



Low Carbon Ukraine

Policy advice on low-carbon
policies for Ukraine

Instruments to catalyse energy efficiency investments in residential buildings

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About Low Carbon Ukraine

Low Carbon Ukraine is a project that continuously supports the Ukrainian and Moldovan governments with demand-driven analyses and policy proposals to promote the transition towards a low-carbon economy.

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Executive summary

This policy paper examines the challenges and opportunities for improving energy efficiency in Ukraine's residential housing sector. Since Russia's full-scale invasion of Ukraine in February 2022, the residential sector has suffered over EUR 54 billion in damages. Attacks on energy infrastructure have caused severe energy shortages, highlighting the need for energy efficiency in rebuilding efforts. Furthermore, the age of the buildings and the low energy tariffs act as deterrents to investment in energy efficiency. Additionally, the high proportion of owner-occupiers presents obstacles to efficiency improvements, which is particularly evident in multi-family houses (MFH) that are not organised in homeowner associations (HOAs). In such cases, poor maintenance is common due to the ownership structure. As a result, energy consumption in Ukraine exceeds the European average by 30-50%.

Several international and national programs have been initiated to address these challenges. The Energy Efficiency Fund (EEF), supported by the Ukrainian government, the EU, and the German government, provides grants for energy-efficient renovations, though its reach is currently limited to MFHs organized in HOAs. The Ukrainian government's Warm Loans program, active until 2021, reimbursed loans for energy efficiency measures for single- and multi-family houses (SFHs and MFHs) in HOAs. Currently, the pilot phase of the Felicity II project by GIZ and the EIB supports municipalities in non-HOA MFHs with energy-efficient infrastructure rebuilding.

This situation creates an **eligibility gap**, as only MFHs organized in HOAs can apply for the EEF. Alternatives for SFHs or MFHs without HOAs are discontinued or still in pilot phases. Furthermore, an **investment gap** exists, with EUR 13 billion needed for modernisation by 2030, while current support mechanisms cover only a small portion and private capital is lacking.

The policy recommendations developed in this paper help improve energy efficiency in Ukraine:

Minimising the eligibility gap:

- **Opening up EEF to non-HOAs:** Includes all MFHs as well as SFHs
- **Increasing the grant component for HOAs:** Incentivises the set-up of HOAs
- **Introducing phase-in period for HOA establishment:** Facilitates the compliance with the eligibility criterion of being organised in a HOA
- **Expanding early reimbursement to all project components:** Prevents excluding recipients with limited financial means or low creditworthiness
- **Attracting municipalities as loan takers and fund distributors:** Enables the restructuring towards including non-HOA MFHs and SFHs

Minimising the investment gap:

- **Construction of new and energy efficient social housing:** channels public investments into residential energy efficiency projects

- **Green mortgages and ESCOs for the residential sector:** channel private investments into residential energy efficiency projects

Accompanying domestic policy reform needs:

- **Tariff reform with cost covering prices:** shortens payback period
- **Expansion of technical and vocational education and training:** prevents skill shortage and creates new and better jobs

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1 Introduction

The residential sector has been the most heavily affected sector since the Russian invasion of Ukraine in February 2022. As of January 2024, estimated damages reached approximately EUR 54 bn, representing 38% of the total recorded damages across all sectors.¹ Concurrently, the devastating attacks on Ukraine's energy infrastructure lead to a situation of extreme energy insecurity, both in terms of the power and heating segments. This highlights the fundamental need to conserve energy wherever possible. Hence, considering energy efficiency for reconstruction in Ukraine is of high importance.

While energy efficiency in other Eastern European countries has improved since independence, Ukraine's housing stock has lagged behind and scores poorly on most measures related to energy efficiency due to the buildings' age, long-standing issues in the ownership structure of buildings and the design of the energy market. Only 12.6% of the building stock was constructed after Ukraine's independence in 1991. Furthermore, the Soviet legacy ownership structure of multi-family houses (MFHs) has led to insufficient maintenance and uptake of the buildings. In addition, subsidised, artificially low energy tariffs have discouraged the efficient use of energy more broadly, but have also traditionally rendered many investments into energy efficiency measures unprofitable. Large upfront costs and long payback periods, a consequence of low tariffs, gained little acceptance from homeowners which slowed investments into energy efficiency measures additionally. Furthermore, the high interest rates and little commercial lending deepened the investment gap as well. Consequently, energy efficiency improvements did not gain significant uptake in Ukraine's residential buildings, resulting in low energy savings. This entails the missing out of social benefits, such as improved thermal comfort, and environmental benefits such as decreased carbon emissions.

Nonetheless, the damage to Ukraine's building stock and urgent need to conserve energy has translated into a larger push to promote energy efficiency in the country, with approaches favouring a greener reconstruction of Ukraine's housing stock being part of all key reconstruction plans. The benefits of energy efficiency for Ukraine cannot be overstated. Despite low tariffs, increases in energy efficiency can provide savings for consumers, with a recent study on the city of Bucha showing that payback periods for some building types and energy efficiency measures can make economic sense even under current energy prices.² In addition, energy efficiency is fundamental to improving the living conditions of Ukrainian consumers, especially through the ability to regulate internal temperatures leading to increases in thermal comfort. Additional large-scale benefits also include reductions in emissions, critical not only for air quality, but also for Ukraine's international commitments as well as improvements in Ukraine's overall energy security due to decreases in energy consumption. As Ukraine proceeds with aligning its regulatory

¹ Kyiv School of Economics (2024). *\$155 billion — the total amount of damages caused to Ukraine's infrastructure due to the war, as of January 2024*. [Link](#)

² Bilek, P., Stubbe, R., Saparova, D. (2024). *The Green Reconstruction of the Residential Sector of Bucha*. [Link](#)

framework and policies with the EU acquis in light of its current accession process, investments into energy efficiency should already begin now.

Other benefits of energy efficiency for Ukraine are indirect, but nonetheless fundamental. As the country begins to rebuild, energy efficiency retrofitting of old buildings and the construction of new ones will be a fundamental driver of new, green jobs. As an example, the IEA has previously estimated that for every USD 1 million invested, energy efficiency has the potential of creating between 14.8 to 15.2 new jobs across the value chain.³ Additionally, positive economic spillovers are expected for local businesses providing services for the construction and energy efficiency construction sectors, but also for the equipment suppliers. The elevated demand for materials needed for energy efficiency will increase significantly, and may provide further impetus for the localisation of these sectors' manufacturing operations in Ukraine, again leading to further labour, economical and fiscal benefits.⁴

As such, this policy paper provides an overview of the state of the residential building stock and energy efficiency in Ukraine and presents tools and financial mechanisms needed to enable the sectors' growth and development. The paper proceeds by firstly providing an overview of the state of play of the residential building stock, including damages and other key factors, before providing a comprehensive overview of the energy efficiency financing landscape, including critical international and local actors and programmes. Finally, the paper provides key recommendations of strategic instruments to be considered, providing a bouquet of policy options to pursue.

2 Overview of Ukraine's residential housing stock

2.1 Ownership structure

In Ukraine, the current residential housing stock is strongly shaped by Ukraine's independence after the collapse of the Soviet Union and the resulting ownership structure. During this period, Ukraine transitioned to a market economy with the privatisation of residential buildings as an important component. The consequences of this mass-privatisation are still visible with 94.7% of households living in their own property, 4.8% renting out from private individuals and 0.5% inhabit publically provided dwellings as shown in Figure 1.⁵ It is expected that these official values differ to some degree from reality due to an informal renting market. However, the owner-occupier ratio remains on of the highest globally.⁶

³ IEA (2020). *Energy Efficiency 2020*. [Link](#)

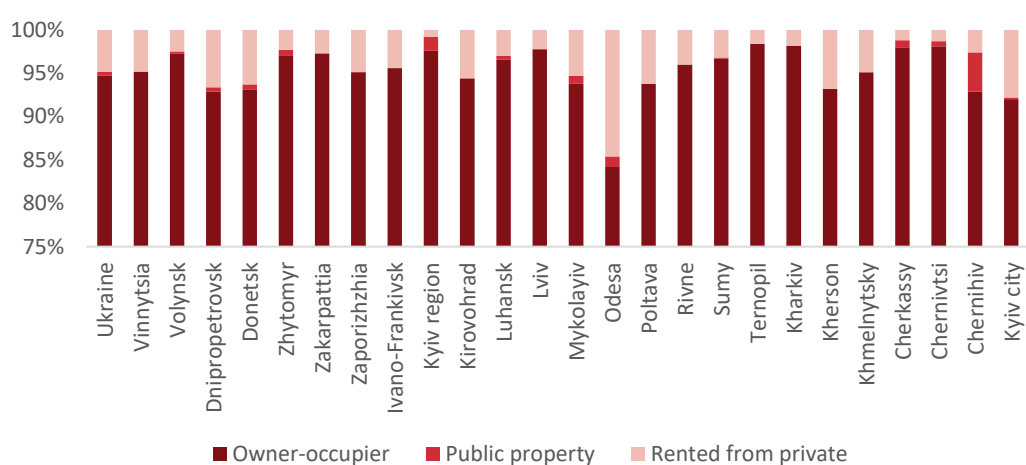
⁴ Bilek, P., Stubbe, R., Saparova, D. (2024). *The Green Reconstruction of the Residential Sector of Bucha*. [Link](#)

⁵ State Statistics Service of Ukraine (2021). *Social and demographic characteristics of households of Ukraine 2021*

⁶ UNECE (2023). *Country Profiles on Housing and Land Management Ukraine*. [Link](#)

With the privatisation of apartments in MFHs, common places, the roof, walls, and the responsibility for upkeep remained mainly in the ownership of third bodies.⁷ However, their tendering processes for the respective work are often opaque or not conducted at all, resulting in poorly executed maintenance and long waiting times.⁸ Furthermore, private apartment owners within MFHs do not feel responsible for maintaining the building parts owned by a third party.⁹ As a result, the housing stock in Ukraine was in poor condition also prior to the war and still requires significant renovation efforts.

