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INVESTMENTS IN THE BUILDINGS SECTOR TO PROMOTE SUSTAINABLE ENERGY TRANSITION THROUGH APPROPRIATE FINANCING SCHEMES

July 2025

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July, 2025

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This paper was made possible with support from the Rockefeller Brothers Fund (RBF). The opinions and views of the authors do not necessarily state or reflect those of the RBF.

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List of abbreviations

Lista e shkurtesave	
EE	Energy Efficiency
KEEFK	Kosovo Energy Efficiency Fund
MCC	Millennium Challenge Corporation
EU-IPA	European Union Pre-Accession Instrument
EBRD	European Bank for Reconstruction and Development
KoSEP	Kosovo Sustainable Energy Projects
ESCO	Energy Service Company
ESA	Energy Services Agreement
BE	European Union
ktoe	Kilotons of oil equivalent
GWh	Gigawat per hour
NECP	National Energy and Climate Plan
NZEB	Nearly Zero Energy Buildings

1 INTRODUCTION

Energy is the foundation of modern development and social well-being, but the traditional way of producing and using it has brought major environmental and economic challenges. As Kosovo faces the urgent need to reduce its dependence on old and polluting power plants, the transition to a sustainable energy economy becomes increasingly important. In this context, energy efficiency in buildings is one of the main pillars for achieving these objectives, enabling the reduction of energy consumption, improving living conditions and contributing to environmental protection.

Energy efficiency in buildings means the more rational and effective use of energy to achieve optimal levels of thermal comfort, lighting and functionality of the buildings themselves, reducing the need for high energy consumption. This includes improving the thermal insulation of building envelopes, using high-efficiency equipment, managing heating and cooling, and optimizing natural and artificial lighting. In Kosovo, where the buildings sector is one of the largest energy consumers, improving efficiency is key to reducing greenhouse gas emissions and energy costs.

The purpose of this summary document is to highlight the importance of energy efficiency in buildings as a key component in the sustainable energy transition in Kosovo. Through analysis of the current situation and identification of opportunities for improvement, concrete recommendations will be provided for policies and measures that need to be taken. In particular, it will be discussed how increasing energy efficiency can contribute to reducing dependence on fossil energy sources, improving energy security, and achieving the sustainability objectives set by the 2022-2031 energy strategy.

2 CURRENT SITUATION IN KOSOVO

The energy sector in Kosovo is mainly based on electricity production from lignite-fired power plants, which contribute around 90% of total energy production. This sector faces numerous challenges, including limited production capacities, dependence on domestic energy sources, and old infrastructure that requires large investments to modernize.

Kosovo's thermal power plants are among the oldest in Europe and negatively impact air quality and the environment. High emissions of harmful gases and their impact on public health are major concerns. Dependence on these power plants for energy has created a situation where energy security is closely linked to an unsustainable and environmentally harmful source.

In an effort to address these challenges and set a new direction for the sector, Kosovo has approved the Energy Strategy for the period 2022-2031. For the first time, this strategy has set specific targets for energy efficiency in the building sector, emphasizing the importance of improving their energy performance as a way to reduce energy consumption and support the transition towards a more sustainable and cleaner energy system, as buildings account for more than 40% of the country's annual energy consumption. These objectives include measures for thermal insulation, replacement of inefficient equipment and promotion of energy-saving technologies.

3 ENERGY EFFICIENCY IN BUILDINGS AND ITS ROLE IN THE ENERGY TRANSITION

Kosovo, as a net importer of energy, faces major challenges in energy supply security, especially due to the energy crisis caused by the war in Ukraine and unprecedented price increases. Reducing energy consumption in buildings is a key strategy to address these challenges, as this not only reduces energy demand, but also strengthens energy security and supports environmental sustainability objectives. Reducing energy consumption directly contributes to reducing greenhouse gas emissions and improves the quality of life for citizens.

Most buildings in Kosovo, including residential, commercial and public buildings, have low energy efficiency standards, with poor insulation and inefficient heating and cooling systems. This leads to high energy consumption, resulting in high bills and increasing dependence on external energy sources, burdening the country's economy.

