IEECP INSTITUTE FOR EUROPEAN ENERGY AND CLIMATE POLICY

GREENPEACE

Financial Analysis

Fossil gas vs energy-saving investments in the residential sector in Romania

April 2023

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Executive Summary

The real financial benefit for Romania lies in energy efficiency, not in new fossil gas projects.

A cost-benefit analysis by the Institute for European Energy and Climate Policy, commissioned by Greenpeace Central and Eastern Europe, shows that it would be much more beneficial financially for the Romanian economy and society if the €4.35 billion earmarked for new fossil gas projects mainly under National Investment Program of Romania and Romania's National Recovery and Resilience Plan was directed instead to energy retrofits and installation of renewable energy in Romanian residential buildings.

Summary

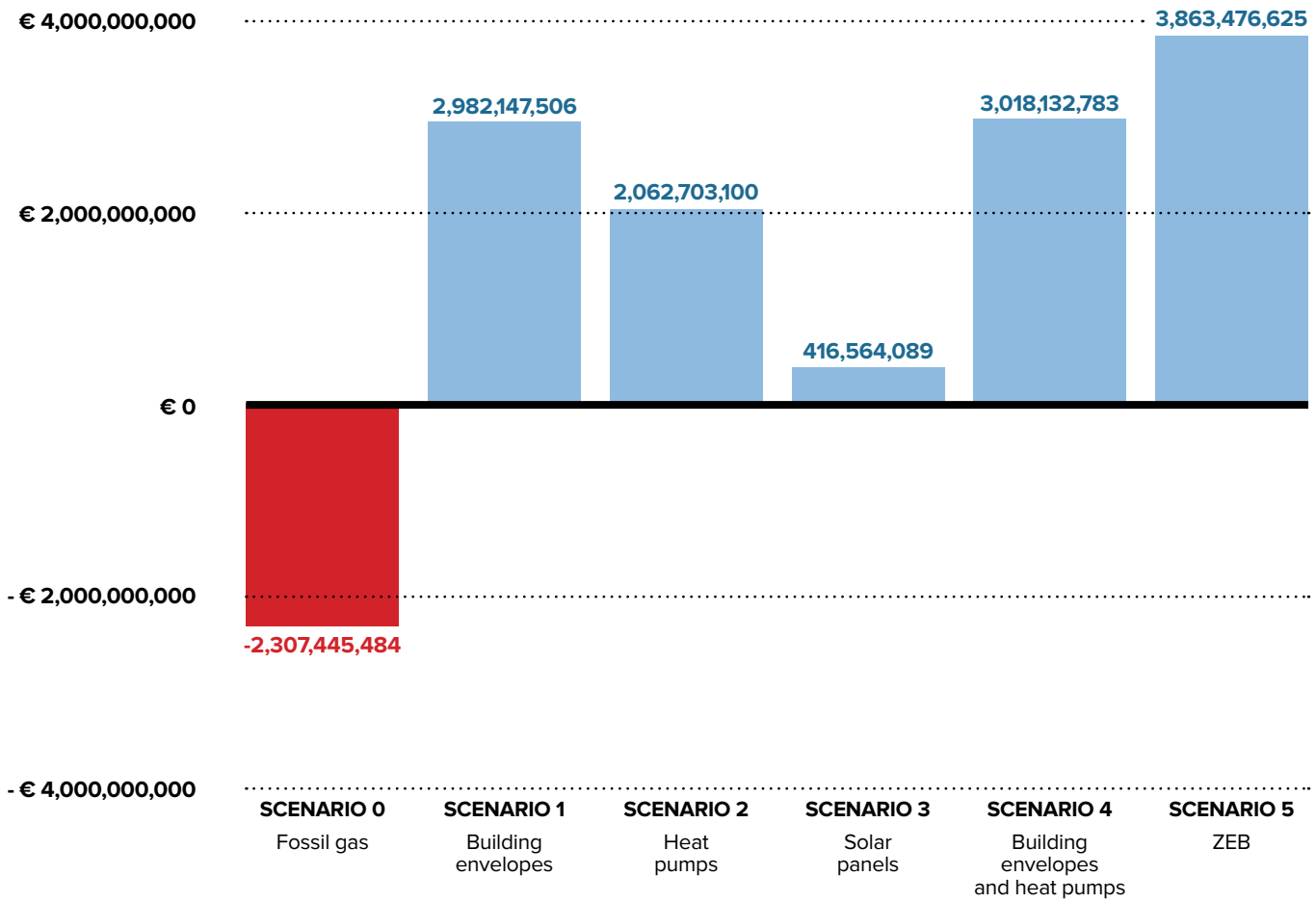
Greenpeace Central and Eastern Europe commissioned the Institute for European Energy and Climate Policy (IEECP) to prepare a cost-benefit analysis for Romania that compares investments in gas infrastructure development to investments in renewable and energy efficiency. The study examines what would happen if instead of spending €4.35 billion on new fossil gas projects as planned according to the to the National Investment Program, the National Recovery and Resilience Plan, the Large Infrastructure Operational Program, the Sustainable Development Operational Program and the Modernisation Fund, Romania used the same amount to finance energy efficiency investments in residential buildings. The result shows that energy efficiency and renewable investments would create a substantially greater economic and social benefit for households, businesses and the overall national economy than investing into gas infrastructure.

