AI.1 Baseline Assessment Report for Hungary

Deliverable **Assessment Report on the Available Data and Information Regarding the Building Stock in Hungary**

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This project is part of the European Climate Initiative (EUKI). EUKI is a project financing instrument by the German Federal Ministry for Economic Affairs and Climate Action (BMWK). The EUKI competition for project ideas is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. It is the overarching goal of the EUKI to foster climate cooperation within the European Union (EU) in order to mitigate greenhouse gas emissions.

Project Acronym	JustReno
Project Name	JustReno - Renovation for a socially just decarbonisation of buildings
Project Duration	01/03/2025-15/12/2026
Deliverable Number	A I.1
Deliverable Leader	MEHI
File Name	Baseline assessment report for Hungary

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Executive summary

Hungary's residential building stock is central to achieving national climate goals and ensuring social equity. The sector is both a major consumer of energy and leaves many households exposed to affordability and energy security risks. This baseline assessment identifies the structural characteristics of the building stock, the current status of data collection and governance, and the systemic challenges that undermine effective renovation strategies. It also outlines links to energy poverty, and the pressing need for integrated and socially just renovation solutions. The age of the stock, its inefficiency and high ownership rates – along with various barriers to energy-efficient renovations – create significant challenges for meeting climate and social objectives under the EU's revised Energy Performance of Buildings Directive (EPBD).

Hungary has 4.6 million dwellings, of which 4 million are inhabited. The stock is predominantly old: nearly two-thirds were built before 1980, often without energy efficiency standards. Only a small fraction of the housing – around 14% – was constructed after 2000 to modern standards. Detached single-family houses dominate (around 2.8 million), and these are typically the least energy efficient. Brick and stone remain prevalent, but a significant share of adobe dwellings persists, especially in rural areas. These structural characteristics translate into high energy needs, with heating alone consuming about three-quarters of household energy use. This profile places Hungary among the least energy-efficient housing markets in Europe.

Several datasets provide partial insights into the building stock: the national census, energy performance certificates (EPCs), occasional housing surveys, and data from national authorities. Data from the 2022 census provides reliable national coverage but lacks detail on energy characteristics and renovation status.

EPCs are the main operational dataset, with over 1 million issued since 2016, covering roughly a quarter of the inhabited stock. However, EPCs are biased toward marketable and better-condition homes. The recent transition (2023) from a two-letter to a one-letter EU-aligned rating scale revealed even lower efficiency levels: over 50% of dwellings are rated F or worse, and 1.25 million homes fall into the lowest "I" category, mainly older single-family houses. Average household heating demand remains among the highest in the EU, with 72–74% of energy use going to heating.

Hungary's homeownership rate is about 90%, among the highest in Europe, while the rental sector remains small. However, high ownership does not equate to affordability: property prices rose 234% between 2010 and 2024, far outpacing income growth (86%). By 2025, the price-to-income ratio reached 13.6, nearly double the EU average, making home ownership increasingly inaccessible. Rental costs also surged (+12.6% in 2023), further burdening low-income and younger households.

Energy poverty is widespread, though definitions vary. Official figures suggest only 3% of households are "energy poor," but broader indicators (such as the 10% expenditure rule) show up to 60% of households face difficulties paying for energy. Vulnerable groups – elderly people, low-income rural households, single parents and Roma communities – are disproportionately affected. Many live in poorly insulated single-family houses, often heated with inefficient solid fuels. Around 25% of households (30% of the population) experience at least one form of housing poverty, and over 160,000 people face multiple housing disadvantages simultaneously. These socio-economic conditions reinforce the link between poverty, poor housing and high energy costs.

Hungary lacks a single, comprehensive and integrated database linking energy use, building typologies and socio-economic information. Renovation activity is poorly monitored – there is no systematic tracking of renovation depth, quality or post-upgrade performance, leaving a critical gap in evidence-based policymaking.

Hungary has committed to climate neutrality by 2050 and a 50% emissions reduction by 2030, but progress in the building sector lags behind. The Long-Term Renovation Strategy (2021) sets ambitious targets, yet the current deep renovation rate is just 0.2%, far below the 3% needed. Governance challenges include:

- Lack of an integrated, up-to-date building stock database linking structural, energy and socio-economic data.
- Fragmented data sources (census, EPCs, surveys, regulatory data) with poor comparability and limited accessibility.
- Weak monitoring of renovation depth and impacts; the planned Building Renovation Monitoring System (ÉMOR) is still not operational.

- Policy silos, with limited alignment between energy efficiency, housing, social support and family policies.

Existing programmes, such as the Home Renovation Programme, Rural Home Renovation Programme and the Energy Efficiency Obligation Scheme (EEOS), provide some support, but targeting is weak and often fails to reach vulnerable households. The dominance of energy price caps since 2013 reduced reported energy poverty but also encouraged inefficient energy use and delayed structural improvements.

To achieve Hungary's renovation and climate targets while ensuring social justice, this report highlights several priorities:

- Establish an integrated national building database linking energy, housing and socio-economic data.
- Develop a comprehensive, publicly accessible renovation monitoring system, tracking rate, depth and impacts.
- Align building renovation policies with housing affordability and social support measures to avoid reinforcing inequalities.
- Prioritise low-income, rural households in inefficient single-family homes as the key target group for minimum energy performance standards and subsidy schemes.
- Strengthen one-stop-shop networks to provide households with guidance, information and technical assistance.

Hungary's building stock is inefficient and aging, its inefficiency drives high energy use and emissions, while its age and ownership structure make it costly and complex to modernise. Without a systemic overhaul of data collection, governance and financial targeting, Hungary risks missing its climate objectives and deepening social inequalities. The recast EPBD and the forthcoming national building renovation plan offer a rare chance for systemic change. With better data, targeted support and coordinated policies, Hungary can turn renovations into a driver of decarbonisation, affordability and social justice – ensuring the transition effective, fair and inclusive.

1. Introduction

Indicator	Value			Source/reference
	Occupied	Non-occupied	Total	
Number of residential buildings	-	-	2,772,488	ITM / LTRS (2021)[1], data: 2011
Total floor area of residential buildings (m^2)	274,149,410	-	-	ITM / LTRS (2021), data: 2020
Total floor area of single-family houses	200,573,410	-	-	ITM / LTRS (2021), data: 2020
Total floor area of multi-family houses	73,576,000	-	-	ITM / LTRS (2021), data: 2020
Total number of dwellings	4,008,541	571,997	4,580,538	HCSO 2022 census[2]
Number of single family houses (occupied)	2,800,854	-	-	Horváth et al. (2025)
Number of multi-family houses (occupied)	1,686,444	-	-	Horváth et al. (2025)
Number of dwellings in urban areas	2,910,696	426,728	3,337,424	HCSO 2022 census
Number of dwellings in rural areas	1,097,845	145,269	1,243,114	HCSO 2022 census

[1] Ministry of Innovation and Technology (2021)
[2] Hungarian Central Statistical Office, HCSO (2025)

2. Overview of the building stock in Hungary

2.1. Building stock data

Hungary's residential building stock comprises approximately 4.6 million dwellings, of which around 4 million are occupied. The age profile is heavily skewed toward older construction: about one-fifth of homes were built before 1945, and roughly two-thirds of all homes – and three-quarters of currently occupied dwellings – were constructed before 1980, largely without consideration for energy performance or requirements. Only about 14% of homes have been built since 2000. [3] This means the existing stock is overwhelmingly composed of older buildings with inherently poor energy standards.