Figure 1: Distribution of households (%) by type of ownership



Source: State Statistics Service of Ukraine¹⁰

To overcome this problem, Ukraine set the legal basis for the establishment of homeowner associations (HOAs) in 2001. The respective law no. 2866-III “On Co-owners of Apartment Buildings” and its amendments regulate the joint ownership of common property in MFHs. HOAs not only solve the problem of missing incentives for maintaining the building through shared ownership and the shared interest in upkeeping the building by apartment owners in a MFH instead of a third party. The legal structure also enables the entity to borrow money for repair work.¹¹

⁷ UNECE (2023). *Country Profiles on Housing and Land Management Ukraine*. [Link](#)

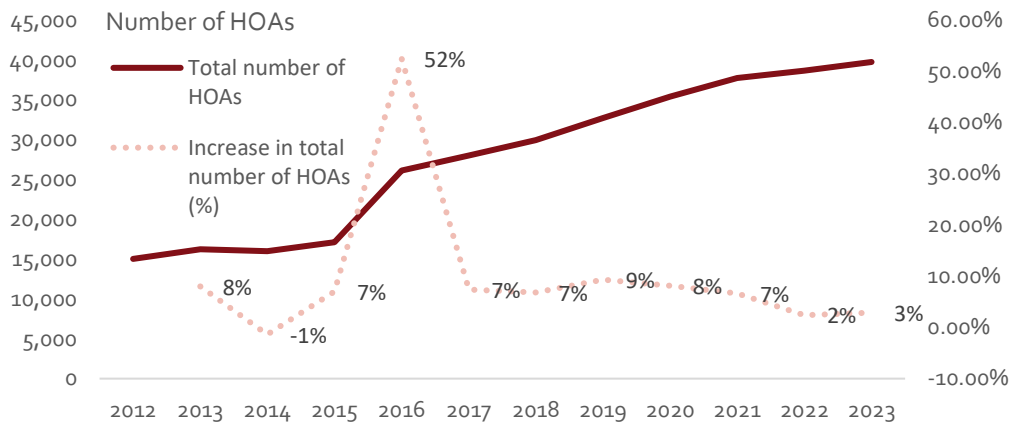
⁸ <https://www.atlanticcouncil.org/blogs/ukrainealert/ukraine-s-next-big-reform-you-haven-t-heard-of-yet/>

⁹ UNECE (2023). *Country Profiles on Housing and Land Management Ukraine*. [Link](#)

¹⁰ State Statistics Service of Ukraine (2021). *Social and demographic characteristics of households of Ukraine 2021*

¹¹ UNECE (2023). *Country Profiles on Housing and Land Management Ukraine*. [Link](#)

Figure 2: Establishment of HOAs since 2012



Source: PROOSBB ¹²

Figure 2 depicts the development of HOA establishment, starting off with a growth rate of 8% from 2013 to 2014. The negative growth of -1% in the subsequent year is associated with the exclusion of MFHs in temporarily occupied territories from the statistic. The moderate positive growth in 2016 was followed by a massive increase where the number of HOAs grew by more than 50%. This can be traced back to changes to the law of Ukraine “On Associations of Co-owners of Apartment buildings” which was introduced in 2015. These changes eliminated certain barriers for the creation of HOAs. One adjustment was that procedures for creating HOAs were simplified and making joint decisions at co-owners general meetings were made easier as well. Further, previous inequalities between co-owner’s rights were levelised, and the grounds for self-sufficiency of the operation of HOAs were improved. However, the effect was not sustained due to unsatisfied demand prior to 2015 and the legislative changes with the hike in 2016 filling this demand gap. Hence, in the following years, the growth rate stabilised again around 8% and went down in 2022 to 2% and 3% in 2023 due to the full-scale invasion.¹³

In general, the operational environment for conducting HOA duties during the war remained similar to pre-war conditions. However, the legislation on HOA duties was adjusted to accommodate the war situation, with large shares of homeowners migrating abroad or within Ukraine (IDPs), or serving at the frontline, to ensure the functioning of HOAs during martial law. These amendments enabled online meetings and the use of e-signatures and video-conference votes.¹⁴

¹² PROOSBB (2023). *The dynamics of the creation of condominiums in Ukraine*. [Link](#)

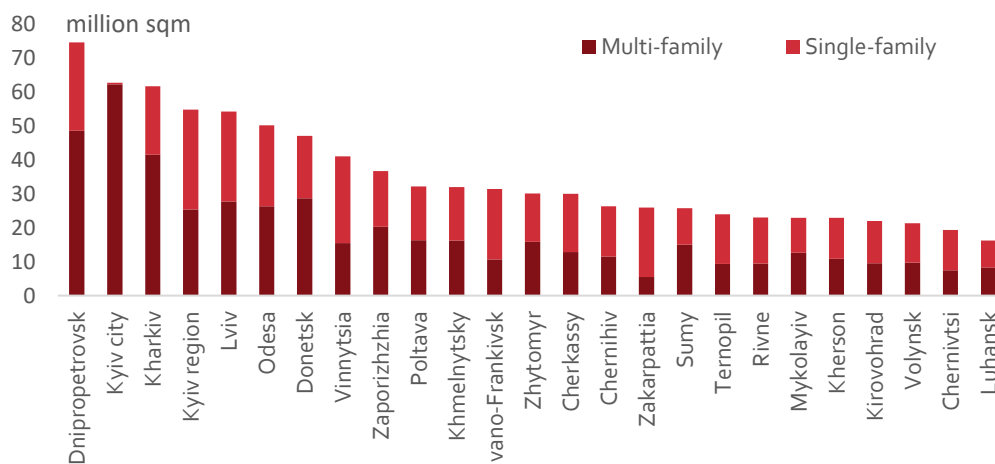
¹³ PROOSBB (2023). *The dynamics of the creation of condominiums in Ukraine*. [Link](#)

¹⁴ Verkhovna Rada of Ukraine (2023). *On making changes to some laws of Ukraine on simplifying the management of multi-apartment buildings*. [Link](#)

2.2 Pre-war building stock

Prior to the full-scale invasion, in 2021, the total area of residential housing amounted to approximately 892 million square meters, not accounting for the temporarily occupied territory of the Autonomous Republic of Crimea. When additionally excluding the temporarily occupied Donetsk, Zaporizhzhia, Luhansk, and Kherson oblasts, the total area sums to 769 million square meters.¹⁵ At the national level, the split of households¹⁶ living in MFHs amounted to 49% while 51% of households resided in single-family houses (SFHs) in 2021.¹⁷ Regional specificities lead to deviations from this national average. In the city of Kyiv, the country's urban epicenter, nearly every household lived in a multi-family house. Other regions with high levels of urbanisation and density are Kharkiv and Dnipropetrovsk where 61.1% and 59% of respective households live in multi-family buildings. Regions with a nearly equal distribution of housing type are Sumy, Zaporizhzhia and Mykolayiv. In Zakarpattia and Ivano-Frankivsk the overwhelming majority of accommodation type are single-family housing comprising 83% and 72% respectively. Figure 3 illustrates the share of multi- and single-family housing for each Oblast as well as the sum of square meters of residential housing.

Figure 3: Distribution of households living in SFHs and MFHs with the approximated living space Ukraine 2021



Source: State Statistics Service of Ukraine¹⁸, square meters per Oblast are approximated by the authors

The composition of Ukraine's residential buildings by their construction year shown in Table 1 and Figure 4 is another notable reason why the majority fail to adhere to present-

¹⁵ Approximation using Long-term renovation strategy and the Social and demographic characteristics of households of Ukraine 2021 survey by the State Statistics Service of Ukraine. Full exclusion of the currently occupied oblasts.

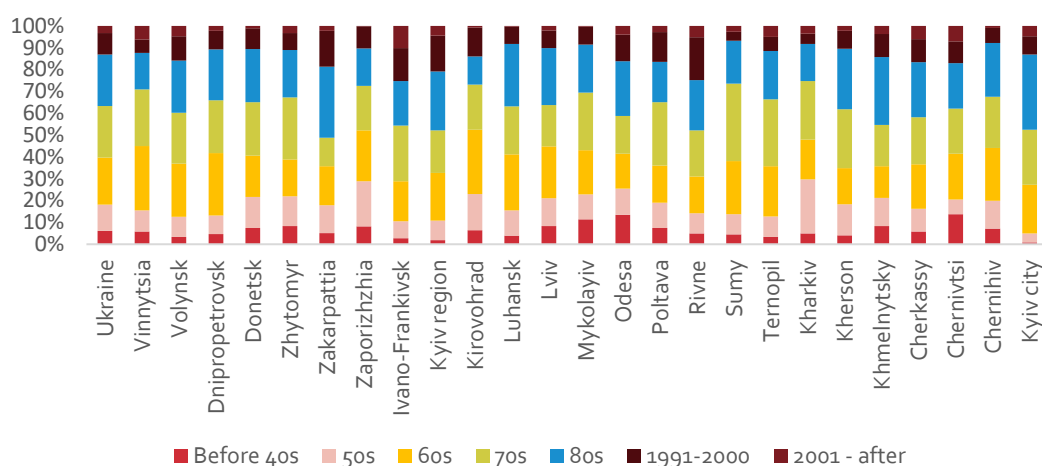
¹⁶ The survey defines a household as a group of individuals living together in one dwelling, sharing resources, and pooling their funds. They may be related by family, kinship, or have no relation.