IEECP designed 6 scenarios:

SCENARIO 0	**investment into fossil gas infrastructure by installing higher energy efficient boiler;**
SCENARIO 1	**building envelope, i.e., insulation and window frames;**
SCENARIO 2	**installation of heat pumps;**
SCENARIO 3	**installation of photovoltaic solar panel;**
SCENARIO 4	**integrated energy retrofitting of the energy upgrade of the building envelopes and installations of the heat pump;**
SCENARIO 5	**zero emissions building (ZEB) - thermal insulation of external walls, replacement of window frames with new energy efficient ones, installation of photovoltaic solar panels and installation of heat pumps.**

IEECP compared the financial, social and environmental benefits of the different investment scenarios, in line with the EU's Energy Efficiency First Principle.[1] It found that under all circumstances, investing in energy efficiency and RES in residential buildings brings positive socio economic returns, while investing in gas always performs badly when we look at return on investment and social impact on society. In fact, the return on investments varies from positive to very high for all scenarios of energy efficiency and Renewables in buildings, while, on the contrary, they were negative for the planned fossil gas investments.

Social Cost Benefit analysis for each Scenario - Net Present Value (€)

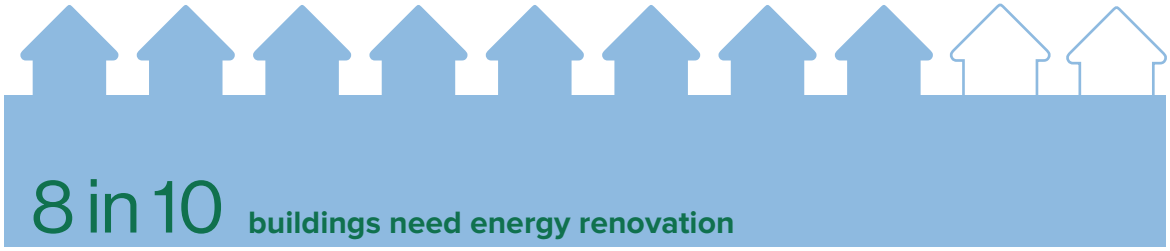


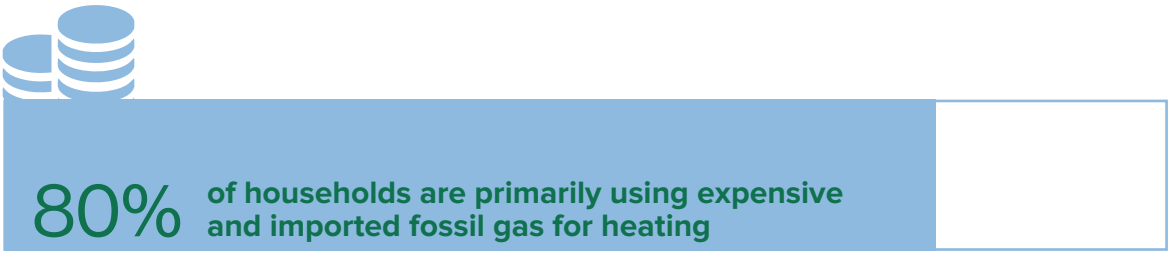
1. The EU's Energy Efficient First Principle says that a government first ought to thoroughly check whether an investment in supply infrastructure, such as new gas pipelines, is really needed or it can be avoided because another investment in energy efficiency has similar, or better, value for the energy system, the economy, the environment and the society.

Introduction

The Romanian government plans to extend its fossil gas grids and storage facilities by 2030 under Romania's National Investment Program, the National Recovery and Resilience Plan, the Large Infrastructure Operational Program, the Sustainable Development Operational Program and the Modernisation Fund at a total cost of €4.35 billion.