The most comprehensive building survey in Hungary was conducted in 2015, aiming to assess and evaluate the energy performance of the existing building stock. The project classified buildings into 23 types and was based on surveys and bottom-up modelling of 2,000 statistically representative residential buildings.[4] The building typology[5] has been widely used in policy contexts over many years, including in official strategic documents such as the long-term renovation strategy (LTRS) published by the former Ministry for Innovation and Technology (ITM).[6]

The most recent and methodologically sound dataset comes from the 2022 Hungarian national census. While census data is significantly more robust in terms of statistical reliability and national coverage, it presents several limitations from a building energy analysis perspective. First, it is collected at the dwelling level, not at the building level, which makes it difficult to assess full-building renovation needs or typologies. Second, the categorisation is much less detailed: instead of 23 building types, the census classifies homes into just seven construction periods. This means that it does not aim to uncover structural or typological patterns of the building stock but rather focuses on capturing general trends in Hungarian housing conditions. Despite these constraints, we have

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[3] HCSO (2025)
[4] Csoknyai (2022), KEOP-7.9.0/12-2013-0019/2020 (2015)
[5] Developed by Tamás Csoknyai, Budapest University of Technology and Economics
[6] Some of the underlying data provided by ITM was based on a one-time measurement campaign and cannot be considered fully reliable for current policy planning or monitoring purposes.

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chosen to work with the 2022 census data in our current analysis, prioritising maximum reliability and comparability across the entire housing stock.

Construction period	Brick, stone, hand-made wall construction	Panel	Concrete, medium- or large-block	Adobe, mud	Other wall construction	Total
–1919	191 596	-	-	71 073	9 695	**272 364**
1919–1945	215 718	-	-	133 479	12 397	**361 594**
1946–1960	292 469	-	5 072	152 569	16 313	**466 423**
1961–1980	821 632	326 966	122 541	141 919	38 600	**1 451 658**
1981–2000	584 216	187 689	75 637	17 450	44 986	**909 978**
2001–2010	312 454	-	13 346	4 327	21 709	**351 836**
2010–	171 045	-	10 000	1 243	12 400	**194 688**
Total	**2 589 130**	**514 655**	**226 596**	**522 060**	**156 100**	**4 008 541**

Table 2. Typological matrix of housing units in Hungary[7] – inhabited dwellings only

Table 2 shows that among the approximately four million inhabited dwellings, buildings constructed between 1961 and 1980 account for a particularly large share – more than one-third of the total stock. Another significant portion (23%) consists of dwellings built between 1981 and 2000. Around 12% of the housing stock was built in the post-World War II period, between 1946 and 1960, while 16% of the dwellings were built before 1945 and typically exhibit very poor energy performance. Dwellings constructed between 2001 and 2010 make up about 9% of the total.

In terms of wall construction, 65% of the dwellings fall into the brick, stone or hand-made category. Panel buildings account for 13%, while adobe or mud wall buildings represent another 13%. When examining both wall construction type and construction period, we find that one-fifth of the entire housing stock was built between 1961 and 1980 using brick, stone or hand-made wall construction. A further 15% of the stock was built between 1981 and 2000 using the same wall construction type.

Hungary has a homeownership rate of around 90%, one of the highest in Europe. Less than 10% of households live in rented accommodation, with only 4.2% residing in market-based rental housing as of 2022; the remainder benefit from some form of subsidised housing. Even in Budapest, where the ownership rate is somewhat lower, 81% of

[7] HCSO (2025)

households still live in their own homes, while the share of rental housing stands at 18%, notably above the national average but still indicating a relatively small rental market overall.[8] The proportion of households living in social housing is very low by regional standards, especially when compared to cities like Prague.

Data collection

Housing stock data is collected by KSH – Hungarian Central Statistical Office: censuses are conducted every ten years (most recently in 2022), while micro-censuses are usually held halfway between two censuses (most recently in 2016). They provide a comprehensive structural overview of the building stock, but their infrequency makes them unsuitable for tracking renovations over time. An EU-wide data collection instrument, the EU statistics on income and living conditions (EU-SILK) is regularly conducted to gather harmonised, comparative microdata at both the individual and household levels – covering related areas such as income, poverty, social exclusion and housing.

Additionally, energy performance certificate data is collected and managed by Lechner Knowledge Centre, on behalf of the government. The information available varies significantly depending on whether the certificate was issued under the old two-letter classification system or the new one-letter classification system. Two-letter certificate data typically includes only basic information: address, cadastral number and overall energy rating. The new one-letter system provides a more detailed dataset with building attributes such as building function, reason for issuing the certificate, overall energy performance category and CO_2 emissions – the latter two expressed both as a category and in quantified form (kg/m²/year).

The Hungarian Energy and Public Utility Regulatory Authority (MEKH) is responsible for collecting and managing energy statistics. MEKH publishes annual energy consumption data for households, including final energy use, presented as a time series and broken down by main end-uses such as heating and domestic hot water. Table 3 provides an overview of the different data collection methods.

[8] HCSO (2025)

	Strength	Weakness
Census, micro-census	Comprehensive survey	Only conducted every five years, renovations cannot be tracked
Energy performance certificate data	A registered expert surveys the property and performs detailed calculations	The sample is not representative, detailed data is not accessible
Housing survey	A thorough housing survey that provides a detailed picture of renovation works and intentions	Only rarely and occasionally conducted as a representative survey
EU-SILC	With an EU-wide uniform methodology	Small sample size, works with relatively few questions
MVM[9]	Comprehensive data collection on the consumption of residential customers	Restricted (not open source) database; apart from consumption, no information on the building or other characteristics of the consumer
Hungarian Energy and Public Utility Regulatory Authority (MEKH)	As the responsible body for energy statistics, MEKH publishes data on the energy consumption of households, broken down by main end-uses (heating, hot water, etc.)	Does not collect data on the energy consumption of the building sector
Ad hoc surveys	Can provide answers to focused questions	Rarely conducted and usually geographically concentrated

Table 3. Residential building energy data collection methods in Hungary[10]

How operational is the data?

Among the available datasets, the EPC system stands out as the most operational, regularly updated dataset, since certificates are required by law with every sale or new

[9] Hungary's largest incumbent energy supplier, universal service provider
[10] MEHI (2025a)

construction. However, concerns remain over consistency as regulations changed in 2023 (see Energy performance data section).

Census and micro-census data is highly robust but infrequent. Meanwhile, insights from bank mortgage portfolios and municipal records tend to be partial, focusing on narrower segments of the stock. As a result, while Hungary possesses significant data on its residential building stock, there is no single integrated database that combines structural, financial and energy-use characteristics.

2.2. Energy performance data

The primary operational dataset on energy efficiency in Hungary comes from EPCs, which have been mandatory since 2012 for all property sales, new builds, rentals, public buildings larger than 500 m^2, and projects involving public funding for energy renovation.

A two-letter rating scale was introduced along with new energy performance requirements in 2016. Between 2016 and 2022, an average of 150,000 EPCs for residential and accommodation-type buildings were issued annually in Hungary, with over one million buildings certified by 2022 – representing approximately a quarter of the total inhabited residential building stock.[11]

Until 31 October 2023, Hungary used a two-letter energy rating scale (AA–JJ). This was replaced by a new single-letter system from A+++ to I, aligned with updated EU rules and offering a clearer, more detailed framework – especially for top-performing (A+++) and worst-performing (I) buildings. The new certificates are more visual and user-friendly, include mandatory retrofit recommendations, are valid for five years, and must be shown in property listings. Buildings are now rated on both energy use and operational CO_2 emissions.