Energy intensity in Kosovo is higher than the Western Balkans average by 25% and almost three times the EU average, highlighting the use of inefficient technologies that increase energy consumption and costs. Considering that buildings in Kosovo account for 40% of total[1] energy consumption (around 600ktoe), investment in EE in the buildings sector is essential to improve energy intensity initially at the regional level and by 2050 to reach EU standards.

The building stock in Kosovo includes approximately 300,000 buildings with a total area of 47.12 million square meters. Residential buildings make up the majority of this stock, representing 73% of the total area, commercial buildings make up 20% of the stock, while public buildings represent only 7%.[2]

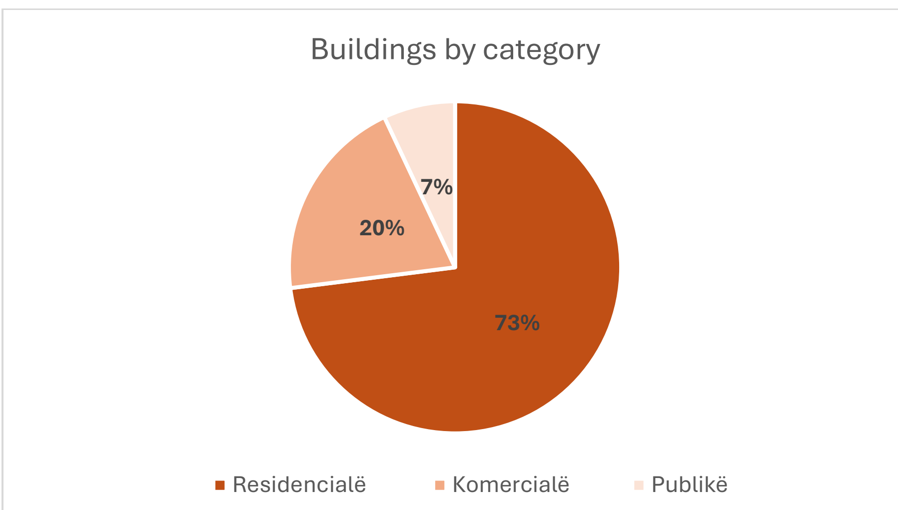

Figure 1: Energy consumption by category

[1] Energy Strategy of the Republic of Kosovo 2022-2031

[2] https://www.worldbank.org/content/dam/Worldbank/Feature%20Story/ECA/kosovo/Kosovo%20Eptisa%20Final%20Report_2013.04.13.pdf

Energy consumption in these sectors is considerable:

- Residential Sector: around 413,000 residential units (247,680 buildings) consuming around 6,500 GWh per year, and total energy costs of 300 million euros.
- Commercial Sector: around 50,500 buildings consuming around 1,700 GWh per year, and a total cost of 149 million euros.
- Public Sector: around 1,600 buildings consuming 300 GWh per year, and a total cost of 23 million euros.[3]

These data highlight the urgent need to improve energy efficiency across all sectors to reduce both costs and CO_2 emissions.

3.1 Potential for improvements and their economic, social and environmental advantages

The potential for improvements in energy efficiency in buildings is great. Through interventions in insulation, replacing windows, installing better heating and cooling systems, and replacing appliances with more efficient ones, a significant reduction in energy consumption can be achieved. The World Bank[4] estimates that the potential for energy savings in Kosovo's buildings is around 44%, estimating that more than half of the buildings in Kosovo are over 45 years old, therefore investing in EE measures represents an economic opportunity to increase the asset value of buildings, reduce energy costs, and improve comfort by improving their internal temperature.

Improvements in energy efficiency can result in significant financial savings for households and businesses, by reducing energy bills and increasing property values. Initial investments in efficiency measures are often paid back within a short period through energy savings.

Improving the energy efficiency of buildings can contribute to reducing energy poverty by providing more households with access to affordable energy. More energy-efficient buildings also provide a healthier and more comfortable environment for their occupants.

Reducing energy consumption in buildings helps reduce greenhouse gas emissions and protect the environment. This is particularly important for Kosovo, which is committed to meeting international climate and energy targets.