Given that fossil gas is an expensive fossil fuel, which is largely responsible for this winter's spike in energy prices and the related energy crisis, the question arises whether on one hand these proposed projects make sense, in financial and energy terms, and on the other whether they deprive Romania of valuable economic resources for other, more meaningful and necessary, projects.





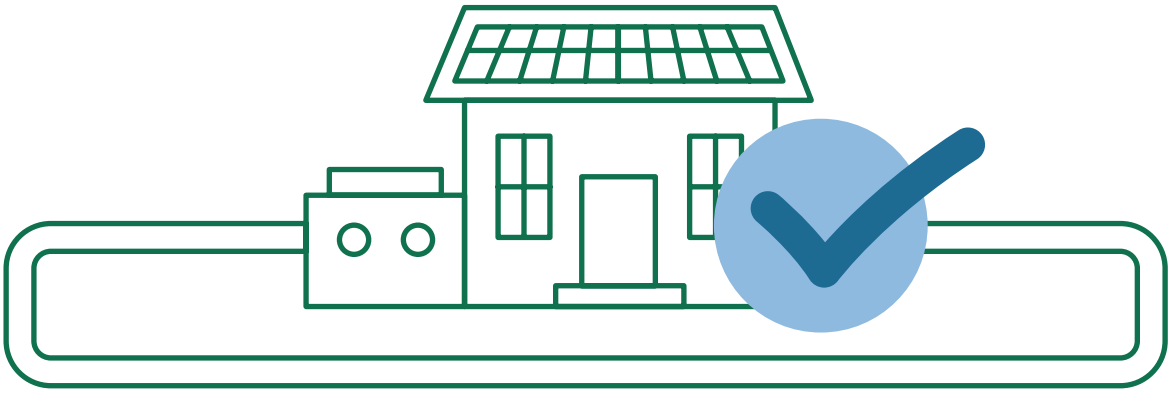
Buildings in Romania have a very low rate of energy efficiency, with 8 in 10 buildings (77%) needing energy renovation, being built before 1980 and lacking energy efficiency standards for the building envelope. This results in households and businesses being subject to disproportionately high expenses for heating and cooling, while at the same time still having to endure uncomfortable living conditions.

The inability of many households to afford ever rising energy bills has led to a dramatic increase in energy poverty. Romania presents the highest percentage of people at risk of poverty or social exclusion within the EU. Poverty remains widespread and unfortunately increasing in rural areas. This contributes to high-income inequality and also to energy poverty. Energy poverty affects 1 in 3 households in Romania. This means that more than 2 millions households in Romania have difficulties paying their electricity bills, cannot heat their homes properly or do not have access to affordable sources of energy supply.

The European Commission is asking member-states to immediately proceed to a Renovation Wave leading to a decarbonised building sector by 2050. More specifically, the European Commission plans to phase out the use of fossil fuels used for heating to new buildings by 2030, while requiring member-states to adopt rules for Nearly Zero Energy Buildings (NZEB) and Zero Emissions Buildings (ZEB) by 2030, with mandatory use of RES for the energy they consume.