Due to the shift in methodology, the old and new ratings are not directly comparable – for example, an "FF" under the old system does not correspond to an "F" today. In practice, the same building typically receives a rating one to two categories lower under the new system, reflecting the tightened standards. The national database currently contains both the old two-letter and new single-letter certificates. A practical solution to improve comparability is the conversion formula proposed by Horváth and colleagues in their

[11] Lechner Knowledge Centre (2023) in: MNB (2023)

2025 study,[12] which estimates a statistical relationship between the old and new classification systems. This allows for the estimation of the new category based on the old rating, even in the absence of detailed property data.

Overall, the updated scale includes 12 categories. The top four (A+++ to A) align with requirements for new constructions and various levels of nearly zero-energy demand. Below these, the scale differentiates between buildings still economically operable (B or C), those needing medium-term upgrades (D, E), and those that are outdated or highly inefficient (F to I), requiring major renovations. This makes it much clearer which buildings meet current efficiency ambitions and which lag significantly behind. The change also brought in new calculations and stricter CO_2 emission and renewable integration requirements, especially for new buildings that must now reach at least an "A" rating.

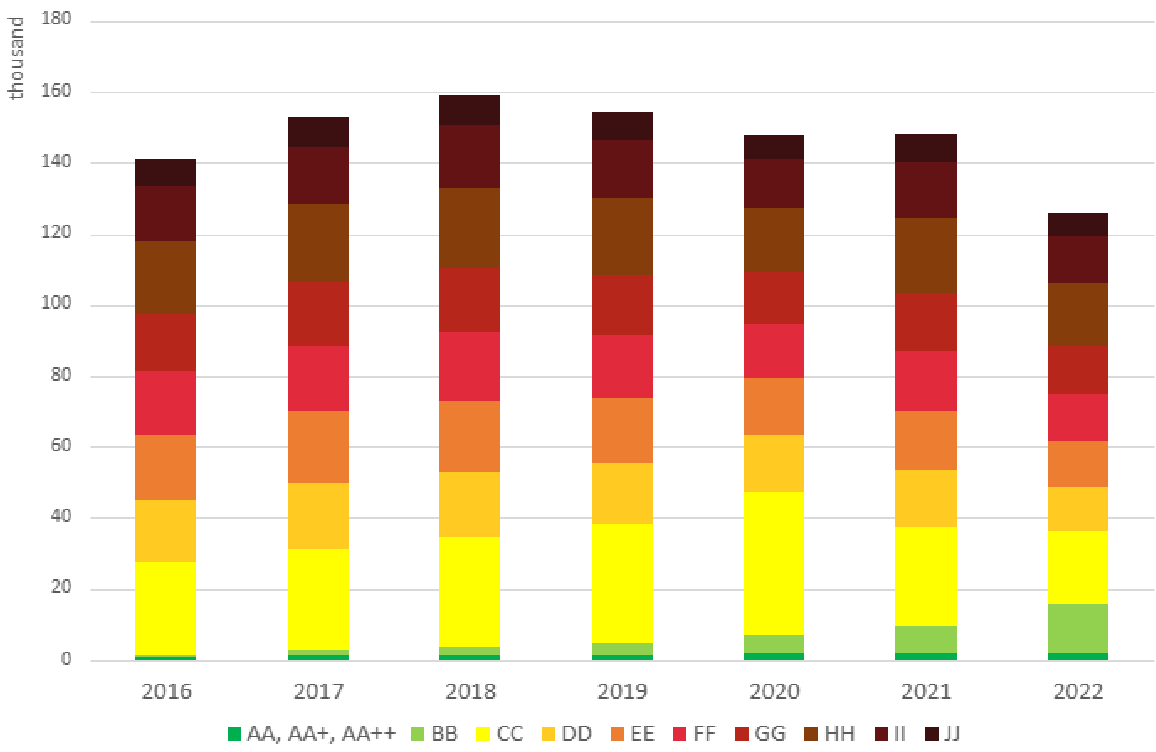

Figure 1. Number of EPCs issued for residential and accommodation buildings[13]

[12] Horváth et al. (2025)
[13] Lechner Knowledge Centre (2023) in: MNB (2023)

Figure 1 shows the number of energy certificates issued in Hungary each year between 2016 and 2022, broken down by energy efficiency categories. A slow improvement can be observed in this period: the proportion of residential properties achieving a CC rating increased from 20% to 29%. In 2022, the share of residential buildings rated as nearly zero energy (at least BB-rated) rose significantly – from 6.4% to 12.4%. This proportion was slightly higher in rural areas, reaching almost 13%, while in Budapest it remained lower, at below 11% (Figure 2). The increase was largely due to the anticipation of stricter building regulations, prompting new home developers to prepare accordingly – although in the event the introduction of those tighter standards was postponed until July 2024.

However, Hungary's overall poor energy efficiency remains evident: in 2022, 70% of the certified buildings did not meet the "modern" energy standard, and 30% fell into the three lowest energy categories. Also, under the new single-letter classification system, many buildings previously rated under the old two-letter scheme (such as EE or FF) will be reclassified into even worse categories, making the current picture look even grimmer.