Of course, also due to the consumption profile, the residential, commercial and public sectors in Kosovo have different intensities for all beyond Energy Efficiency standards. The residential sector, with an energy intensity of 278 kWh/m²/year, generates 4,113 tons of CO_2 per year, resulting in energy costs of 300 million euros[5]. The commercial sector, with the highest energy intensity of 515 kWh/m²/year, emits 1,468 tons of CO_2 per year and has costs of 149 million euros. The public sector, although with a lower energy intensity of 436 kWh/m²/year, produces 209 tons of CO_2 and faces annual costs of 23 million euros.

The value of 100-150 kWh/m²/year[6] for energy intensity is usually mentioned in the context of energy efficiency standards and best practices for buildings that aim to be more efficient. Therefore, the high energy intensity indicates that buildings in Kosovo are inefficient, and indicates great potential for energy savings. Reducing the energy intensity in buildings by 50% could play a key role in the energy transition, especially

[3] Draft Building Renovation Strategy
[4] Energy Efficiency in Kosovo (worldbank.org)
[5] Draft Building Renovation Strategy
[6] Guidelines and documents supporting directive 2010/31/EU as well as ASHRAE Standard 90.1

considering that 40% of total energy consumption in Kosovo comes from buildings. Furthermore, a 50% reduction in energy intensity would halve CO2 emissions and improve comfort levels by increasing indoor temperatures.

A simple analysis shows that energy efficiency in buildings shows its great benefits. With an energy consumption of around 600 ktoe from existing buildings, the implementation of EE measures would reduce energy intensity by 50%. This reduction would translate into a reduction of around 3 million tons of CO2[7].

From a financial, environmental and security of supply perspective, reducing consumption through EE measures is more advantageous than producing the same amount of energy. According to an assessment by the American Council on Energy Efficiency [8] conducted a decade ago, the levelized cost of energy shows that 1 kWh saved through EE measures is cheaper than producing 1 kWh from any other energy source, including renewables.

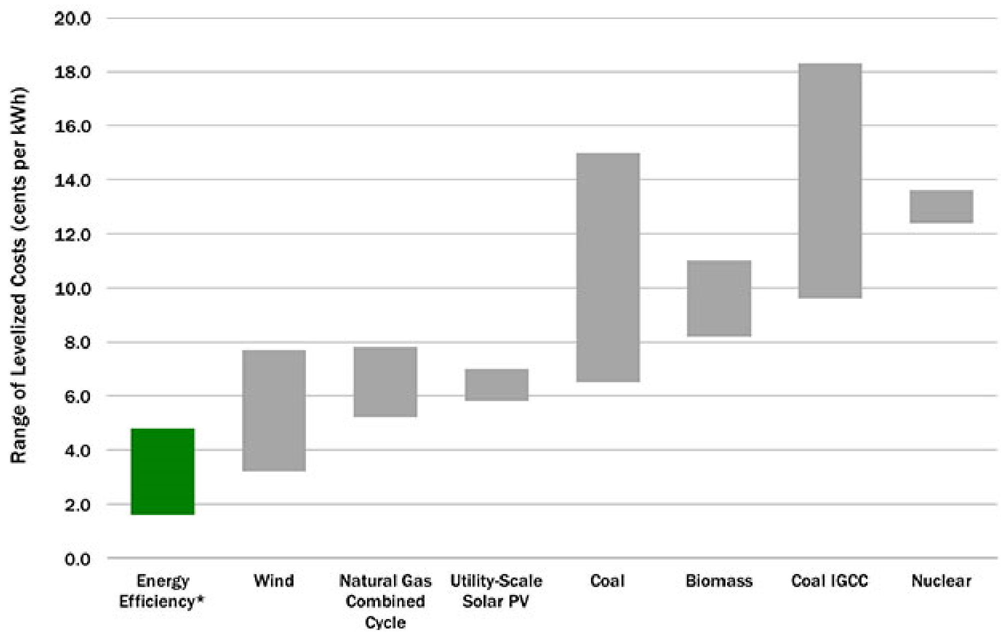

Figure 2: Levelized cost by energy sources

This analysis highlights that investing in energy efficiency not only reduces consumption and emissions, but also provides a cost-effective solution, compared to additional energy production, making it a critical strategy for sustainable energy management.