Equally important, the EU's Energy Efficiency First Principle requires member states prior to any public financing for developing energy supply projects, for example new gas pipelines, grids etc., to compare through a cost-benefit analysis the benefits of similar sized public spending on demand measures (such as energy savings). If the cost-benefit analysis shows higher benefits in energy savings, then the public financing for the supply projects is not justified.

The technical report "Fossil gas vs energy-saving investments in the residential sector in Romania" by IEECP proves beyond any doubt that investments in energy savings and renewable energy in buildings, instead of the planned fossil gas projects, will create a far greater economic and social benefit for households, businesses and the Romanian society in general.



Methodology

The study examined 6 different scenarios, according to which the largest part of the budget available for the development and expansion of fossil gas networks (€4.35 billion) according to the to the National Investment Program, the National Recovery and Resilience Plan, the Large Infrastructure Operational Program, the Sustainable Development Operational Program and the Modernisation Fund is utilised to finance interventions in Renewables and energy savings. The scenarios under study are:

SCENARIO 0 (baseline scenario)

Investments on gas expansion by installing higher energy efficient gas boilers

SCENARIO 1

Energy upgrade of the building envelopes

SCENARIO 2

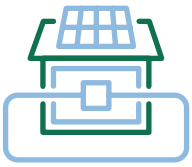
Heat pump installation

SCENARIO 3

Photovoltaic solar panel installation

SCENARIO 4

Integrated energy retrofitting including the energy upgrade of the building envelopes and installations of the heat pump



SCENARIO 5

Zero emission building (ZEB) including the thermal insulation of external walls, the replacement of existing window frames with new energy efficient ones, and the installation of photovoltaic solar panels and heat pumps

The financial and social cost-benefit assessments

For each scenario, two assessments were carried out:

a purely financial assessment **(Cost-Benefit Analysis)**

an assessment of the social and environmental impacts in line with the EU's Energy Efficiency First Principle **(Social Cost-Benefit Analysis)**

For the latter, the methodological approach developed in the framework of the European project PRODESA4 was applied, which quantifies external effects - either positive or negative - such as:

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

The results of the Cost-Benefit Analysis and Social Cost-Benefit Analysis for each scenario were calculated using well-known financial indicators, such as the Net Present Value (NPV) and the Internal Rate of Return (IRR).

Net Present Value (NPV)

Expresses the net value (benefit or cost) resulting from the discounting in the present of the annual net cash flows (i.e. the cash position) during the lifeline of an investment. If 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 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.

