built environment due to historic reasons, and the region's disproportionally high dependence on climate-damaging and expensive fossil fuels used for household heating.



	Country	EDEPI Score
1	Sweden	95.4
2	Finland	85.6
3	Denmark	81.9
4	Austria	81.2
5	Luxembourg	80.9
6	United Kingdom	80.5
7	Ireland	79.3
8	Netherlands	78.1
9	Germany	75.8
10	France	73.3
11	Belgium	67.6
12	Spain	64.7
13	Romania	64.2
14	Poland	61.0
15	Czech Republic	60.2
16	Croatia	58.8
17	Malta	58.6
18	Estonia	58.0
19	Italy	52.1
20	Slovenia	51.3
21	Cyprus	46.2
22	Greece	43.7
23	Lithuania	42.4
24	Latvia	40.0
25	Portugal	36.7
26	Slovakia	8.4
27	Hungary	6.2
28	Bulgaria	0.7

Ranking of countries based on the EU Domestic Energy Poverty Index (EDEPI)

Energy poverty levels are higher in CEE than in the rest of the continent. Central and Eastern European citizens take up a large amount of the 80 million citizens of the EU who cannot afford basic energy services to support their health and well-being.

Although the renovation rate varies significantly across the region, it is much lower in CEE countries than in the rest of Europe. Currently, only 3% of the public funds that could be used to support energy-efficient investments in the Central and Eastern European region is dedicated to upgrading buildings. At the same time, most of the heating and cooling needs of the region's households are met through polluting and expensive fossil fuels. As a result, Central and Eastern European citizens use (and therefore, pay for) more energy than the EU average while they also have lower economic output and lower standards of living.

Only 0.12% of Polish buildings are renovated each year compared to 2% in France.

Homes in Romania are losing heat almost four times as fast as homes in Sweden.

40% of Bulgarian households are at a risk of energy poverty, compared to 9% EU average.

In Europe, residential buildings are responsible for 40% of final energy consumption and 36% of greenhouse gas emissions. The European Commission is requesting member states proceed immediately to a Renovation Wave, leading to a decarbonised building sector by 2050. The European Commission plans to phase out the use of fossil fuels used for heating of new buildings by 2030, while requiring member states to adopt rules for Nearly-Zero-Emission Buildings (NZEB) and Zero-Emission Buildings (ZEB) by 2030, with mandatory use of renewables for the energy they consume.

Methodology

The report examines four scenarios (see below) across the region to investigate different ways of using the budget available for the development and expansion of fossil-fuel infrastructure to finance investments into energy savings and renewables. The scenarios for which the study conducts economic and social cost-benefit analyses are:

Scenario 0
Investment in gas expansion by installing higher energy-efficient gas boilers

Scenario 1
Energy upgrade of building envelopes

Scenario 2
Heat-pump installation

Scenario 3
Integrated energy retrofitting including the energy upgrade of the building envelopes and installation of heat pumps

Scenario 4
Zero-energy buildings

In the case of Romania, an additional scenario was also examined: the installation of photovoltaic solar panels. This is due to the fact that the Romanian government has recently shown an inclination to boost solar deployment there. It will construct Europe's largest solar plant, while the government also aims to support households installing solar panels.

The Cost Benefit Analysis (CBA) is used to show the social profitability of the examined projects. The overall objectives of CBA for the economy and society are to:

- **Evaluate the impact of investments.**
- **Justify the feasibility of implementing a specific investment (yes/no decision).**
- **Select a suitable choice, and maximise the net benefits, among the different scenarios.**

In addition to the original CBA, this report focuses on **the social CBA (SCBA)** that includes each factor in the CBA analysis, and, on top of that, the environmental and social impact of the project concerned. This calculation compares the supply investments to those on the demand side, and the evaluation takes into consideration the impact on society as a whole.

The Social Cost Benefit Analysis (SCBA)

For each scenario, an assessment of the social and environmental impact was conducted in addition to their financial one, in line with the EU's Energy Efficiency First Principle. The methodological approach of applying SCBA was developed within the framework of the European project PRODESA[1]. This quantifies different external effects - either positive or negative – such as:

- **the environmental cost of the studied technologies;**
- **the increase in the value of residential buildings due to energy upgrading;**
- **multiple benefits from energy saving interventions, such as the improvement of comfort conditions in buildings, reduction of energy poverty, reduction of morbidity and mortality, etc.**

The results of the Social Cost Benefit Analysis for each scenario were calculated by examining both the financial and the social benefits.