[7] Analysis by the author
[8] https://www.aceee.org/blog/2016/01/yes-saving-energy-cheaper-making

4. POLICIES AND IMPLEMENTATION OF EE MEASURES IN THE BUILDINGS SECTOR IN KOSOVO

4.1 Existing policies

Kosovo, as a signatory to the Energy Community Treaty, has harmonized its legislation with EU directives to promote energy efficiency in buildings. Key initiatives include the Energy Strategy 2022-2031, which among other things sets targets for investments in energy efficiency in the construction sector, and the National Energy and Climate Plan 2025-2030, which was to be adopted by December 2024. Although the National Building Renovation Strategy is still a draft, the Energy Strategy currently sets the main target on EE which sets the limitation of final energy consumption to 1,877 ktoe by 2031 (without EE measures final consumption would be 2143 ktoe), achieving cumulative energy savings of 266.4 ktoe in all building types, and certifying 150 buildings with nearly zero energy consumption by 2031.[9]

EE targets foreseen in the 2022-2031 strategy	Starting point	Target for 2024	Target for 2031
Total cumulative energy savings in public buildings	2.6 ktoe [2021]	3.3 ktoe	33.9 ktoe
Total cumulative energy savings in residential and commercial buildings	0.1 ktoe [2021]	14.46 ktoe	232.5 ktoe
Number of buildings with near-zero energy consumption	0	10	150

According to the strategy, as a short-term goal in Kosovo, 17.26 ktoe should be saved by the end of 2024 only through investments in the building sector.

Table: Cumulative EE target in the buildings sector from 2021-2031, Source: Author

Savings ktoe	2024	2025	2026	2027	2028	2029	2030	2031
2021	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44
2022	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44
2023	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44
2024	4.44	4.44	4.44	4.44	4.44	4.44	4.44	4.44
2025		4.44	4.44	4.44	4.44	4.44	4.44	4.44
2026			4.44	4.44	4.44	4.44	4.44	4.44
2027				4.44	4.44	4.44	4.44	4.44
2028					4.44	4.44	4.44	4.44
2029						4.44	4.44	4.44
2030							4.44	4.44
2031								4.44
Totali	**17.76**	**22.2**	**26.64**	**31.08**	**35.52**	**39.96**	**44.4**	**48.84**

[9] Energy Strategy of the Republic of Kosovo 2022-2031

By 1 January 2024, 1% of the surface area of government buildings must be renovated in terms of EE every year, increasing to 3% starting from 2024. This translates into energy savings of 0.119 ktoe between 2022 and 2024, and 0.356 ktoe each year from 2024 to 2031. Public buildings are expected to achieve annual energy savings of 0.39 ktoe, commercial buildings 0.578 ktoe, and residential buildings 3.46 ktoe per year. It remains to be seen whether these mandatory targets will be achieved.[i10]

4.2 Initiatives to improve energy efficiency in buildings

Until 2020, investments in energy efficiency (EE) measures in Kosovo have been mainly implemented in the public buildings sector. Although delayed thanks to the support of international donors, there have also been investments in residential buildings, initially through the SEEK program, supported by MCC, and later through the FKEE under the EU-IPA program, which has applied the co-financing scheme with citizens, subsidizing up to 45% of the investment.

Among the main initiatives to improve EE in the buildings sector are:

- **SEEK Program:** Investment of €17.6 million for 1000 individual buildings and 20 multi-apartment buildings, achieving estimated savings of 4 ktoe/year. The project is closed in 2022, with support from MCC.
- **EU-IPA Program:** Investment of €15.6 million in 65 school buildings, which brought estimated savings of 3 ktoe/year. The project was completed in 2016.
- **KoSEP:** €24.1 million project, financed by EBRD and EU, for EE and RE in the residential and business sectors.
- **Kosovo Renewable Energy Efficiency Project:** €16 million capital investment in 100 government buildings, with estimated savings of 3 ktoe/year, financed by the World Bank.
- **Investments in public buildings by KEEF:** Worth €14.5 million, financed by the EU, the World Bank and the Government of Kosovo, achieving estimated savings of 3 ktoe/year in 86 public buildings.
- **Investments in residential buildings by KEEF:** Scheme with 45% grant and 55% from homeowners, with estimated savings of 4.44 ktoe/year and a total value of €22.22 million.