¹⁷ State Statistics Service of Ukraine (2021). *Social and demographic characteristics of households of Ukraine 2021*

¹⁸ State Statistics Service of Ukraine (2021). *Social and demographic characteristics of households of Ukraine 2021*

day standards for building envelopes and engineering systems. Merely 12.6% of these buildings were erected post-independence, with the bulk being built between 1960 and 1990.

Figure 4: Distribution of households per region by the time of their construction



Source: State Statistics Service of Ukraine ¹⁹

The regional distribution of building age ranges from only 6.8% of constructions after independence, which is the case in Sumy, to 20% in Rivne and Kyiv region, and 25% in Ivano-Frankivsk. Consequently, the prevalent inefficiency in Ukraine's residential sector can also be attributed to the construction of most buildings before the introduction of substantial energy efficiency norms. Additionally, the natural process of degradation has further reduced the energy efficiency of the housing stock. Furthermore, as described in section 2.1 on the ownership structure, the high owner-occupier rate combined with little financial means, the ownership of common parts in a MFH by third bodies conducting insufficient maintenance and the lack of incentives of apartment owners to conduct maintenance and renovation work, played a major role in little renovations. This dynamic is visible in Table 1 showing the distribution of the latest major renovation of a building, as well as the detailed distribution of the latest major renovation by year of construction. The umbrella category of major renovations includes construction and repair works that involve the restoration, replacement or modernisation of the building structure or the respective engineering equipment. Furthermore it includes the improvement of the operation of buildings. In addition, during the renovation works the operation of (parts of) the building need to be suspended for the duration of it.

In 49.5% of residential housing built in the 1980s, no major renovations were conducted while dwellings built in the 1970s 41.3% of buildings were not repaired to a major degree, and 32.7% of buildings from the 1960s did not experience major renovation works.

¹⁹ State Statistics Service of Ukraine (2021). *Social and demographic characteristics of households of Ukraine 2021*.

Buildings constructed in these years (1960s, 1970s, and 1980s) account for around 69% of housing in Ukraine.

Table 1: Distribution of households (%) by the time of the last major renovation of their housing

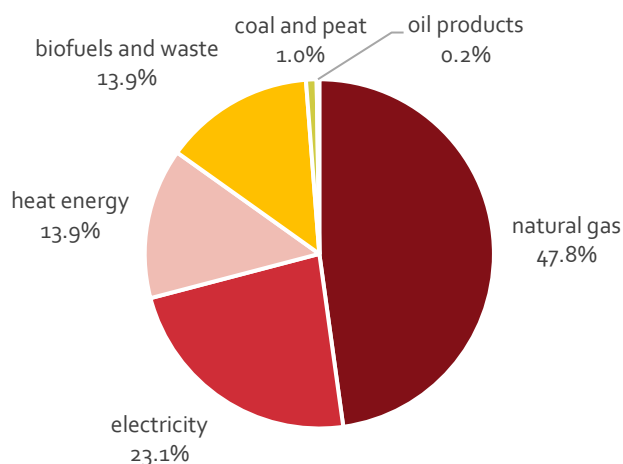
		<i>Major renovation of housing by year of construction (%)</i>							
		Distribution of housings by year of major renovation	1940s and earlier	In the 1950s	in the 1960s	in the 1970s	in the 1980s	in 1991-2000	in 2001 and later
Distribution of housings by year of construction			6.1	12.1	21.5	23.6	23.6	9.8	3.3
Distribution of year of last major repair in housing (%)	until 1970	0.6	6.2	0.7	0.5	-	-	-	-
	1970-1980	1.3	5.4	4.4	1.5	0.4	-	-	-
	1981-1990	2.5	9.2	6.3	3.5	1.3	0.7	-	-
	1991-2000	8.8	16.3	12.9	12.6	7.9	5.4	3.8	-
	2001 and later	45.5	45.4	48.2	49.2	49.1	44.4	38.6	-
	no major renovation were carried out	41.8							
	%	100	100	100	100	100	100	100	100

Source: State Statistics Service of Ukraine ²⁰

²⁰ State Statistics Service of Ukraine (2021). *Social and demographic characteristics of households of Ukraine 2021*

2.3 Energy efficiency and emissions

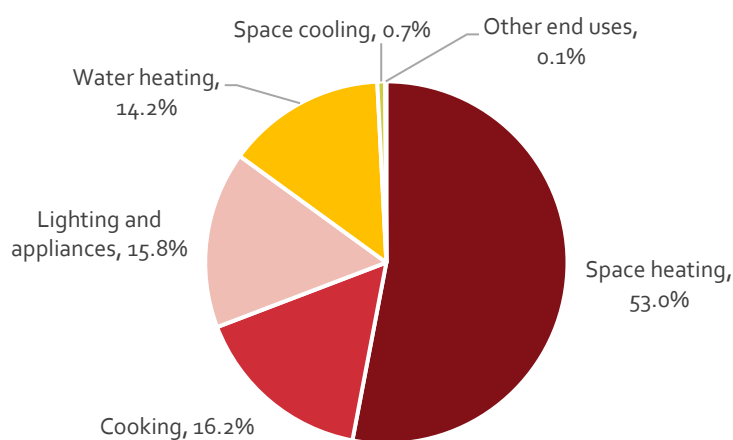
Figure 5. Final energy consumption in the residential sector by source, 2020 (158.5 TWh)



Source: State Statistics Service of Ukraine ²¹

In 2020, Ukraine's residential sector consumed a total of 158.5 TWh (13.6 million tonnes of oil equivalent) across all energy sources. The energy mix in this sector was predominantly composed of natural gas, which accounted for 47.8% of the total consumption. The final energy consumption of natural gas was followed by electricity at 23.1%, heat energy at 13.9%, and biofuels and waste also at 13.9%. The use of coal and peat, along with oil products, was minimal, contributing only 1.0% and 0.2%, respectively.

Figure 6. Final energy consumption in the residential sector by type of end use, 2020 (158.5 TWh)



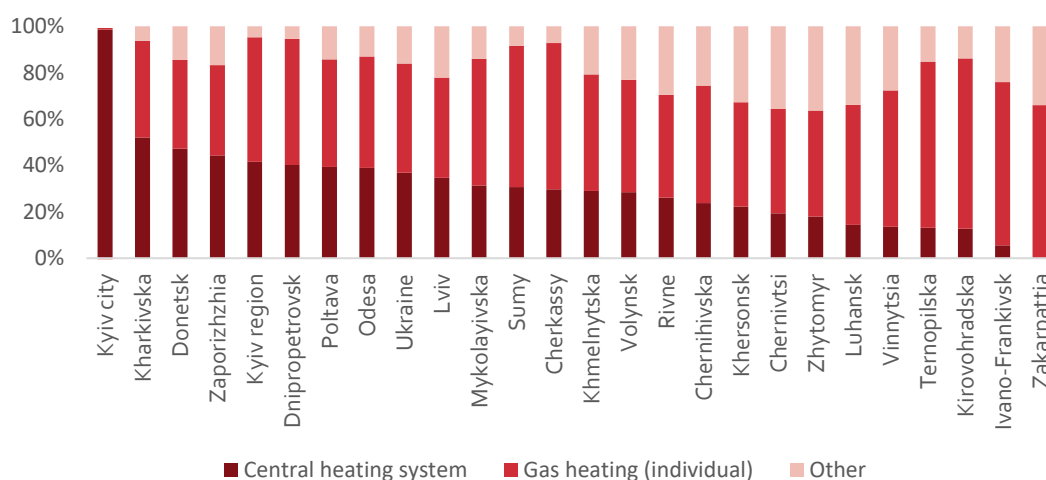
Source: State Statistics Service of Ukraine

²¹ State Statistics Service of Ukraine (2021). *Total energy balance of Ukraine*. [Link](#)

The end-use energy consumption provides a detailed picture of energy usage within the residential sector. The largest share of energy was used for space heating, which accounted for 53% of the total final energy consumption. This significant proportion underscores the essential heating needs for Ukraine and potential for improvement. Other significant areas of energy use in the residential sector included cooking and lighting, with appliances consuming 16.2% and 15.8%, respectively. Water heating also represented a considerable portion of the energy usage, accounting for 14.2%. Meanwhile, energy consumption for space cooling was very low at 0.7%, and other end uses were negligible at 0.1%.

Overall, average specific energy consumption in the buildings sector is approximately 163 kWh/sqm annually, exceeding the same indicator in European countries by 30-50%. Consequently, Ukraine requires substantial investment for the thermal modernisation of its building stock.²²

Figure 7: Heating sources by region in 2022



Source: State Statistics Service of Ukraine ²³

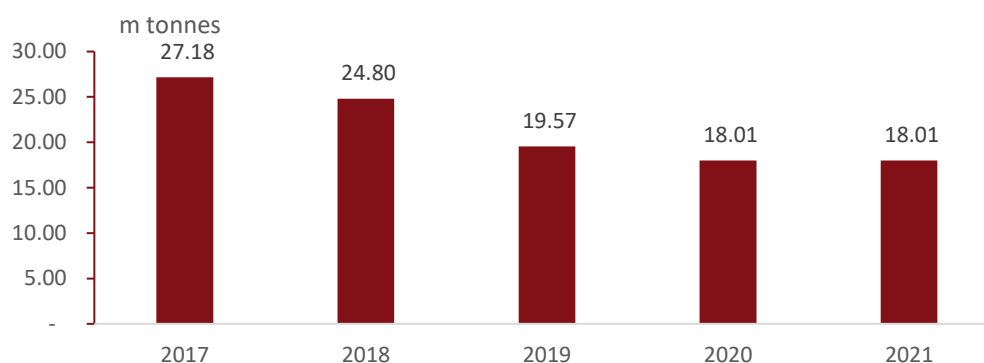
On average the most used source for heating is gas for individual level heating appliances like gas boilers with 47.2%. , 36.8% of heating is supplied by central heating systems. In Kyiv city, with its high population density, close to 100% of heat is supplied using central heating systems. Households in the regions like Kirovohrad, Ternopil, and Ivano-Frankivsk utilise mostly individual gas heating systems (more than 70%). This is partly due to a high share of single-family houses. For example, in Ivano-Frankivsk over 72% of buildings are single-family houses, while the other two regions have a rather equal distribution of single- and multi-family houses.