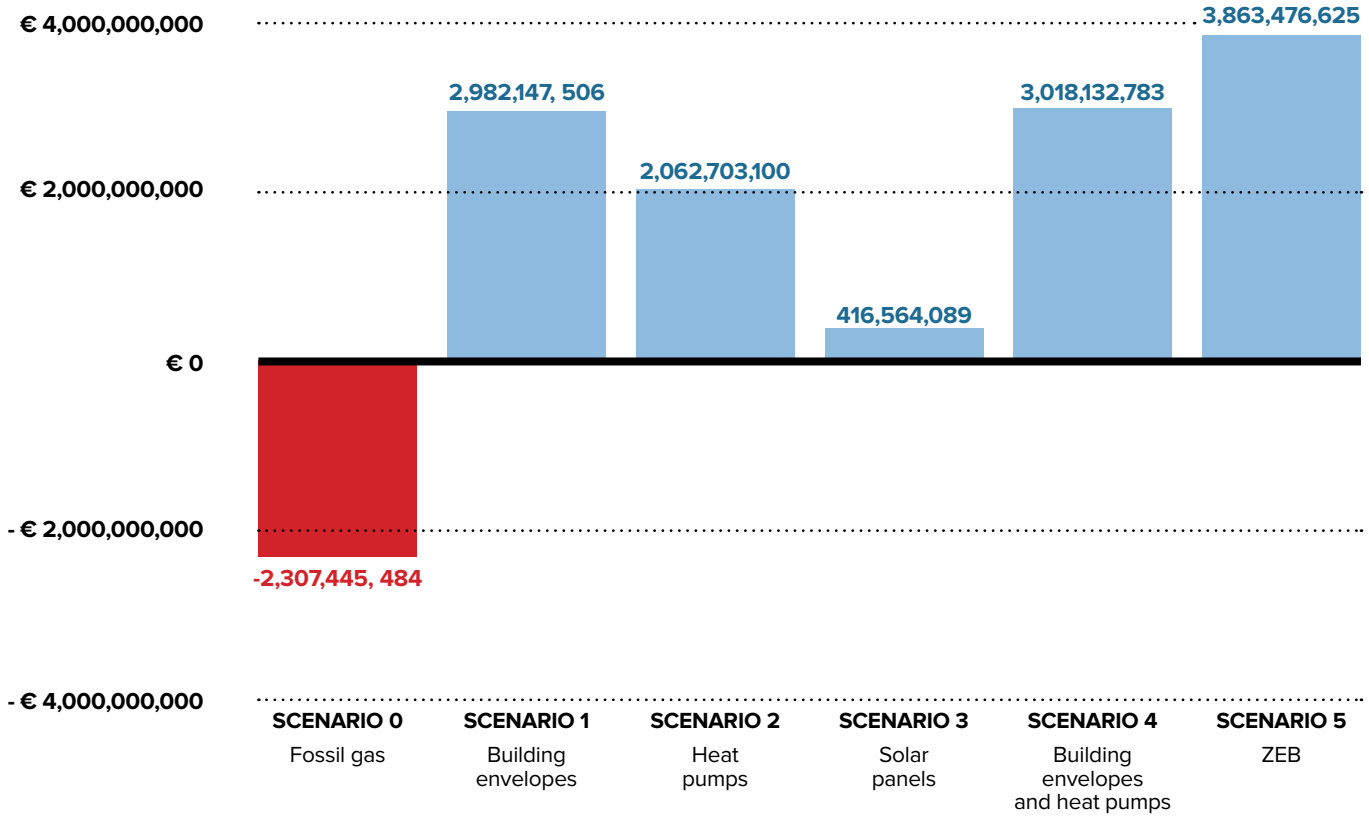
Therefore, if an investment is not efficient purely financially (low NPV and IRR values) but is efficient socially and environmentally (high NPV and IRR values), then the government ought to promote this investment through the respective policies and proper financing.

On the contrary, if an investment is not socially efficient then the government should not finance it, regardless of whether it is financially efficient or not.