[10] Energy Strategy of the Republic of Kosovo 2022-2031

5 SUSTAINABLE FINANCING SCHEMES

5.1 Sustainable schemes in public buildings

In developed countries, large-scale investments in energy efficiency (EE) in public buildings through grants were stopped much earlier due to concerns about sustainability. To overcome this, various financing schemes were introduced, using state or donor funds to create an investment cycle through savings generated by EE projects as follows:

1. *Financing through utility bills: Utility companies finance EE projects, while consumers pay the costs through their bills.*
2. *Revolving Fund: Public funds and international loans are used to finance EE projects, with savings being reinvested for continuous improvements.*
3. *Public ESCO/Super ESCO: State entities manage EE projects, offering guarantees and securing financing.*
4. *EE Credit Lines: Loans backed by donor/government funds support EE projects in public buildings.*
5. *Risk-sharing structures: Partial credit guarantees reduce risk for lenders and financing costs.*
6. *Commercial financing/bonds: Municipalities provide loans or issue bonds to finance EE investments.*
7. *Private ESCO: Provides full services for EE, assuming risk and guaranteeing savings under performance-based contracts*.[11][12]

While until 2020, investments in the public buildings sector in Kosovo were realized through government grants and donors, in 2021, the KEEFK implemented a new innovative, sustainable revolving financing scheme by signing the Energy Services Agreement (ESA) with the respective municipalities. Under this scheme, 86 municipal public buildings have been invested in EE. Under the scheme, municipalities, through the Ministry of Energy and Water Resources, cover the costs of services for the preparation of a detailed energy audit report and the preparation of tender documents for capital investments, including detailed design and technical specifications. It also covers the costs of capital investments in energy efficiency and the return on investment based on energy savings determined by the reduction in energy costs.[13]

[11] https://documents1.worldbank.org/curated/en/561571536097283340/pdf/129733-BRI-PUBLIC-VC-LW88-OKR.pdf

[12] https://documents1.worldbank.org/curated/en/607521475846166137/pdf/108848-ESM-P157135-PUBLIC-EE-Options-Paper-Kosovo-ENGLISH.pdf

[13] https://fkee-rks.net/raportet-vjetore/

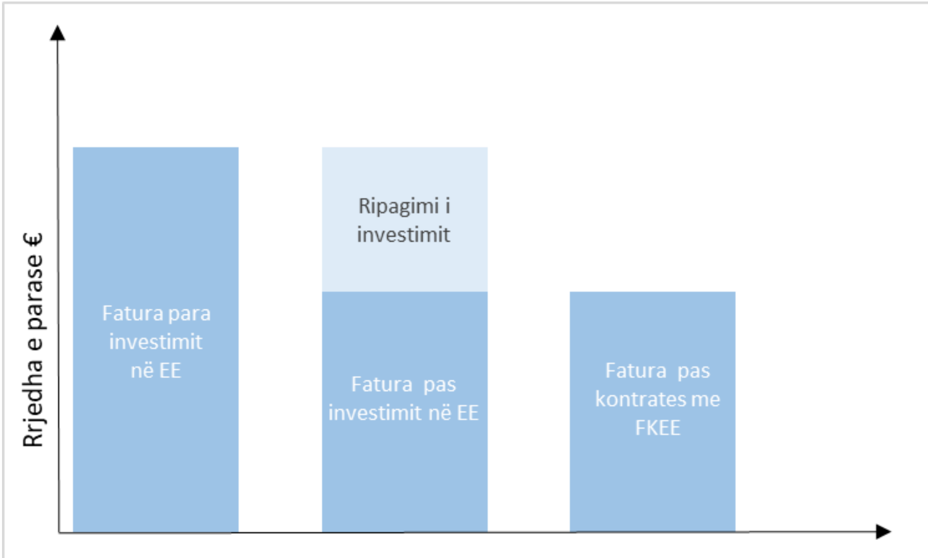

Figure 3: Figurative illustration of the functioning of the circulating scheme [14]