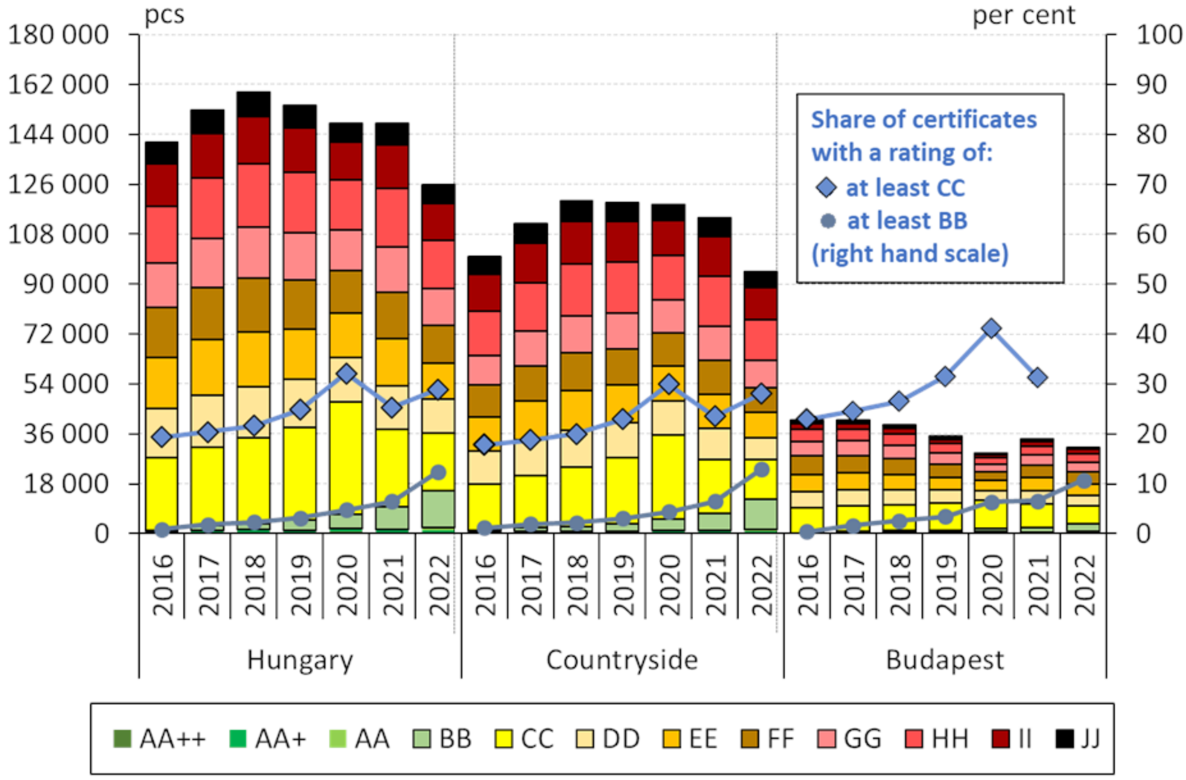

Figure 2. Number of EPCs issued for residential and accommodation buildings (used and new) by category and location (Budapest and rural areas)[14]

EPCs are widely used to assess the energy performance of individual buildings, and the EPC database can serve as a useful tool for policy planning. However, it has notable limitations: it is not fully representative of the Hungarian building stock, as it disproportionately reflects properties that are marketable and in relatively better condition. A straightforward way to address this imbalance would be to increase the renovation of poorly performing buildings and ensure that EPCs are systematically issued, linked to such upgrades, capturing a more accurate picture of the lower end of the energy performance spectrum.

Recent studies by Bene and colleagues have linked EPC data with micro-census and transaction records, still within the framework of the old two-letter certificate system (Figure 3). A new feature of the analysis is that, using statistical estimation, the

[14] Lechner Knowledge Centre (2023) in: MNB (2023)

distribution of energy performance ratings has been extended to cover the entire residential building stock, not just the properties with existing energy certificates. In line with Figure 1, this distribution highlights the overall poor energy performance of Hungarian homes, indicating that the typical dwelling falls far short of modern efficiency standards. Based on these statistical estimates, the picture is even more concerning than what is reflected in the EPC data.

Out of the 4.5 million residential units in Hungary, one-quarter fall into the HH category, making it the most common energy rating (25%). Altogether, 40% of homes – about 1.73 million properties – are in the three worst energy categories. Fewer than 10% of dwellings even approach a modern energy standard, and only 1.2% meet the nearly zero-energy (BB or better) level, compared to over 10% based on EPC data alone.

The situation is particularly alarming among single-family homes: approximately 2 million out of 2.8 million (71%) fall into the GG category or worse (considered below average or poor). Only 3% of single-family houses can be considered energy-efficient, while over 10% of apartment buildings reach that level. Apartment buildings often receive relatively better ratings, but this does not necessarily mean they have higher energy performance. These favourable results are largely due to the physical characteristics of such buildings, rather than superior insulation or systems. Larger buildings generally have lower energy consumption per square metre because there is less cooling surface area per unit of heated volume. As a result, apartment buildings tend to perform better in energy assessments than single-family houses.

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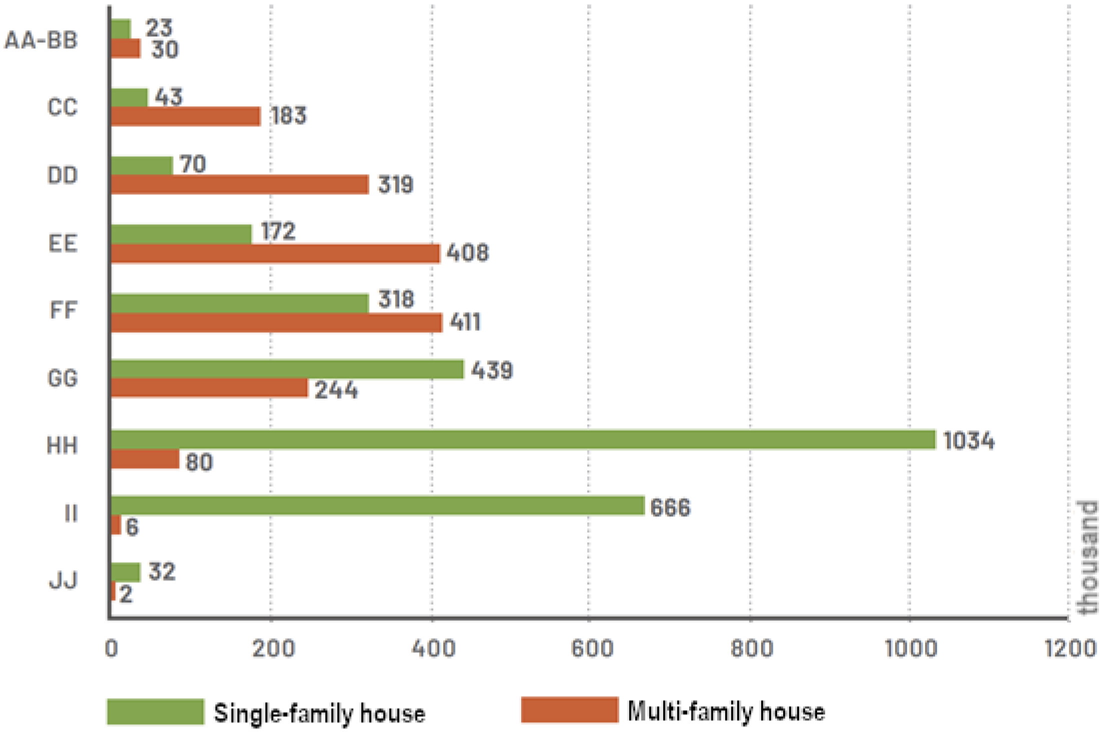

Figure 3. Estimated energy classification distribution of single- and multi-family houses in Hungary[15]

Bene and colleagues also calculated thresholds corresponding to the EU Taxonomy's top 15% performance criterion, demonstrating that it is possible to estimate such benchmarks for the entire building stock using linked EPC, micro-census and transaction data. This kind of detailed distribution modelling not only supports identifying the top tier for taxonomy alignment but possibly enables calculating cut-off points for the worst-performing 15% or 43%, which will be critical for designing and enforcing future minimum energy performance standards and measures to implement the national trajectory.