²² Cabinet Of Ministers of Ukraine (2023). *Long-term strategy for thermal modernisation of buildings for the period up to 2050*. [Link](#)

²³ State Statistics Service of Ukraine (2022). *Social and demographic characteristics of households of Ukraine 2022*

According to the IEA's indicators, residential energy intensity in Ukraine is largely driven by space heating, with an energy intensity of 156 KWh/sqm.²⁴ In the EU, The energy intensity of residential space heating varies significantly, ranging from approximately 83 KWh/sqm in countries such as the Netherlands, Switzerland, and Ireland, to 139-167 KWh/sqm in Belgium, the Czech Republic, Austria, and Poland.²⁵

Figure 8. CO₂ emissions, excluding emissions from biomass (residential heating and cooling)



Source: State Statistics Service of Ukraine²⁶

Given that heating constitutes a significant portion of end-use consumption, the CO₂ emissions from these activities are considered for assessing the overall environmental impact of energy use in the sector. Excluding emissions from biomass used as fuel, these emissions show a positive trend toward reduction. In 2017, emissions stood at 27.18 million tonnes of CO₂. By 2018, this figure had decreased to 24.80 million tonnes, continuing to drop to 19.57 million tonnes of CO₂ in 2019. In 2020, emissions further declined to 18.01 million tonnes of CO₂, and then remained stable. This downward trend in emissions over the years suggests that improvements in energy efficiency, but also changes in methodology for Environmental Accounts in 2019

To put this into perspective, with a population of 41.17 million²⁷, the per capita CO₂ emissions from residential heating in 2021 were about 0.44 tonnes per capita. In comparison, the average EU CO₂ emissions per capita in buildings are 0.66 tonnes, ranging from 0.003 tonnes in Iceland to 1.54 tonnes in Luxembourg.²⁸

The residential sector, being the second largest consumer of energy in Ukraine shows potential areas for further improvement in energy efficiency, particularly for space heating. The overall decline in CO₂ emissions from residential heating underscores the

²⁴ IEA (na). *Ukraine*. [Link](#)

²⁵ IEA (2023). *Energy Efficiency 2022*. [Link](#)

²⁶ State Statistics Service of Ukraine (2018). *Air emissions accounts*. [Link](#); State Statistics Service of Ukraine (2015). *Methodological provisions from compiling the emission account in the atmospheric air*. [Link](#)

²⁷ State Statistics Service of Ukraine (2023). *Demographic situation in 2021*. [Link](#)

²⁸ Eurostat (2024). *Air pollutants and greenhouse gases*. [Link](#)

positive impact of energy efficiency measures and the transition towards cleaner energy sources.

2.4 Impact of the war

The full-scale invasion has severely affected the buildings sector in Ukraine, with damages to both residential and non-residential real estate, as well as other infrastructure. The total monetary level of damages has reached over EUR 142 billion, with residential buildings accounting for 38% of this number or EUR 54 billion as of January 2024.

As of January 2024, an initial evaluation of war-related destruction to residential buildings in Ukraine shows widespread damage across housing types. Apartment complexes, totaling 178,921 units, have seen substantial damage, affecting 15% of the total stock. For individual homes (8,977,862 units), a lower damage rate of 2.5% is reported. Dormitories, with 7,114 total units, have 7.39% of their stock impaired. Major events like the destruction of the Kakhovka hydroelectric power plant and dam also significantly influenced housing conditions in Kherson, Zaporizhzhia, Dnipro and Mykolaiv oblasts.

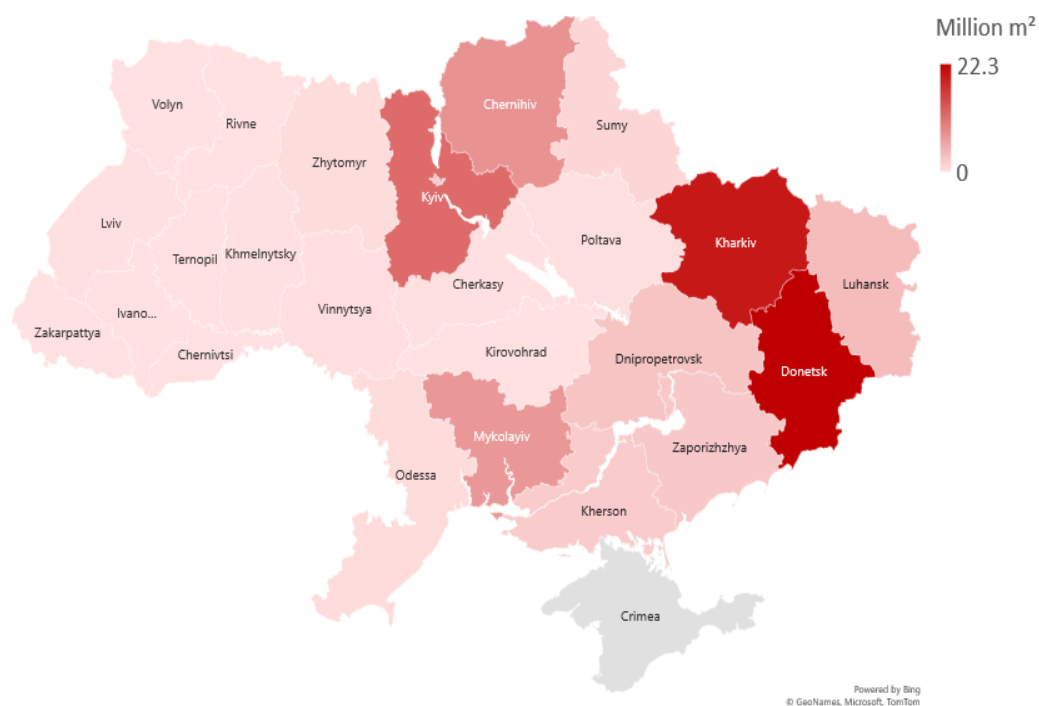
Table 2: Assessment of damages and losses to residential buildings as of January 2024

	Initial stock	Total damaged and destroyed stock	Damage assessment, EUR bln
Apartment buildings	178,921.0	27,000	54.0
Individual houses	8,977,862.0	222,000	
Dormitories	7,114.0	526	

Source: Kyiv School of Economics²⁹

²⁹ Kyiv School of Economics. (2024). *\$155 billion — the total amount of damages caused to Ukraine's infrastructure due to the war, as of January 2024*. [Link](#)

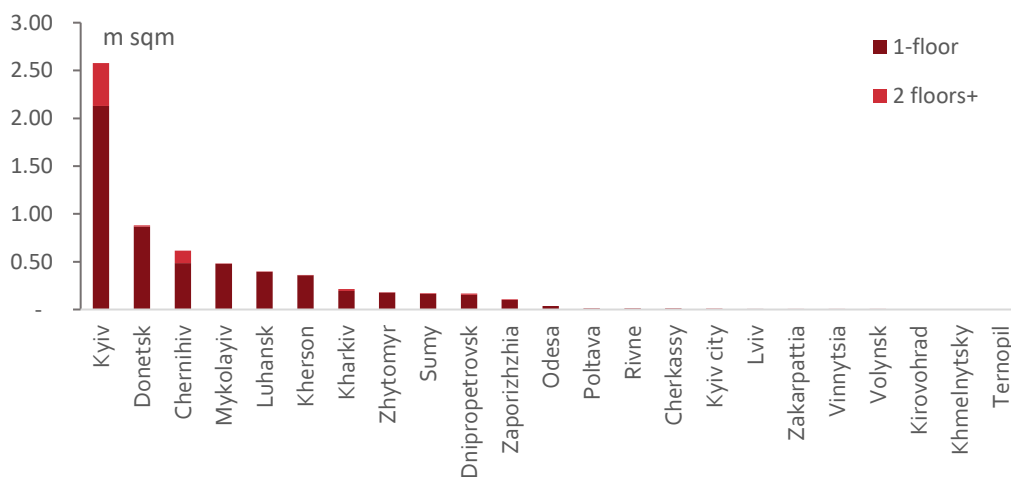
Figure 9: The map of the total damage area across SFHs and MFHs



Source: Kyiv School of Economics, authors' calculations

Figure 9 provides a general overview of the total damage area across SFHs and MFHs in the regions. The detailed breakdown by type of housing and regions is provided by Figure 10 and 11.