KEEF has already successfully applied the revolving scheme, building a good operational base for all phases of the EE project implementation cycle, therefore, in this regard, it is encouraged to continue the application of this scheme in other buildings in coordination with the municipalities of Kosovo and to expand investments not only in EE, but also in photovoltaic projects in public buildings because, based on the high cost of electricity, these investments guarantee sustainability through a rapid return on investment.

5.2 Sustainable schemes in residential buildings [15]

Around 40% of final energy consumption comes from the buildings sector, with the residential sector playing a key role in the energy transition. Over the last two decades, the number of homes has doubled, making EE investments in this sector essential. However, these investments face numerous challenges. First, there is a significant lack of knowledge, as most residential building owners are not equipped with sufficient information on the performance of building materials and energy-saving devices. The high initial costs of EE investments represent a major barrier, especially for low-income households, who have little or no access to affordable financing.

Limited financing is another challenge, with access to loans on favorable terms difficult, especially for individuals with low collateral and those facing high interest rates. Furthermore, owners often have different priorities, making investing in EE less attractive, especially when energy prices are low. Another important factor is the lack of incentives. In the absence of sufficient incentives and with low energy prices, investments in EE remain in the domain of citizens' voluntary willingness.

Despite the challenges in the residential sector, there are several financing schemes that support investments in EE. Demand management programs by distribution companies include regulatory mechanisms that force these companies to implement EE measures in their customers' homes. These include directly implementing measures, engaging contractors, purchasing energy savings from third parties, or creating

[14] https://energy-community.org/dam/jcr:c3a7e38f-5578-4a53-bd30-c2573d80308f/World%20Bank%20EE%20WG%20ECS%20Presentation_fin.pdf

[15] Vlersim nga autori

revolving funds to finance such measures. Such programs are in response to demand to reduce load during certain periods.

Commercial financing is provided by governments or donors through credit lines to commercial banks, which then provide loans to residential customers. This includes direct loans for building renovations or credit schemes for the purchase of efficient equipment. Green mortgages are another form of financing, offering subsidized or preferential mortgages to encourage the construction and renovation of buildings in accordance with pre-defined green measures.

Loan guarantees, offered by public or private agencies, cover part of the losses from loan defaults, encouraging banks to provide loans for energy efficiency projects. Also suitable for countries with low energy prices and comfort are funds offered by governments or donors that include grants covering 20-50% of the cost of investing in EE.

Market transformation initiatives include bulk purchasing and distribution of efficient equipment, marketing through existing channels, and the establishment of standards and labels to assist consumer decision-making. These schemes aim to ease financial barriers to EE in the residential sector, encouraging the adoption of more sustainable technologies and practices.

In Kosovo, a large number of residential buildings operate with a low level of thermal comfort, where indoor temperatures are below the established standards, while energy costs still remain low. This means that savings from EE investments do not fully cover the investment costs. Considering thermal comfort and low energy costs, a more appropriate scheme is currently co-financing with citizens through grants, where a certain percentage of investments in EE measures for residential buildings is covered. Such a scheme is being implemented by the FKEE, which during 2023 and 2024 has opened calls for grants supporting the insulation of the envelope of residential buildings (insulation of walls, roof, replacement of efficient windows and external doors). In both cases, public calls were closed early due to the high interest from citizens.

The grant amount included 45% of the total value of investments in the building envelope (wall insulation, efficient windows, external doors and roof insulation), or no more than 5,500 euros. [16]. Due to the fact that most buildings in Kosovo are not thermally insulated or have insufficient insulation, implementing measures only for the envelope is extremely beneficial, given that 70-90% of energy losses in residential buildings occur due to the lack of thermal insulation. In the future, the KEEF should increase its capacities and take on a role in supporting investments and efficient equipment, while this is currently being done by the Ministry of Economy, which has legal responsibility only to prepare and implement policies, draft legal acts, approve sub-legal acts and set mandatory standards related to the energy sector, but not to implement projects in the field of EE, which role, based on the Energy Efficiency Law, KEEF has.