To examine financial benefits, the well-known financial indicators of the **Net Present Value (NPV)** and the **Internal Rate of Return (IRR)** were used.

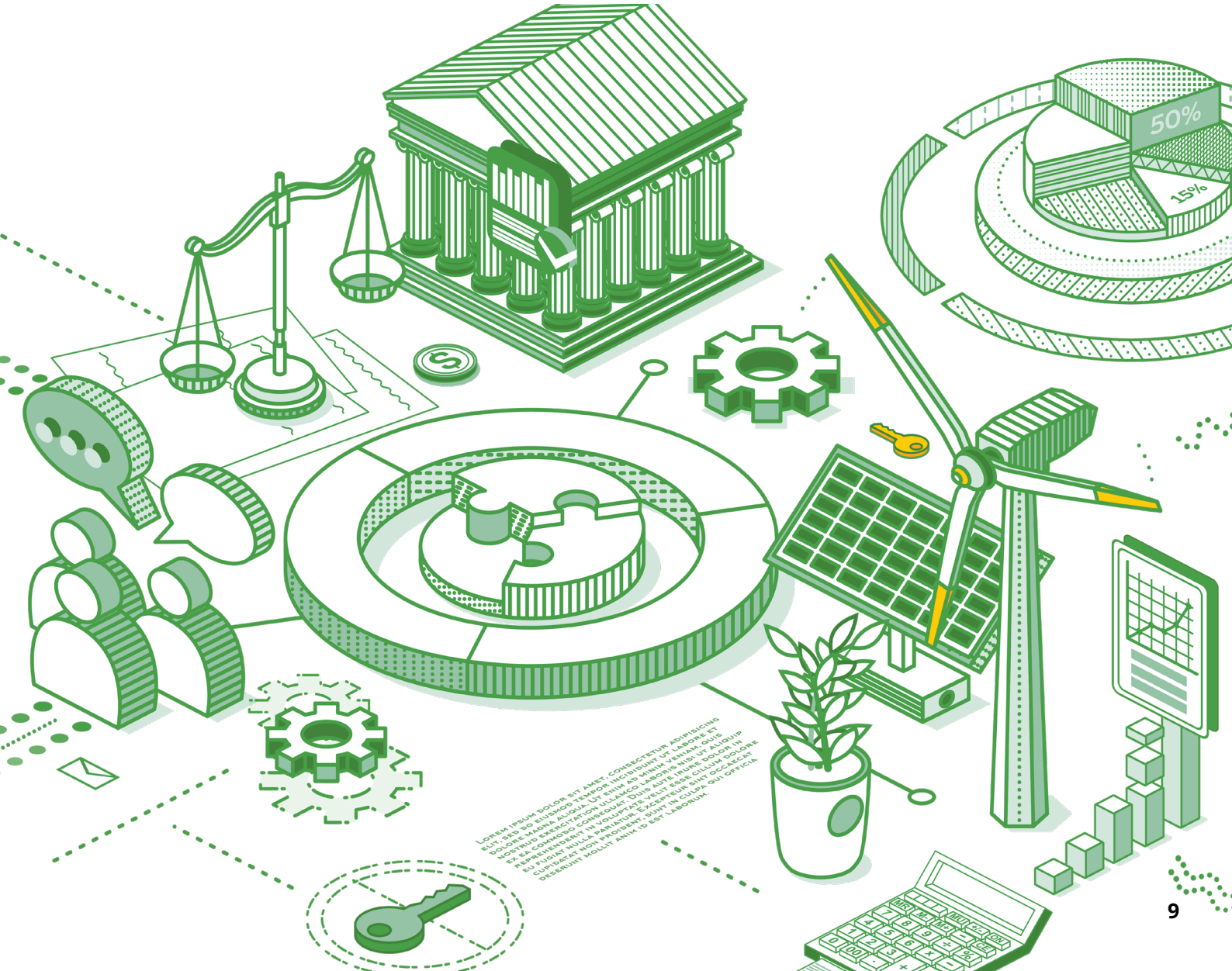
Net Present Value (NPV): Expresses the net value (benefit or cost) resulting from the current discount of the annual net cash flows (i.e. the cash position) during the lifeline of an investment. If the NPV is positive (>0), the investment will be approved; otherwise, it will be rejected.