[15] Bene et al. (2023) in: Beleznay et al. (2023)

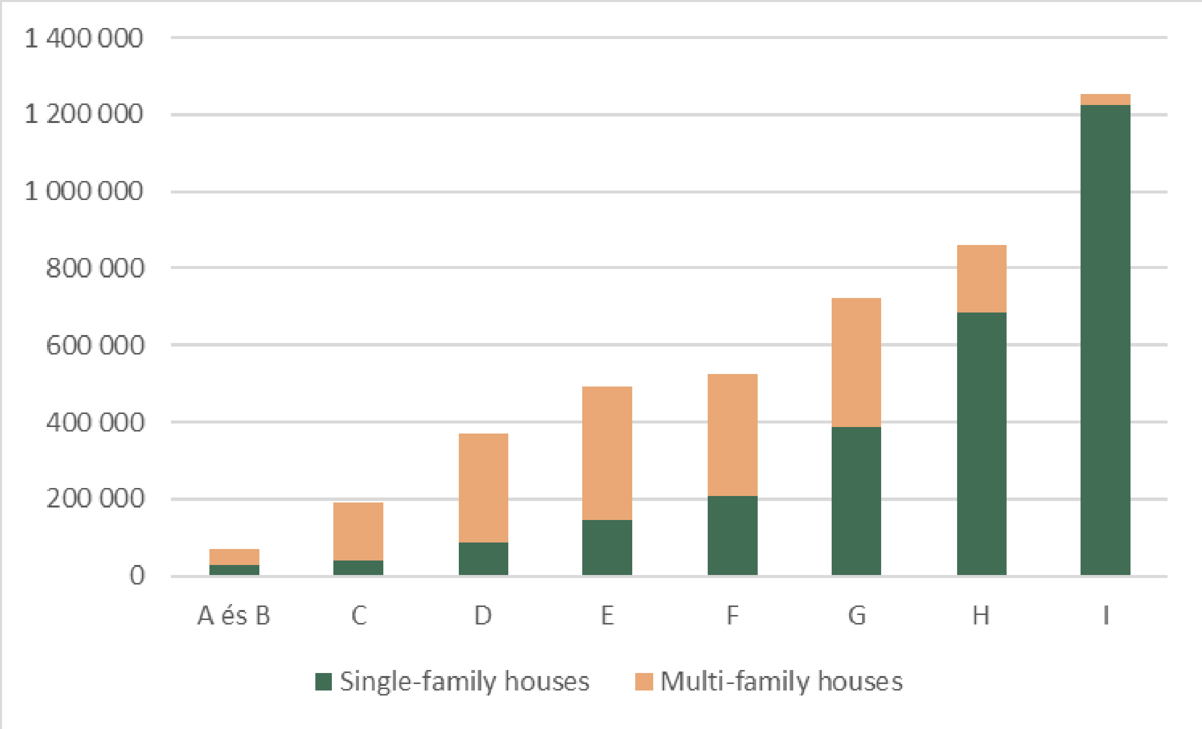

Figure 4. Estimated distribution of the housing stock in Hungary by energy performance category[16]

A recent study (Figure 4) estimated the distribution of energy performance categories of residential buildings according to the new, one-lettered certification system (effective since 2023). The data again confirms that the vast majority of Hungarian residential buildings fall into the lowest energy efficiency categories. Over half of all dwellings are classified as F or worse, indicating outdated structures with high energy consumption and poor performance. Notably, more than 1.25 million homes are in the worst "I" category – most of them single-family homes. This highlights a critical need for large-scale energy upgrades in Hungary's housing stock to reduce energy use and related emissions, and improve living comfort.

The recast of the EPBD introduced significant changes to strengthen the role of EPCs in driving building decarbonisation. Alongside the traditional trigger points – such as construction, sale or lease to a new tenant – the directive now requires EPCs to be issued in three additional situations: when a building undergoes a major renovation, upon the renewal of a rental contract, and for all existing buildings owned or occupied by public

[16] Horváth et al. (2025)

bodies, regardless of size or frequency of public access. These additions are expected to expand the scope of EPCs across the Hungarian building stock, supporting better energy awareness and promoting renovations.

2.3. Socio-economic data

Socio-economic indicators of the Hungarian residential building stock refer to metrics that connect housing characteristics with the social and economic conditions of both the population and the built environment. From the wide range of possible measures, the following key indicators have been selected for an overview in this assessment:

- Housing quality (e.g. average number of people per room or dwelling, access to basic services)
- Affordability (income levels, housing cost-to-income ratio, homeownership rate)
- Economic factors (property values and price trends, new construction activity, vacancy rate)
- Social aspects (tenure status, segregation, inequality, mobility)
- Sustainability (thermal comfort, heating and cooling systems, fuel mix).

Housing affordability in Hungary has significantly deteriorated over the past decade. Between 2010 and 2024, average residential property prices surged by 234%, while per capita net incomes increased by only 86%, resulting in a steep affordability gap.[17] As of early 2025, the price-to-income ratio stands at approximately 13.6, meaning that the typical home now costs nearly 13–14 years of gross annual income – nearly twice the EU average. Although price growth has recently moderated somewhat, due to rising real wages and a tighter lending policy, the overall market remains deeply unaffordable.

The rental sector adds another layer of pressure on housing affordability. Rental costs surged by 12.6% year-on-year in 2023, outpacing the rise in property prices. Hungary's exceptionally high homeownership rate (around 90%) and the limited supply of rental housing further constrain options, especially for younger or more mobile households. Although government incentives – such as the Family Housing Support Programme (*Családi Otthonteremtési* Kedvezmény, CSOK) and other family housing schemes – offer support for eligible buyers (support linked to having children), they often stimulate

[17] Eurostat (2025a)

demand without effectively expanding supply, widening the affordability gap rather than closing it.

New residential construction in Hungary remains at historically low levels. In 2024, roughly 13,300 new dwellings were completed[18] – a 29% decline compared to the previous year and marking one of the lowest annual construction rates in the past decade. The issuance of building permits has also stagnated or declined. This limited pipeline has contributed to Budapest's vacancy rate falling to just under 10%, a relatively low figure by European standards, reflecting a mismatch between housing demand and constrained new supply.

Figure 4 compares European countries by annual renewal rate of the housing stock (blue bars) and new housing construction per thousand inhabitants (orange triangles). Hungary stands out with the lowest renewal rate among all countries shown, highlighting a severely limited level of new construction and renovation activity compared to other EU Member States. Most other countries maintain renewal rates between 0.6% and 1.8%, while Hungary's is dramatically lower, underscoring a critical challenge for maintaining and modernising its housing stock. This illustrates the urgency of ramping up both renovation and new construction to address aging buildings and meet climate targets.