Figure 10: Damage area distribution across single-family houses by floor number and regions as of Jun-23

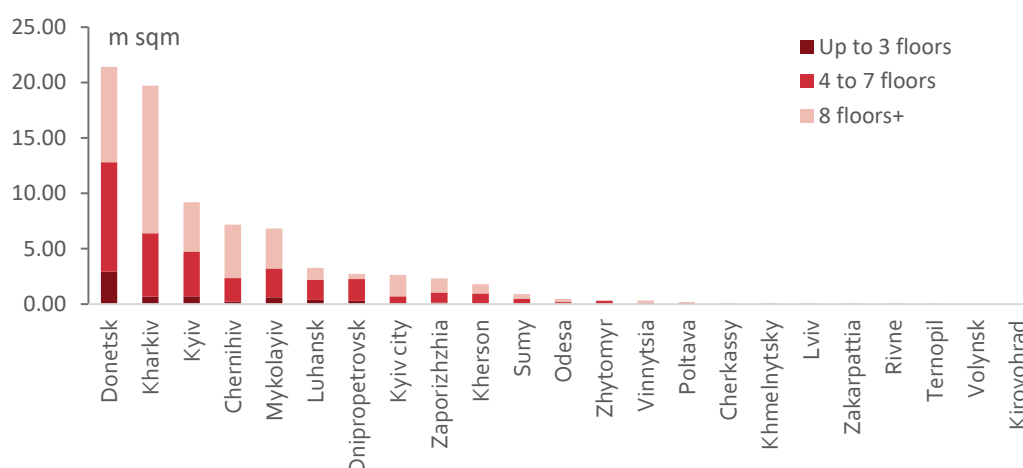


Source: Kyiv School of Economics, State Committee on Statistics of Ukraine, authors' calculations

The data on damaged single-family housing in Ukraine indicates that Kyiv region has suffered the most, particularly in 1-floor houses, with over 2.1 million square meters damaged. Other heavily affected areas include Donetsk, Chernihiv, and Mykolayiv.

Damage is predominantly seen in 1-floor houses across most regions, predominantly in the eastern areas like Donetsk, Luhansk, and Kharkiv, that are the closest to war zones. Western and central regions such as Lviv and Zakarpattia exhibit significantly less damage, aligning with their distance from active war areas. Regions like Ivano-Frankivsk and Chernivtsi did not witness significant damage to the residential sector.

Figure 11: Damage area distribution across multi-family houses by floor number and regions as of Jun'23



Source: Kyiv School of Economics, State Committee on Statistics of Ukraine, authors' calculations

In the multi-family house category, the most extensive damage is observed in Donetsk, with a total damage area of approximately 21.42 million square meters, primarily in buildings with 4 to 7 floors and 8+ floors. Kharkiv follows closely, with significant damage mainly in high-rise buildings (8+ floors), totaling about 19.7 million square meters. Lesser but still substantial damage is noted in Kyiv and Chernihiv. In Kyiv city the damages are distributed across all building categories. The pattern of damage suggests a higher impact on taller buildings in regions closer to war zones like Donetsk and Kharkiv, whereas regions like Ternopil, Volynsk, and Kirovohrad show little or no damage.

3 National and international public support landscape

To complete the description of the status-quo, the overview of Ukraine's residential housing stock is complemented by the following overview of key support mechanisms for the Ukrainian building sector. The chapter contains the description of the two most prominent programmes supporting investment by households in energy-efficient modernisation of their homes with a grant funding financed from the State Budget as well as from donors. The government of Ukraine started to support owners of individual houses and apartments in multi-family houses in 2014 offering reimbursement of a part of the cost of selected individual energy efficiency measures (replacement of windows, boilers, etc.) with the Warm Loans Programme, while the Energy Efficiency Funds established in 2018 has been targeting building level renovation projects – more expensive comprehensive solutions bringing about sizable energy savings. The third described programme is the IKI

funded Felicity II which is presented because of the relevant learnings regarding the inclusion of non-HOAs to EEF. These three programmes represent a selection. An overview of the entire national and international public support landscape for the Ukrainian building sector funded by international donors is presented in the Annex.

Warm Loans Programme

From 2014 to 2021, the government supported the Warm Loans Programme for home insulation and local energy efficiency measures. The programme implemented measures to encourage the population to initiate energy efficiency measures by reimbursing part of the amount of loans taken to purchase non-gas boilers and energy efficient equipment and/or materials. The programme was administered by the State Agency for Energy Efficiency and Energy Saving of Ukraine and used partner banks to offer loans to finance energy efficiency measures and process clients applications. More than 865,000 Ukrainian families participated in the programme, which raised over EUR 200 million of investment for energy efficiency measures.

However, the programme was discontinued at the end of 2021 as no funding was allocated in the State Budget for the programme for 2022 and beyond.

Energy Efficiency Fund

In 2018, the Ukrainian government, with the support of the EU and the German government, established the EEF for the residential sector to support investment into energy efficient renovation of multifamily buildings.

The EEF is a 100% government-owned financial institution acting on the basis of a separate law. It is funded jointly by the Ukrainian government via contributions to the Statutory Capital of the EEF and the donors (the EU and the German government) via a trust account managed by the International Finance Corporation (IFC). It is a grant fund offering reimbursement of part of their investment costs for thermal modernisation of multiapartment buildings conducted by HOAs (the only eligible beneficiaries of the grant funding from the EEF). The EEF offers support for both small-scale building-level investment projects and large-scale renovation of residential buildings resulting in significant energy savings. The programme's distribution mechanism includes the use of partner banks offering loans to HOAs and processing their applications for financing from the EEF.

As of the end of 2022, the EEF had 864 projects in its portfolio and a pipeline for the total value of EUR 195 million³⁰ with the expected share of grant funding of 121 million. However, since the inception of the fund only 112 projects have been implemented as of the end of 2022 with only EUR 17.5 million of grants already paid to HOAs.³¹

The EEF is tracking the environmental impact of the financed projects – by the end of 2022 the energy savings resulting from the implemented projects were equal to 62.9 MWh/year and annual reductions of CO₂ emissions stood at 17.6 thousand tCO₂/year.

³⁰ UAH/EUR exchange rate as of the end of 2023.

³¹ EEF (2022). Activity report of the Energy Efficiency Fund for the year 2022. [Link](#)

The Fund is making efforts to cooperate with local financing programmes and local revolving funds working via the mechanism of collective investment schemes available in some municipalities. These local revolving funds are typically quite small and can provide only limited assistance to investment projects.

The activities of the Energy Efficiency Fund are currently restricted exclusively to multi-family residential buildings where HOAs are created, leaving out individual houses and MFHs without HOAs (representing nearly 80% of all MFHs in Ukraine). The current distribution model of the EEF is linked to cooperation with partner banks – it is necessary for a HOA to obtain a loan to pre-finance the investment costs.

Felicity II

The IKI funded Project Felicity II "Financing Energy for Low-Carbon Investment – Cities Advisory Facility" is the joint initiative by GIZ and the European Investment Bank (EIB) to rebuild Ukraine's critical water and sanitation infrastructure in a green and energy-efficient way as well as to repair and thermo-modernise lightly damaged MFHs not organised in HOAs. The project offers:

- technical assistance in the preparation of infrastructure investment projects, and relevant staff training (this component is implemented by GIZ on behalf of the International Climate Initiative of the Federal Ministry for Economic Affairs and Climate Action Germany)
- financing of the investment projects (funded by the EIB).

Investment in the energy efficiency measures in residential and public buildings is eligible under Felicity II.

The goal of Felicity II is to provide information on energy efficiency projects that are ready-to-tender, as well as on municipal level financial mechanisms and on the institutional set-up to develop the capacity of municipalities. The project will yield knowledge on energy-efficient rehabilitation of war-damaged housing. The lessons learned during the pilot phase of Felicity II will offer valuable expertise for the expansion of the EEF. Felicity II was launched at the end of 2023 and is currently in the stage of assessment of the current needs of water utilities and their readiness to participate in the Project.

4 Gap analysis and policy recommendations

4.1 Gap analysis of investment needs and support programmes

The importance of increasing Ukraine's residential energy efficiency is shaped by its international commitments on emission reduction, the fulfilment of EU climate goals pertinent due to the EU accession process but also very acutely by its relevance as an energy saving measure to improve the country's overall energy security.

The associated costs of energy efficiency measures depend on the time horizon and their scope. According to the State programme for supporting thermal modernisation of buildings until 2030 adopted on December 29th, 2023 the investment needs for thermal modernisation of buildings are assessed between EUR 4.1 billion and EUR 22.2 billion.³² The average value of these two figures, EUR 13 billion, corresponds to the assessment of investment needs for energy efficient modernisation of buildings until 2030 as per the Second Ukrainian NDC.³³ According to the estimations, this level of investment would result in annual energy savings of up to 2,300 ktoe and related emission reductions of up to 5 Mt CO₂ annually from 2030 onwards. The modelling performed for the purposes of preparation of the draft NECP estimated the investment needs in the building sector until 2050 at EUR 280 billion under the net zero scenario. According to the Strategy of Thermal Modernisation of Buildings in Ukraine until 2050, the total investment needs for thermal modernisation of housing are estimated between EUR 160 and 214 billion.³⁴

Table 4: Overview of investment needs

	Thermal modernisation, until 2030	Energy efficient modernisation of buildings, until 2030	Energy efficiency measures in the entire building sector, until 2050	Thermal modernisation, until 2050
Estimated investment needs	EUR 4.1 billion – 22.2 billion	EUR 13 billion	EUR 280 billion	EUR 160 - 214 billion

Source: Cabinet of Ministers of Ukraine, Ministry of Environment, Verhovna Rada

³² Cabinet of Ministers of Ukraine (2023). *State target economic programme support for thermal modernisation of buildings until 2030*. [Link](#)

³³ Ministry of Environment (2021). *Analytical Review of the Updated Nationally Determined Contribution of Ukraine to the Paris Agreement*. [Link](#)

³⁴ Verhovna Rada (2024). *The Strategy for Thermal Modernisation of Buildings of Ukraine until 2050 has been approved*. [Link](#)

It is likely that the investment gap in the buildings sector will exceed EUR 10 billion by 2030, even without accounting for the ongoing damage and losses from Russia's invasion.