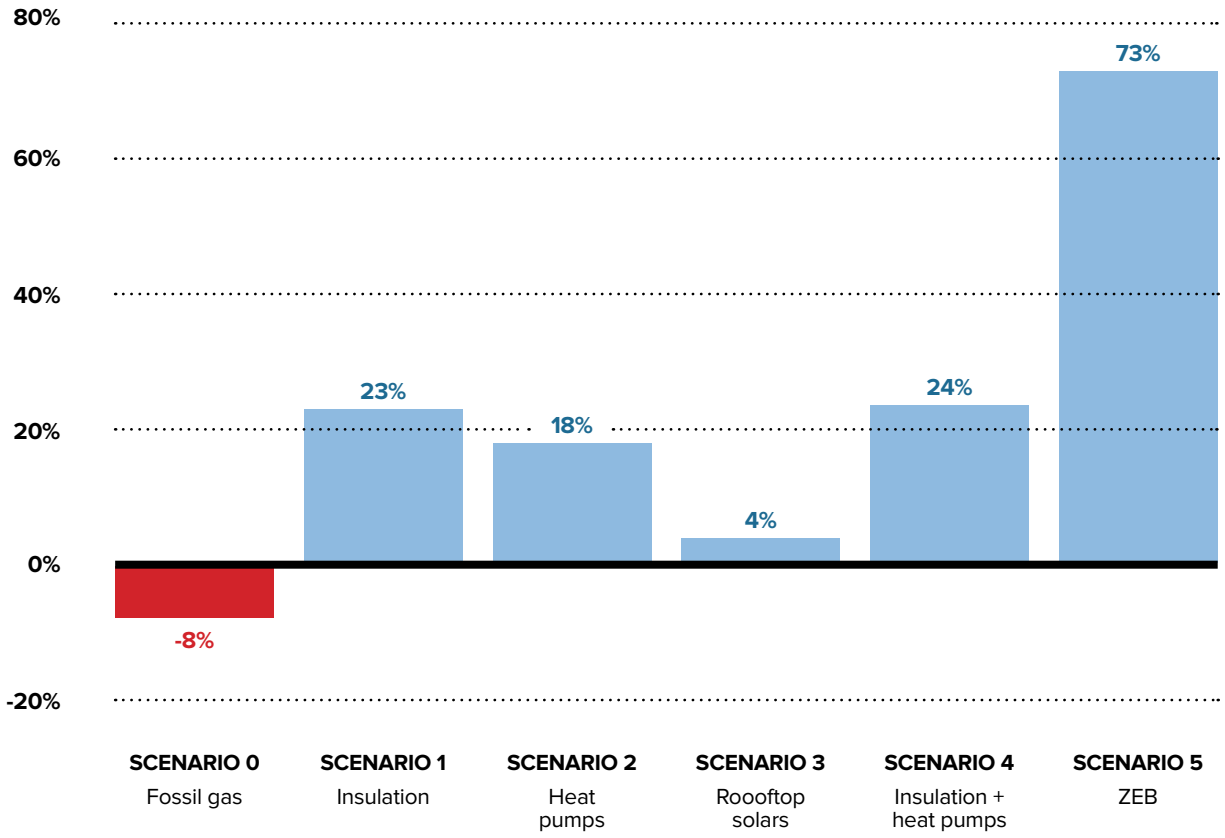
Results

The following graphs show the main results of the research.

Social Cost Benefit analysis for each Scenario - Net Present Value (€)



Social Cost Benefit analysis for each Scenario - Internal Rate of Return (%)



The social cost benefit analysis shows that for Romania, Scenario 0, Fossil Gas, is the least economically beneficial investment and it is the only investment which does not provide society with benefits in the long term. On the other hand, Scenario 5, Zero Energy Buildings, is the best performing scenario overall. The social benefits compared to other scenarios is the highest.

According to the best performing scenario overall, Scenario 5, almost 200.000 zero-energy buildings can be achieved through the combination of thermal insulation of external walls, the replacement of existing window frames with new energy efficient ones, and the installation of photovoltaic solar panels in residential buildings and the installation of a heat pump.

The benefits of households could be the reduction of energy costs due to both the reduced energy demand for space heating and cooling, as well as the operation of the heat pump with the energy generated from the photovoltaic solar panels.

Conclusions and policy proposals

This analysis has identified that Romanian households can benefit considerably if their government diverted the funds currently foreseen for gas network expansion to energy retrofitting of Romanian residential buildings.

The EU commission defines strategies for accelerating the energy transition in the building sectors including the Fit for 55, renovation wave strategy, and REPowerEU. The prioritisation of investments in energy upgrades is 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). In REPowerEU, the EU commission encourages their member states to find the quickest and cheapest ways to address the current energy crisis and reduce the bills for their citizens, doubling solar photovoltaic capacity and the rate of deployment of heat pumps.

According to the results of the current research, the policy interventions in Romania need to be modified towards more demand-side interventions (e.g. subsidies on the energy efficiency renovations) rather than supply-side interventions. As part of the upcoming revision, existing and new policies in the Energy and Climate plan should be modified to remove all funding currently foreseen for fossil gas investments. This funding should be allocated to financing a Zero Energy Buildings strategy in Romania, including the thermal insulation of buildings and the uptake of renewable energy (solar panels and heat pumps).

Given the situation of the Romanian building stock, and the exceptionally high levels of energy poverty in the country, the Romanian government should develop a ZEB strategy that prioritises the most vulnerable households, with adequate financing schemes in order to critically promote upgrades in these dwellings.

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