Based on the Energy Strategy 2022-2031, EE investments in the residential sector constitute 87% of the overall target, or 232.5 kTOE by 2031. Despite the great interest from citizens in the KEEF program for subsidizing EE measures in individual homes, the premature termination of the public call for applications is worrying. This massive response should encourage the Government of Kosovo to increase the budget allocated for this purpose, in order to achieve the strategy's objectives of annual savings of 4.44 kTOE by 2031.[17]

[16] https://fkee-rks.net/thirrjet-publike/

[17] Energy Strategy of the Republic of Kosovo 2022-2031

We recommend that the KEEF request from the Government of Kosovo a commitment of additional funds of at least 10 million euros/year and continue accepting applications based on the principle of "First come, first served". This approach will enable the Government and the KEEF to assess the real cost of supporting all applicants, ensuring that the program remains effective, inclusive and contributes to achieving the objectives set out in the Energy Strategy.

6 CONCLUSIONS AND RECOMMENDATIONS

Kosovo faces major challenges in the energy sector due to its high dependence on lignite-fired power plants, which contribute around 90% of electricity production. These power plants are among the oldest in Europe and have a significant negative impact on air quality and public health. The Energy Strategy for the period 2022-2031, approved for the first time, has set specific targets for improving energy efficiency in buildings, which are essential to reduce energy consumption and support a more sustainable and cleaner energy system.

Kosovo, as a net importer of energy, faces an energy crisis and rising prices. Improving energy efficiency in buildings is a key strategy to address these challenges. Most buildings in Kosovo have low energy efficiency standards, leading to high energy consumption and high bills. Investing in energy efficiency can significantly reduce energy consumption and greenhouse gas emissions, and provide significant economic and social benefits. The potential for improvements is large and could contribute to achieving EU energy intensity standards by 2050.

Kosovo has adopted the Energy Strategy 2022-2031 and the National Energy and Climate Plan 2025-2030 to promote energy efficiency in buildings. These documents set targets for energy savings and for the certification of buildings with nearly zero energy consumption. However, the realization of these targets will require a strong commitment and effort to reach the anticipated target. Existing policies and programs such as the SEEK Program and other initiatives supported by international donors are an important start, but broader and more coordinated implementation will be needed to realize the full potential of energy efficiency in the buildings sector, and in conclusion we provide the following recommendations:

- Development and approval of a long-term strategy for building renovation covering the period 2025-2050;
- The National Energy and Climate Plan (NECP) should be harmonized with the energy strategy related to the targets set in the buildings sector;
- Building certification is being extended, so start as soon as possible in order to implement the legal requirements set out in the Building Performance Law;
- Government commitment to an annual budget for the EEEF, which will be used to finance energy efficiency projects in buildings, including subsidies and soft loans for households and businesses that apply for these measures, in order to achieve the binding annual targets of 4.44ktoe of energy savings.
- Partnering with international financial institutions to expand funding and ensure sustainable support;
- Mandatory implementation of energy efficiency standards for all new and existing public buildings, with a clear deadline
- Prioritizing school buildings, hospitals, and government buildings for energy improvements.
- To implement the long-term building renovation strategy, the Government should implement the Energy Efficiency Law by setting mandatory energy saving targets. In this context, energy

companies will be obliged to invest a portion of their revenues in efficiency measures in the building sector, in order to achieve these targets.

- No ESCO company is active in Kosovo as a mechanism to support EE projects based on energy performance contracting in buildings. The Government is required to develop all necessary secondary legislation and draft contracts and eliminate institutional barriers to the functioning of ESCOs according to international best practices.
- The government should build a control mechanism to ensure that all new public buildings meet NZEB criteria.
- Integrate EE policies into urban development plans and review building regulations to encourage the use of low-energy equipment and materials.
- Including incentives for developers who follow green building practices and net-zero energy buildings.

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[i] [i] Energy Strategy of the Republic of Kosovo 2022-2031