The massive investment gap and the current state of residential buildings were shaped by the following features of the housing sector and continue to play a role:

- The age of the building stock, with only 12.6% of buildings constructed after Ukraine's independence (see section 2.2 Pre-war building stock)
- The post-Soviet ownership structure, where common spaces and building envelopes are owned by third bodies and apartments in a MFH are owned privately. This has led to insufficient public management of repairs and upkeep of shared spaces and building structures, resulting in poor conditions combined with lack of incentives for inhabitants to repair or maintain the publically owned part of the building themselves (see section 2.1 Ownership structure)
- The high owner-occupier rate combined with a large share of non-affluent households that are unable to finance energy efficiency measures combined with high interest rates (see section 2.1 Ownership structure)

Additional deterrents to energy efficiency measures entail highly subsidised energy prices for households, leading to long amortisation periods. Consequently, financing energy efficiency measures requires either large upfront investments and long payback periods, both of which are unattractive or unfeasible for the majority of owners. Furthermore, the borrowing conditions on the market were unattractive due to high interest rates and, pre-2022, only a minor share of subsidised mortgages were distributed enlarging the investment gap again.³⁵

To address the investment gap, support mechanisms outlined in section 3.2 with a total volume of approximately EUR 464.9 million of grants and loans are in place. Setting this in comparison with the estimated investment needs for energy efficient modernisation of buildings until 2030 (EUR 13 billion) this accounts for merely 3.6% of it.

However, the support gap is not the only issue; eligibility criteria create an additional barrier. Applicants to the EEF must be organised in a HOA, which aims to resolve problems related to ownership structures within multi-apartment buildings. However, only 20% of multi-apartment buildings in Ukraine are organised in a HOA. Moreover, out of 20% MFHs with HOAs, merely 3% of the HOAs are able to engage in substantial energy efficiency improvements with government assistance.³⁶ This indicates a substantial gap in support for essential renovations in multi-apartment buildings.

A further obstacle within the current design of the EEF is the disbursement of loans after the renovation. Even though the EEF redesigned its initial procedures to allow early reimbursement of many components of project expenses, the need to take loans and its financing costs remain a limiting factor. Many HOAs have constrained creditworthiness

³⁵ Centre for Economic Policy Research (2024). *Development of mortgages in Ukraine*. [Link](#)

³⁶ Cabinet Of Ministers of Ukraine (2023). *Long-term strategy for thermal modernisation of buildings for the period up to 2050*. [Link](#)

and functionality in relation to adoption a decision on implementing a renovation project in their building, as well as planning, designing and implementing the project.

A significant barrier to the effective functioning of the EEF is the lack of long-term funding commitments from both the Ukrainian government and international donors. The Ukrainian government's funding decisions are subject to annual reviews, while donors struggle to balance long-term planning with the need to align their contributions with Ukrainian funding. Additionally, Ukraine's dire fiscal situation further hampers funding efforts.

Another support gap emerged with the discontinuation of the government-supported Warm Loans Programme, leaving owners of single-family houses without access to any support programmes.

To summarise, the state financing alone is insufficient without long-term funding commitments to address the investment gap in Ukraine's building sector, and instruments to incentivise private funds are missing. Despite support programs, the eligibility criteria exclude MFHs without HOAs and SFHs leaving a significant portion of the housing stock unable to access necessary funds for energy efficiency improvements and essential renovations. Thereby, widening the support gap even further. The reimbursement of loans for selected components at a late stage also plays a role for a smaller up-take rate. With a thorough understanding of the building stock, the current support programs, and the gaps between them, targeted recommendations can be developed to enhance energy efficiency in residential buildings across Ukraine.

As described, this is two dimensional. The first dimension concerns the size of available funds which can be solved through increasing donor funds or attracting more private investors. The second dimension of funding gap constitutes the number of entities eligible to access the funds and can be solved by expanding the criteria to include SFHs, MFHs not organised in HOAs, and newly constructed dwellings. Those extensions can be implemented either through expanding the framework of existing instruments or by introducing new ones.

4.2 Expanding existing instruments

The current situation presents an opportunity to revise the EEF's objectives to balance bureaucratic processes, negative climate impact reduction, and alignment with EU's climate goals (notably achieving net zero by 2050). A relevant gap in the operational scope of the EEF is the aforementioned eligibility of MFHs only with already established HOAs. This constraint excludes approximately 80% of MFHs not organised in a HOA as well as SFH and hence limits the reach of the fund significantly.

The main reason for setting such a condition is the advantage of converting MFHs ownership structure to that of a HOA to increase the sense of stewardship for common space and the building in general (see section 2.1 on ownership structure). This condition combines the goal of increasing energy efficiency in residential buildings and the

establishment of an efficient organisational structure. However, the law on establishing HOAs was introduced more than 20 years ago and HOAs still account only for a small share MFHs, while the current war-time conditions further reduces the growth rate.

To expand the number of eligible buildings that can apply for EEF support, the fund can be restructured in such a manner that MFHs organised in HOAs receive EEF support with a higher grant component while MFHs without a HOA have a higher loan component. This way the incentive to set up HOAs remains intact while the group of eligible users is broadened. Such a reward mechanism for desired behavior is also incorporated into energy efficiency support schemes in Germany and UK. The Federal Funding for Efficient Buildings in Germany offers repayment subsidies for loans and provides an efficiency bonus for installing highly efficient heat pumps.³⁷ In UK the Domestic Renewable Heat Incentive (RHI) provides additional payments to applicants if they share their heat pump related data.^{38,39}

To further facilitate the setting up of HOAs, a phase-in period allowing the establishment of HOAs after applying for EEF support can be introduced. If this condition is met within a certain deadline a HOA bonus in form of a higher grant component is endowed by transforming a predetermined part of the loan component, specified in the loan agreement, into a grant. This addition could help alleviate the reluctance of apartment owners to form HOAs. The hesitation to form HOAs and take ownership is often driven by the poor conditions of MFHs over which they do not wish to become responsible for. With renovation works that precede the HOA creation, the overall state of the building is enhanced and apartment owners may be more willing to take over the responsibility for the building and form a HOA. This addition may be difficult to implement as MFHs without a HOA are not a proper legal entity that can be held accountable for non-compliance. Hence, the specific design of such an addition must be oriented toward the experience from the pilot of Felicity II which envisages a phase-in period for HOA establishment as well and which will provide valuable insights.

To implement the distribution of funds to MFHs without a HOA, municipalities can act as important partners for the Fund by assuming the roles of loan takers and fund distributors in this process. Their deeper understanding of local energy modernisation needs, particularly in terms of damage assessment and priority setting, positions them well to manage and distribute the funds effectively. From our previous communication with the Bucha municipality, residents with damaged houses usually approach their office for assistance with reconstruction or advice on reconstruction. Municipalities are also engaged in managing local district heating companies (usually these companies are owned by municipalities). This suggests that their existing capabilities to oversee the synergy between building-specific energy efficiency and broader thermal system modernisation

³⁷ Forschungsstelle für Energiewirtschaft e.V. (2024). *Revision of federal funding for efficient buildings*. [Link](#)

³⁸ OFGEM (2022). *Domestic Renewable Heat Incentive - Essential Guide*. [Link](#)

³⁹ Legislation.gov.uk (2014). *The Domestic Renewable Heat Incentive Scheme Regulations 2014*. [Link](#)

programmes, as described in Table 5. This also allows them to adjust to consumption patterns and plan the thermal system operations. It is worth noting that this approach of using municipalities as borrower on a larger scale is only possible since March 2024, when the government of Ukraine adopted a resolution which enables settlements and villages to borrow from international financial organisations and local banks.⁴⁰

By including municipalities in the distribution process, SFHs can also gain access to EEF's funds as they could not fulfil the HOA condition either. This expands the group of eligible applicants and the number of energy efficient refurbishments further. The experience learned from Felicity II will be helpful in this expansion process.

To address the issue of disbursement of loans post-renovation, it is recommended that the EEF adopts a policy of early reimbursement of all project components, leveraging the building/apartment as a collateral. This policy would facilitate the prompt release of funds to HOAs or other eligible recipients upon commencement of the renovation. By pledging the building/apartment under renovation as collateral, the creditor gains the right to claim the property or repayment of provided funds if the debtor does not complete renovation as agreed/stipulated in the contract. This approach would alleviate the burden of financing costs on HOAs and eligible recipients with constrained creditworthiness to obtain loans first and then repay them with received grants, streamline project planning and execution, and enhance the overall feasibility and attractiveness of renovation projects. Ensuring adherence to legal frameworks governing pledges will safeguard both creditor and debtor interests.