[18] Hungarian Central Statistical Office, www.ksh.hu/stadat?fr=lak

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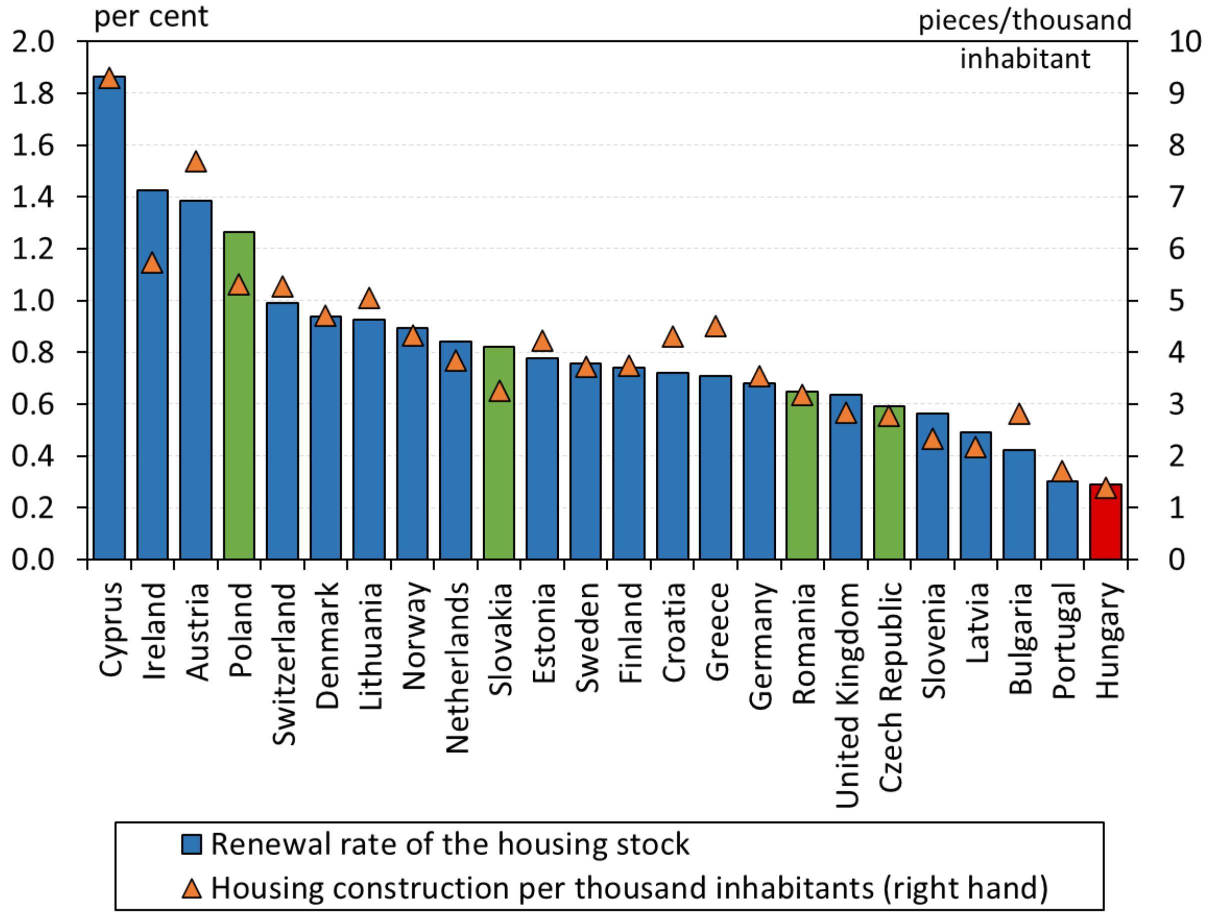

Figure 4. Annual renewal rate of housing stock and housing construction per thousand inhabitants in Europe in 2024[19]

Hungary's socio-economic landscape is marked by significant income disparities, which directly shape the housing conditions of different social groups. The latest Habitat for Humanity Hungary reports[20] underline that households in the lowest income quintile, along with those with unemployed or otherwise inactive household heads, are most likely to live in poor housing situations. Younger households (under 25) are also disproportionately affected, with about 32% of them facing housing poverty.

Data from EU-SILC and national surveys shows that the relationship between income and housing quality is complex. Lower-income households typically spend a much higher

[19] MNB (2025). Data is from the year 2024 except for CH (2022), and AT, CY, HR, DE, UK, SI (2023)
[20] Habitat for Humanity Hungary (2024a, 2024b)

proportion of their income on housing costs. For instance, among the lowest quintile, about one-third allocate nearly half of their income to housing, while among inactive households this ratio ranges between 30% and 40%.

In Hungary, where around 90% of households are owner-occupiers, poor housing conditions are prevalent even among them. Materially or socially deprived households are disproportionately exposed to inadequate housing, indicating that ownership alone does not ensure decent living conditions and may obscure deep structural problems.

Additionally, the type and age of buildings also correlate with socio-economic status. Households in older, pre-1960 buildings with single-room heating and wood fuel are the most likely to suffer multiple housing-related disadvantages. This overlap signals how income poverty is frequently tied to residing in buildings that are energy-inefficient and costly to heat, further entrenching disadvantage.

The Habitat analyses highlight how income poverty, housing poverty and energy poverty form a mutually reinforcing triangle:

- High housing cost burden: Roughly 13% of households spend over 40% of disposable income on housing, and this jumps to 45% for mortgage payers (36% for renters). These rates are substantially higher for lower-income groups, meaning that housing costs crowd out spending on other essentials.
- Debt and arrears: In 2022, 10.3% of the Hungarian population had mortgage, utility or rent arrears, slightly exceeding the EU average. Among households earning below 60% of the median income, this figure jumps to 26%, well above the EU average of 19.8%, reflecting the severe burden on the poorest.
- Energy poverty: With households in inefficient homes facing high heating costs, these financial pressures deepen both housing and energy vulnerability simultaneously.

The Habitat reports confirm that while Hungary lacks a fully integrated database explicitly linking income, housing and energy data, there are some relevant indirect indicators:

- The EU-SILC survey, adapted by the Hungarian Central Statistical Office, provides annual snapshots of income, living standards and some housing variables, allowing partial cross-analysis.

- Habitat's multi-indicator approach estimates that around 25% of households, representing roughly 30% of the population, are affected by at least one form of housing poverty. Over 500,000 people qualify under two criteria, and more than 160,000 people under three or more, showing a clear concentration of multiple disadvantages.

Hungary's socio-economic data illustrates that income poverty, inadequate housing and energy poverty often overlap, creating persistent vulnerabilities. While data sources like EU-SILC and periodic national studies provide important fragments, there remains a pressing need for integrated datasets that connect income, energy usage, housing quality and renovation histories.

2.4. Main gaps and challenges

To meet Hungary's climate objectives – including the LTRS target of renovating 100,000–130,000 homes per year to 2050 – the data situation must evolve. There is currently no system for annually tracking deep versus shallow renovations, nor for reliably measuring post-renovation energy savings. Similarly, while Habitat for Humanity's annual reports and other studies highlight overlaps between vulnerable households and the worst-performing buildings, there is no systematic database capturing this social dimension.

As Hungary prepares for instruments like minimum energy performance standards and develops its social climate plan under the new EU regulations, there is a clear need for:

- Establishing systems to monitor the rate, depth, and impact of renovations
- Linking EPC data with renovation subsidy records and census data
- Improving data on vulnerable households to better target financial support.

When interviewed, homeowners list[21] the following aspects as main barriers to efficient housing renovations:

- Lack of funds – lack of resources, both for single-family and multi-family buildings
- Lack of information – where to start, why it is worth renovating, what benefits owners get
- Lack of motivation
- Lack of capacity or skills

[21] RenoHUb (2020) in: Beleznay et al. (2023)

- Lack of trust – concerning experts, contractors and expected results.

A comparison of the EPBD data requirements with the current data landscape reveals[22] several critical gaps:

- Lack of annual data on energy efficiency renovations by renovation type and depth, despite this being an explicit requirement under the EPBD.
- Absence of systematic tracking of renovations and upgrades linked to subsidy schemes at the micro level.
- No regular assessment of the energy performance of the housing stock, which should be conducted at least every five years.
- No recurring survey on the population's willingness to renovate, which the EPBD framework expects to be carried out at least every five years.

The requirements of the EPBD must be transposed into Hungarian law by 29 May 2026 – and the draft national building renovation plan must be submitted to the Commission by the end of 2025. According to Article 22 of the revised EPBD, each Member State must create a national database on the energy performance of buildings,[23] a timely but challenging requirement for Hungary.

Hungary's building stock is old, energy-intensive, and dominated by detached family homes with high heating needs. While substantial data exists – particularly via the EPC system and national statistics – critical gaps remain in integrating this information for systematic, targeted renovation policy. Addressing these gaps will be essential to meet climate targets in a way that is both effective and socially just, aligning closely with the ambitions of the JustReno project.