Internal Rate of Return (IRR): Expresses the discount rate at which the NPV is zeroed, and therefore the return on investment is assessed by comparing the IRR to the discount rate. If the IRR is higher than the discount rate, the investment will be approved; otherwise, it will be rejected.

In addition, the SCBA also takes into account **the social NPV** and **social IRR**.

1 PRODESA, 2021. Economic evaluation of the energy efficiency projects, Deliverable D2.6.

If an investment is beneficial economically, socially and environmentally (high financial and social NPV or IRR), then the government should promote this investment through its respective policies. If an investment is not economically beneficial but it is socially important, the government should provide financial support to enable its implementation. However, if an investment is not socially beneficial, then the government should not finance it, regardless of whether it is economically beneficial or not. In this case, the government should issue penalties to investors, and offer incentives (e.g. tax allowances) that distribute the economic benefits among different groups.



Results

The real economic and social benefit for Central and Eastern Europe lies in the energy efficiency of buildings, not in new fossil-fuel projects.

The results show that from a purely economic point of view, support for the fossil-fuel infrastructure (Scenario 0) has the lowest cost-benefit ratio in all CEE countries. This means that among all the scenarios investigated, gas investment brings the lowest benefit and greatest losses to the national economy. By contrast, zero-energy buildings are the most cost-efficient option everywhere (Scenario 4).

When calculating the multiple benefits of energy efficiency and carrying out a social cost-benefit analysis, energy-efficient upgrades together with all heating decarbonisation measures prove positive in terms of a cost-benefit ratio, and the most efficient are zero-energy buildings. The substitution of fossil-fuel boilers for more efficient ones and the general support for a fossil-fuel infrastructure also proves negative from the analysis of social-cost benefits in all countries

The most socially and economically profitable solution across the whole region, in all seven countries examined, is renovation of the building stock with the installation of both heat pumps and photovoltaics. Renovation is in all cases considered more economically viable than public spending on fossil-fuel systems.

According to the analysis, almost 730,000 zero-energy buildings can be developed in the region if the budget currently allocated to fossil-fuel investment were directed to a zero energy buildings strategy in CEE.

Policy Proposals for CEE governments

The analysis prepared by the IEECP has identified that Central and Eastern European households could benefit considerably if governments diverted funds currently earmarked for the expansion of fossil-fuel networks to the energy retrofitting of residential buildings. The most socially and economically profitable solution is renovation of the building stock with the installation of both heat pumps and photovoltaics, in line with the EU's Renovation Wave Strategy and the revised Energy Performance of Buildings Directives.

Buildings in Europe account for 40% of total energy use, making them the largest source of greenhouse gas emissions. Buildings are arguably Europe's biggest energy wasters. For that reason, the EU commission has defined strategies for member states to accelerate the energy transition in the building sector including the Fit for 55, Renovation Wave Strategy and REPowerEU.

The prioritisation of investments in energy upgrades should be fully in line with the European Energy Efficiency First Principle (as defined in the European Governance Regulation and the Revised Energy Efficiency Directive – Article 3 – in the Fit-for-55 package presented by the European Commission). With its REPowerEU, the EU commission encourages member states to find the quickest and cheapest ways to address the current energy crisis, and reduce bills for their citizens, doubling solar photovoltaic capacity and the rate of deployment of heat pumps. According to the results of the current research, policy interventions in CEE need to be more modified towards the demand-side interventions in energy-efficient renovations and the deployment of renewable energy for heating rather than fossil-fuel infrastructural development on the supply-side.

Grants for the renovation of the building envelope and zero-energy buildings should be at the heart of the revised National Energy and Climate Plans' (NECP) policies in all CEE countries, and financing should be provided for the required investments.

Overall, based on the economic and socio-economic performance of different investment plans examined, the report proves that public spending should not be targeted at further fossil-fuel infrastructure in CEE countries, but rather on energy-efficient upgrades and zero-energy buildings to benefit the people, the environment and the economy.

Report title: ***Cost-benefit Analyses of Investments in the Energy Saving Measures of the Residential Sector in Central and Eastern Europe.***

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