Overall, the broadening of the scope of the EEF to include non-HOA MFHs and SFHs via engagement of municipalities in the fund disbursement, several objectives can be achieved:

- Increased coverage of energy efficiency initiatives across different types of residential buildings
- Potentially enhanced capacity building within municipalities and further exchange of experiences and best practices across municipalities
- Certain municipalities can provide guarantees for procured financing, enhancing thereby the financial stability and attractiveness of energy efficiency projects

⁴⁰ Cabinet of Ministers of Ukraine (2024). *Government has provided an opportunity for village and settlement budgets to attract borrowings to accelerate socio-economic development.* [Link](#)

Table 5: Comparison summary of HOA and municipalities in terms of their operations

	HOA	Municipality
Legal status and formation	Legal entity established under Law No. 2866-III "On Co-owners of Apartment Buildings"	Government entity with administrative powers
Structure, governance	Governed by a board of directors elected by the residents	Governed by elected officials and administrators
Financial resources	Funded by the monthly/annual fees collected from its members. Limited financial resources compared to municipalities	Budget funded by local taxes, national government transfers and international grants. Budget difficulties due to the invasion
Scope of operations	Focused on the management of residential properties and common areas. Manages single buildings or the complexes of buildings	Broad expertise and a range of large-scale projects for the entire communities and/or regions. Urban and utility system planning
Potential for energy efficiency projects	Suitable for energy efficiency projects within single buildings or small residential complexes. Smaller and more agile organisational size allowing for faster project implementation	More comprehensive energy efficiency initiatives that require coordination across multiple buildings and public infrastructure
Challenges	Potential difficulties in securing larger loans Only small share of MFH is organised in HOAs Highly dependent on the engagement and financial capacity of individual residents High owner-occupier rate among non-affluent households can make financing difficult	Bureaucratic processes with slower implementation Limited human resources and local budget capacities Limited expertise and capacity, i.e. smaller municipalities do not have experience with project application and reporting processes.

A further proposal to adjust the existing framework of the Fund is to **include installation of solar PV panels and individual heating substations as obligatory measures into the packages**. Based on the recent study conducted for Bucha's energy efficiency measures in the residential sector, it has been identified that certain measures can be considered as no-regret options under any scenario.⁴¹ These measures include the installation of solar PV panels and individual heating substations for houses connected to district heating system. Specifically, the installation of solar PV panels is projected to provide annual savings ranging from 2% to 12% of the baseline consumption for different building types. The payback periods range from 7.4 to 14.4 years, predominantly at the lower end of this range in the context of Bucha's residential sector. Additionally, individual heating substations connected to district heating can yield heat savings of 7-11% annually by 2030, with payback periods ranging from 3.0 to 18.6 years, mostly at the lower end.

Currently, Package A (Light) and Package B (Complex) of the EEF do not explicitly include these no-regret measures as part of their obligatory components. To enhance the effectiveness and ensure the financial viability of the energy efficiency initiatives, the obligatory measures should be expanded to include the installation of solar PV panels and individual heating substations in either of the packages. This would ensure that these highly beneficial measures are implemented universally across the buildings undergoing energy efficiency improvements. This integration would maximize energy savings and improve the overall efficiency of the buildings, contributing significantly to the reduction of energy consumption and the achievement of sustainability targets.

4.3 Introducing new instruments

Even with updating the design of the existing instruments, only a fraction of energy efficient renovation and reconstruction projects can be financed. Hence, the reforms of existing instruments need to be accompanied by the implementation of additional ones to diversify the source of financial flows, the supported building types, and the scope of implemented renovations. For some of these instruments policy reforms need to be introduced parallelly in order to exhaust their potential which will be discussed further in the following chapter.

Construction of new social housing. The role of local municipalities in housing policy has increased, especially since the full-scale invasion. Various temporary housing solutions have been implemented, but there is a pressing need for long-term strategies. Municipalities have been responsible for managing temporary shelters and need to develop more permanent housing policies and infrastructure to address the ongoing needs of internally displaced persons. However, as it is mentioned in Table 3, municipalities face the low capacities both in terms of local budgets as well as human resources.

⁴¹ Bilek, P., Stubbe, R., Saporova, D. (2024). *The Green Reconstruction of the Residential Sector of Bucha*. [Link](#)

The process to build new affordable housing through municipalities in Ukraine and subsequently promote privatisation by tenants can be divided into two phases:

1) Construction of affordable housing

- Municipalities identify needs, priorities and plans to address them, possibly setting up a housing company
- Funding and partnerships for construction. Potential sources for the financing of the projects can be low-interest loans and grants from the international donors and government, or via public-private partnerships where private developers and construction firms are being engaged by the municipalities. PPP model should leverage private sector efficiency while ensuring public oversight and objectives. In addition, the financial risk and investment is shared implying the reduction of the financial burden on municipalities.
- Site selection and planning by selecting locations that are close to essential services and areas with significant employment opportunities.
- Community involvement in the planning stages to ensure that the needs are met
- Sustainable and efficient design. Energy efficiency should be a condition for the building design including its insulation, electricity generation and appliances used.

2) Subsequent privatisation by tenants

- Legal and regulatory framework. The clear and transparent legal guidelines for privatisation process with detailed eligibility, pricing and procedures for tenants should be developed. For example, the UK has introduced its 'Right to Buy' program where the tenants can opt for purchase of apartments after three years of renting.
- Financial support mechanism. Down payment assistance can be provided via subsidies or grants to help tenants to afford the purchase cost, it can be carried out via establishing national programs (e.g. subsidised loan program) or international aid. Alternatively, the scheme where a portion of the rent paid by tenants contributes towards their purchase cost, making ownership more accessible over time.
- Long-term management and oversight. Regulations on resale should be implemented to avoid the resale and speculations as well as to ensure that the housing remains affordable for the intended residents. In terms of maintenance and upkeep, the potential clause in the construction contract as well as purchase contract can indicate the condition to create a HOA/alternative management form. In addition, the reporting and transparency mechanisms should be included.

The gradual transition and pilot projects in the selected areas to test and refine both construction and privatisation process should be carried out first. To improve the

processes, data and feedback should be collected before the wider implementation. Upon the success of the pilot program, scale up of the affordable housing and further privatisation can include more regions and housing projects.

Green Reconstruction Mortgages are a channel to provide favourable financing conditions for energy efficient (re)construction and renovation measures through preferential mortgage terms. Mortgages in general are used for the maintenance or purchase of a building, land or plot with the property acting as collateral. Green mortgages are an extension of this design and consider the economic effects of energy efficiency measures by either capitalising the energy savings of a new home and thereby increasing the consumer's purchasing power. Alternatively, this instrument can be used for existing mortgages to carry out energy efficiency upgrades by maintaining the level of down-payments and repaying the additional costs of energy efficiency measures through the resulting savings on utility bills.⁴²

This instrument's advantage is the already existing mortgage market although it is currently underdeveloped. With introducing attractive Green Reconstruction Mortgages, the general mortgage market will be expanded further and the availability of any type of mortgages will be increased. Green mortgages fill the gap of providing financing instruments for energy efficiency measures in single family homes which are not targeted by the current EEF design. Its design can be oriented toward the existing Loan for Youth mortgage programme by the State Fund for Support of Youth Housing Construction which provide long-term preferential loans for (re)construction and purchase for young families at 7% per year. To obtain such a loan, certain eligibility criteria need to be fulfilled similar as for a Green Reconstruction Mortgage using energy efficiency characteristics as conditions. Another programme within the scope of the State Fund for Support of Youth Housing Construction that can act as a template is the loans for IDPs programme for energy efficient rehabilitation financed by KfW. The additional funds needed to finance the mortgage reduction could be provided by international donors in tandem with Ukrainian funds similar to EEF.

Improving the market for **Energy services companies (ESCOs)** can function as a further pillar to increase energy efficiency measures in the private residential sector. The vast majority of energy efficiency improvement projects implemented by ESCOs are for end-users with high energy consumption, e. g. industrial sites or public buildings. ESCOs assess the energy savings potential and implement the respective measures. The advantages for clients of ESCOs are their extensive expertise in the field, their possibility to cover the high up-front costs which are payed back through the energy savings and the possibility to mitigate risks through Energy Performance Contracts (EPCs) with ESCOs compensating the client for saving short-falls. With ESCOs assuming the technical as well as in some cases the financial risks their costs are rather high, rendering small projects with a lower energy

⁴² European Commission JRC (2014). *Financing building energy renovations*. [Link](#)

saving potential, like private residential housing, not the preferred choice.⁴³ However, ESCO projects for residential MFHs can be made possible as the energy savings potential is higher compared to single dwellings. Factors that help increase the implementation of ESCOs in private residential MFHs are the establishment of HOAs which facilitate the contracting between the MFH, the ESCO and a financial institution. Furthermore it is vital to improve the access to financing instruments for private residential clients to enable the realisation of ESCO contracts. Thirdly, in order to strengthen the economic viability of EE measures for ESCOs tariffs need to be increased to.⁴⁴ As ESCOs mostly participate in undertakings with short payback periods individual heating substations would function as viable and efficient projects that can be conducted by ESCOs in MFHs organised in HOAs.⁴⁵

For the implementation of all these instruments, it is fundamental to ensure that the installation of any energy efficiency measures is closely coordinated with utilities and especially district heating companies. While some of the measures proposed here directly include utilities within the process, either through financing or otherwise, close coordination has to be maintained in order to align long-term investment plans and ultimately prevent asset stranding. This is especially the case as large improvements in energy efficiency will dramatically decrease the requirements for district heating systems, meaning that the decommissioning of old boilers and planning new capacities has to be considered more broadly.