[22] MEHI (2025a)
[23] European Commission (2025a)

JustReno

3. Governance of building stock data in Hungary

3.1. Policy and legislative context

Hungary committed in its 2020 Climate Protection Act (Act XLIV of 2020)[24] to achieve full climate neutrality by 2050. The National Clean Development Strategy 2020–2050 (Nemzeti Tiszta Fejlődési Stratégia 2020–2050, NTFS) outlines the pathways to this goal through two scenarios, placing special emphasis on encouraging energy efficiency investments in the residential sector and large-scale building renovations. Aligned with this, Hungary adopted its national energy and climate plan (NECP; or Nemzeti Energia- és Klímaterv, NEKT)[25] in 2020, which initially set a 40% reduction in greenhouse gas emissions and a reduction in natural gas import dependency from 85% to 80% by 2030.

Following the adoption of the Fit for 55 legislative package[26] in 2023, Hungary submitted a revised NECP[27] in October 2024, increasing its greenhouse gas emissions reduction target to 50% by 2030 and setting a 29% target for renewable energy. While the natural gas import dependency target remained unchanged, this upward revision followed the early achievement of Hungary's original 2030 emissions target, with a 43% reduction already reached by 2023.[28] The 2024 NECP is not very detailed regarding buildings and, in terms of national renovation targets and necessary measures aligned with the new EU ambitions, it refers to the forthcoming national building renovation plan required by the EPBD of 2024.

The main strategic document on buildings still in force is Hungary's long-term renovation strategy[29] adopted in 2021. The LTRS sets three important targets: by 2030, it aims to reduce energy consumption in the residential building stock by 20%; by 2040, to cut carbon emissions linked to building operations by 60% compared to 2018–2020 levels;

[24] Országgyűlés (2020)
[25] Ministry of Innovation and Technology (2020)
[26] Council of the European Union (2025)
[27] Ministry of Energy (2024)
[28] European Parliament (2025)
[29] Ministry of Innovation and Technology (2021)

and by 2050, to ensure that 90% of buildings meet nearly zero-energy standards. The strategy makes it clear that to achieve this, the current renovation rate of around 1% per year must increase to 3% and be maintained at this level until 2050. Meanwhile, the actual deep renovation rate is estimated at only 0.2%[30], meaning it would also need to be multiplied roughly fifteenfold.

As for energy efficiency policy measures, over the past decade only limited resources have gone into modernising Hungary's residential building stock. Instead, programmes have largely pursued housing and social policy objectives without explicit energy-saving requirements. An example is the Village Family Housing Support Programme (*Falusi Családi Otthonteremtési Kedvezmény*, or Falusi CSOK in short), which replaced the former Home Renovation Programme by supporting families to buy or renovate homes in small settlements.

Residential energy prices have remained the lowest in the EU due to a long-standing price cap scheme. However, the partial lifting of the residential price cap in July 2022 led to a sharp increase in heating costs, particularly affecting detached houses built before 1990.[31] This caused a 25% drop in gas demand and a significant rise in solid biomass heating in rural areas. Current renovation schemes aim to keep households' energy bills under the threshold aligned with the price-capped consumption limit.

Major regulatory changes occurred in building energy requirements in 2023, which were still aimed at complying with the previous EPBD (2018) requirements. The previously applicable Decree 7/2006 (TNM)[32] was replaced on 1 November 2023 by the new Decree 9/2023 (ÉKM),[33] which establishes requirements in a new structure: distinguishing general requirements, those for new buildings, and those for major renovations or extensions. The implementation of the "nearly zero-energy buildings" requirement has been postponed in several steps, with the most recent extension pushing the deadline to 30 June 2024. The delays were prompted by economic challenges and difficulties in the construction industry, including rising material and labour costs due to the pandemic and the war in Ukraine. The mandatory nearly zero-energy standard for new buildings sets stricter limits on specific heat loss, energy consumption and CO_2 emissions. Major

[30] MEHI (2024)
[31] Csoknyai at al (2022)
[32] Nemzeti Jogszabálytár (2006)
[33] Nemzeti Jogszabálytár (2023)

renovations (defined as affecting more than 25% of envelope structures) also fall under specific energy performance requirements.

Several parallel programmes, funded by either the EU or the state budget, are currently in place to support building renovations.

The Home Renovation Programme, an EU-funded retrofit initiative with a €271 million budget, targets about 20,000 single-family homes. Initially limited to homes built before 1990, it was later extended to those built before 2006. Eligible upgrades include insulation, window/door replacement and HVAC modernisation. From 2025, only air-to-water heat pumps are eligible for heating system upgrades. The programme requires 30% primary energy savings, verified by energy certificates before and after renovation. The support structure includes a €7,500 grant, €7,500 no-interest loan and €2,500 self-financing. The originally planned income-based targeting was not implemented.

The Rural Home Renovation Programme is a government-funded initiative targeting, among others, single-family homes in rural areas with children. It offers a €7,500 post-financing grant combined with a zero-interest loan. The programme supports both energy-related and non-energy renovations and does not require demonstrated energy savings.

In place since 2021, the Energy Efficiency Obligation Scheme is a major policy instrument under Article 8 of the Energy Efficiency Directive. The Hungarian EEOS obliges energy providers to achieve annual savings among final consumers. Initially effective in the industrial, transport, and logistics sectors, the scheme gained popularity in the residential sector in 2024, once a catalogue of standardised energy-saving measures (e.g. insulation, window replacement, heating upgrades) was published. Favourable energy savings calculation and accounting rules under the scheme enabled free attic insulation, primarily in single-family homes in rural areas. In 2024, a significant share of savings under the EEOS came from residential renovation measures.[34] The conditions were later recalibrated, and in 2025, obligations were raised, which are expected to trigger the energy renovation of 150,000 homes by 2027. The EEOS is Hungary's most successful – market-based – energy savings mechanism to date and will be operational until at least 2035. Since its introduction, MEKH has been collecting data on reported energy savings

[34] MEKH (2025)

as the implementing authority of the scheme. Processing and aligning this data with EPBD objectives is a major challenge and is expected to take place partly at MEKH and partly at the Ministry of Energy.[35]

Overall, while recent steps represent progress, Hungary still needs long-term, predictable, comprehensive, equitable and deep renovation strategies to modernise its aging residential building stock and achieve its energy efficiency goals. A comprehensive enabling framework is expected to be established through the upcoming NBRP.

3.2. National vs. local level

As described in the chapter *Building stock data: Main gaps and challenges*, detailed surveys on building energy performance in Hungary are rare, irregular, often unrepresentative, and fail to provide a sufficiently comprehensive picture of the state of the building stock or the extent of energy renovations. A complete, detailed and up-to-date database covering the entire national building stock does not currently exist.

While census and micro-census data is available at the municipal level, it is limited in scope: renovations cannot be tracked, and energy certificates are considered non-representative, with detailed datasets not publicly accessible. Even national-level databases are difficult to compare, as they are created for different purposes and sectors. This results in fragmented, non-harmonised data structures, making it difficult to draw reliable, spatially specific conclusions at the local level. There is no data collection at the regional level either.

We assume that Hungarian municipalities possess some level of data on municipally owned dwellings and public buildings at the settlement level. However, they generally lack detailed information on privately owned buildings within their jurisdictions. Further research is needed to clarify the extent and quality of local-level data availability, particularly regarding the private residential building stock.