In conclusion, the proposed instruments have an immense potential to decrease energy consumption, minimise the trade-off between quick, low-cost but inefficient reconstruction and more capital intensive energy efficient measures, and deliver positive co-benefits. This potential increases significantly with a growing difference between investment costs and monetary savings from energy savings. However, Ukraine is dependent on solutions to finance and implement these instruments, i. e. through international donors and capacity development initiatives, e. g. to train energy efficiency auditors. Other sources for capital can be green bonds, utility or public funds, carbon pricing revenues, credit unions, banks or the capital market.^{46,47}

⁴³ Bertoldi, P. et al. (2019). *How to finance energy renovation of residential buildings: Review of current and emerging financing instruments in the EU*. [Link](#)

⁴⁴ Boza-Kiss, B. (2017). *Energy Service Companies in the EU Status review and recommendations for further market development with a focus on Energy Performance Contracting*. [Link](#)

⁴⁵ Oliynyk, S. (2020). *ECKO на простоті*. [Link](#)

⁴⁶ Meissner, F., Mettenheim, M. (2021). *Energy efficiency in public buildings – 50% retrofitting target until 2030*. [Link](#)

⁴⁷ European Commission JRC (2014). *Financing building energy renovations*. [Link](#)

4.4 Accompanying domestic policy reform needs

4.4.1 Tariff Reform

Ukraine's electricity market continues to feature a Public Service Obligation (PSO) for household electricity supply. In practice, this means that residential electricity retail prices are administratively set at levels significantly below market values and are thus not cost-reflective. The household PSO is financed from revenues of the state-owned electricity generation companies Energoatom and Ukrhydroenergo. The PSO can thus be described as a quasi-fiscal subsidy to residential electricity consumers. Natural gas supply prices for households and district heating companies are also regulated at levels far below market prices for natural gas. This quasi-fiscal subsidy for natural gas and gas-based district heat generation is financed through state-owned company Naftogaz and its subsidiaries. Additionally, final district heating prices for households are often set below levels that would allow for sufficient investments in district heat generation, distribution, and supply infrastructure. Since district heating companies are often municipally owned, this represents another quasi-fiscal subsidy to residential district heating consumers.

Subsidised residential electricity, gas and district heating prices create sizeable fiscal and quasi-fiscal losses for the state and an inability for the municipally- and state-owned energy companies to modernise their infrastructure and adequately invest in existing and new capacities without direct budget support or donor-funded financial support. Furthermore, they drastically reduce incentives to conserve energy and to invest in energy efficiency.⁴⁸

As such, a relatively rapid convergence to fully cost-reflective energy tariffs is required after the war, possibly with some first steps already taken during the war to reduce payback periods and to make investments in the energy-efficient reconstruction of buildings more viable. Moreover, existing direct and indirect energy subsidies are not only inefficient but also inequitable. Wealthier households, who usually consume more energy per capita, profit more from subsidised energy tariffs than less wealthy households. Better alternatives exist such as replacing price subsidies with targeted, consumption-independent subsidies or broad-based social transfers at the same or lower cost to public budgets.

4.4.2 Labour programmes

As mentioned, energy efficiency programmes have the potential to contribute significantly to the creation of new, promising jobs for the Ukrainian economy. This is especially relevant as the country considers a post-war future and long-term economic recovery. As unemployment rates are now high, any economic recovery programme will

⁴⁸ Bilek, P., Stubbe, R., Saporova, D. (2024). *The Green Reconstruction of the Residential Sector of Bucha*. [Link](#)

need to grapple with how to ensure more people do not leave the country after the lifting of travel restrictions. Through the creation of well paying jobs, it can be assumed that people retention rates will be higher, but also that the people who have previously left the country (especially women and children) may be more incentivised to return. As the IEA states, energy efficiency has a great job creation potential, accounting for between 14.8 and 15.2 jobs per USD 1 million spent.⁴⁹ As such, investments in energy efficiency can contribute significantly to good job creation, and ultimately also to the recovery of the economy.

Concurrently, Ukraine faces a skills shortage in various sectors, including the renewables sector which would be fundamental to the broader roll-out of small-scale solar PV needed for many energy efficiency packages. A recent survey from 2020 conducted by the European-Ukrainian Energy Association that surveyed 27 Ukrainian renewable companies, finding that 89.2% of companies noted a significant shortage, and 67.6% considered this shortage critical to operations.⁵⁰ While there has been a noted increase in the number of personnel in the renewable energies space, the current military duty obligations of a large part of the (primarily) male working-age population presents a fundamental issue for many businesses.

The skills shortage may pose a significant barrier to the speed of solar deployment, especially at the more labour-intensive small-scale level, which has already seen significant increases. In the aforementioned survey conducted by EUEA, businesses were seen as the primary actor in the renewables training and capacity development space⁵¹, but more support may be required from the government and international donors in terms of expanding technical, vocational education and training (TVET) more broadly, and expanding technical training for renewables, energy efficiency and solar PV more concretely. Additionally, given the military service duties of the (primarily) male working age population, programmes focusing on the training of women (as well as veterans) may be prioritised, which may also provide additional incentives for people returning from abroad, and for the integration of larger segments of the population into the job market.

5 Conclusion

This paper highlights the pressing need for improving energy efficiency in Ukraine's residential sector. Aging buildings, low energy tariffs, and complex ownership structures in MFHs lead to low levels of energy efficiency in residential buildings, exacerbated by the extensive EUR 54 billion in damages caused by Russia's invasion and targeting of the persisten sector. Current support programmes like the EEF are limited to MFHs organized in HOAs, leaving a significant eligibility gap.

⁴⁹ IEA (2020). *Energy Efficiency 2020*. [Link](#)

⁵⁰ Kalinina, S., Lyndiuk, O., Buchyk, V. (2020). The development of renewable energy in Ukraine in the context of ensuring public employment. *Polityka Energetyczna – Energy Policy Journal*, 23(4), 141-154.

⁵¹ Kalinina, S., Lyndiuk, O., Buchyk, V. (2020). The development of renewable energy in Ukraine in the context of ensuring public employment. *Polityka Energetyczna – Energy Policy Journal*, 23(4), 141-154.

To address this, the paper recommends expanding the EEF to include non-HOA MFHs and SFHs, incentivizing HOA formation, and involving municipalities in financing efforts. Mobilizing private investment through green mortgages and ESCOs, along with public investment in energy-efficient social housing, is essential to closing the investment gap.

Complementary domestic reforms, such as tariff adjustments and vocational training expansion, are also necessary to create a conducive environment for energy efficiency. By implementing these measures, Ukraine can significantly reduce its energy consumption and build a more sustainable, resilient housing sector and increase the level of thermal comfort.

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Table 3: Notable financing programmes for the housing sector

Program	Financing institution(s)	Description of the program	Available funding (EUR)	Project duration and current status
<u>Soft loans</u>				
Felicity II	IKI	<p>Finances the rehabilitation of war-damaged multi-family buildings with comprehensive energy-efficient measures, with a view to scaling up nationally. Financial programme is accompanied by capacity development.</p> <p>The borrowers are municipalities, the beneficiaries non-home owner associations.</p>	EUR 20 million	2022 – 2026 Active
Housing Repair for People's Empowerment (HOPE) Loan	World Bank, IBRD via Ukraine Relief, Recovery, Reconstruction and Reform Trust Fund (URTF)	The project is aimed at financing the repair of partially damaged individual houses, design and capital repair of multi-family apartment houses (MFH), project management and implementation capacity building.	EUR 232.5 million	2023 – 2025 Active
EBRD's IQ Energy Programme	EBRD, E5P (Eastern Europe Energy Efficiency and Environment Partnership)	The Program financed selected eligible energy efficiency measures in individual houses and apartments in multi-family houses by offering a soft loan from a local partner bank and a reimbursement of a part of eligible investment costs.	Loans: EUR 48 million Grants: EUR 15 million	2016 – 2020

Grants				
Energy Efficiency Fund	Ukrainian State Budget, EU and German government via IFC	Financial support to implement energy efficiency measures for residential buildings organised in homeowners associations (HOAs). Programmes: EnergoDim (40 – 70% of energy efficiency measures reimbursed), VidnovyDim (100% of work and materials for restoring war damages, no energy efficiency focus), GreenDim (70% of heat pumps and solar PV installation costs)	Ukraine: UAH 2.7 bn EU: EUR 80 million Germany: EUR 20 million	From 2019 Active
EU support for Urgent Housing Needs for IDPs in Ukraine	EU via NEFCO	Constructing new buildings and recover damaged municipal facilities to accommodate IDPs.	EUR 100 million	2022 – 2023 (was expected to be completed by end-23)
Housing for Internally Displaced Persons and Rehabilitation of Liberated Cities in Ukraine	NIP via NEFCO	Providing housing for IDPs by renovating and improving energy efficiency in existing public buildings in municipalities in Western and Central Ukraine.	EUR 19 million	From 2023 Active
Promotion of Social Infrastructure Development. (USIFIX)	KfW	Creation of additional accommodation capacities for DPs in Dnipropetrovsk, Lviv, Kharkiv and Khmelnytsk regions	24.2 million	50 months from the registration date Undergoing registration
Promotion of social infrastructure development (USIF VI)	UNDP, UNOPS, KfW	Supporting provision of internally displaced persons (IDPs) with housing, improvement of social objects (schools and pre-school institutions) infrastructure in the communities, hosting IDPs. Target group: 13 residential buildings (basic sub-projects), 4 school and 8 kindergarten facilities (secondary sub-projects).	9 million	2018 – 2024 Active

Warm loans	Ukrainian state budget	<p>The Program financed certain eligible energy efficiency measures in individual houses and multi-family houses organised in homeowners associations (HOAs) by offering a reimbursement of a part of eligible investment costs financed with a loan taken from a partner bank.</p> <p>The Programs was administered by the State Agency for Energy Efficiency and Energy Saving of Ukraine.</p>	UAH 7.7 billion from 2018 to 2021	2014 – 2021
<u>Capacity building</u>				
Promotion of energy efficiency and implementation of the EU Energy Efficiency Directive	Germany, Switzerland	Financing capacity building in the sector	EUR 25.2 million	Active until 2025
Training for energy auditors and technical designers (TEAD)	EU	Financing the development of technical capacities to perform energy audits and to educate technical designers with a focus on EE.	EUR 2 million	2022 - 2024