A promising voluntary initiative by the Covenant of Mayors for Climate and Energy is the Sustainable Energy and Climate Action Plan (SECAP):[36] a strategic framework designed to help local authorities plan and implement effective climate mitigation and adaptation

[35] MEHI (2025a)
[36] Bertoldi, P. (ed.) (2018)

strategies by 2030. The initiative has more than 300 signatory municipalities in Hungary, but it is primarily the larger cities that have adopted a SECAP. A SECAP can serve as a strong starting point for defining a municipality's climate and energy objectives, as well as outlining the necessary steps to achieve them. This makes SECAP highly relevant to the goals of JustReno, as it explicitly targets the building stock as a key sector for both mitigation and adaptation. However, due to the typically high investment costs, residential building renovations are usually only included in long-term plans. The data underlying SECAPs is generally drawn from national databases, as previously described, and rarely supplemented with local-level data.

3.3. Main gaps and challenges

Hungary faces several critical challenges in the governance of building stock data that hinder effective, equitable and targeted renovation policies. At the core of the problem is the absence of a unified, comprehensive and up-to-date data system covering the full building stock. Existing datasets are fragmented, inconsistent in structure and difficult to integrate, limiting the ability to monitor renovation progress, design new policy instruments or plan interventions based on actual needs – particularly at the local level. Municipalities typically have only partial information, primarily on public or municipally owned buildings, while data on privately owned homes – where most energy-saving potential lies – is only partially accessible.

This fragmented data environment also impedes efforts to identify which buildings are in the most urgent need of renovation. While it is evident that a large share of the Hungarian building stock performs poorly in terms of energy efficiency, there is no consistent, data-driven way to prioritise interventions. Many households that live in underperforming buildings lack the financial means to renovate, often due to low incomes, poor housing conditions or energy poverty. Although some financial support has been offered to the residential sector, there are still no targeted renovation funding schemes in place.

Another major governance issue is the lack of horizontal policy harmonisation.[37] Building renovation policies are not effectively integrated across key sectors and instruments. There has been no systematic attempt to align family support measures, housing programmes, tax incentives, housing loan rules, monument protection regulations and

[37] Conselvan & Hummel (2024)

social support mechanisms, just to name a few of the recent interrelated policy measures. This siloed approach results in missed synergies and barriers to implementing coherent renovation strategies – particularly when targeting vulnerable groups or historically significant buildings.

The monitoring of renovation activity is also weak. The planned building renovation monitoring system (ÉMOR)[38] was intended to enable effective and up-to-date monitoring of the measures outlined in Hungary's LTRS (2021). Its aim was to provide a comprehensive framework for tracking renovation activity, progress toward energy efficiency targets and related policy impacts. However, despite its strategic importance, ÉMOR has not yet been established.

Finally, while voluntary initiatives like the SECAP framework offer promising tools for local-level planning and data harmonisation, their uptake in Hungary remains limited and under-explored. Overall, without improved coordination, transparent data systems and integrated policies, Hungary will struggle to meet its long-term climate, energy efficiency and social equity goals in the building sector.

[38] Ministry of Innovation and Technology (2021)

4. Key concepts and definitions

4.1. Vulnerable consumers and energy poverty

Energy poverty is a complex and pressing social issue in Hungary, caused by a mix of low incomes, poor housing quality and social deprivation. There is widespread agreement that energy poverty in Europe stems from a range of vulnerability factors – including high energy costs, low household incomes, inefficient buildings and appliances, and specific household needs. Energy poverty in Hungary also constitutes a complex, multifaceted societal issue, with some country-specific characteristics.

4.2. Energy poverty definitions in Hungarian policy documents

Although Hungary has no single official definition of energy poverty, several overlapping concepts are used in legislation and strategic documents. Hungary's NECP defines energy poor as vulnerable consumers "who have or may have difficulties in meeting their household's energy needs. The concept thus includes the difficulty of financing energy needs in the same way as the property's high specific energy consumption." The NECP states that it is essential to reduce the energy vulnerability of the population.

Energy poverty in Hungary cannot be understood without knowledge of the policy environment. Since 2010, one of the flagship programmes of the Hungarian government is the utility cost reduction scheme. The Hungarian government has regulated the retail prices of electricity and natural gas for residential consumers through the so-called universal service scheme. In 2013–2014, the government implemented further reductions, lowering household prices for natural gas and electricity by 25% and district heating prices by 27%. These rates have remained unchanged since, resulting in the lowest residential energy prices in Europe (OECD 2024). More recent data confirms the same pattern (HEPI).

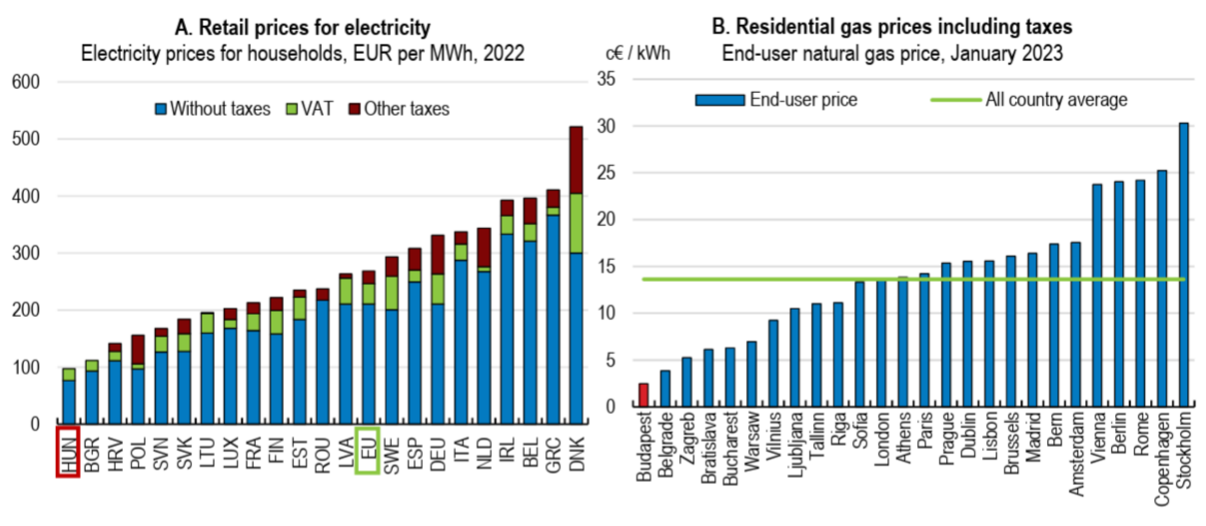

Figure 5. Electricity prices for household consumers in the consumption bands 2.5 MWh-5MWh (band DC)[39]

The price cap has helped reduce energy poverty significantly, according to some key indicators. The proportion of people unable to adequately heat their homes and those behind on utility payments has dropped by more than 10 percentage points since the programme's introduction.[40] However, the artificially low energy prices have also contributed to household energy use for heating being among the highest in Europe (see Figure 6). The high energy consumption is due to the overall low energy performance of the building stock, and the fact that many buildings (especially under district heating) are overheated by approximately 1–3°C unnecessarily.[41]

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[39] Eurostat (2025b)
[40] Streimikiene (2022)
[41] REKK (2023)

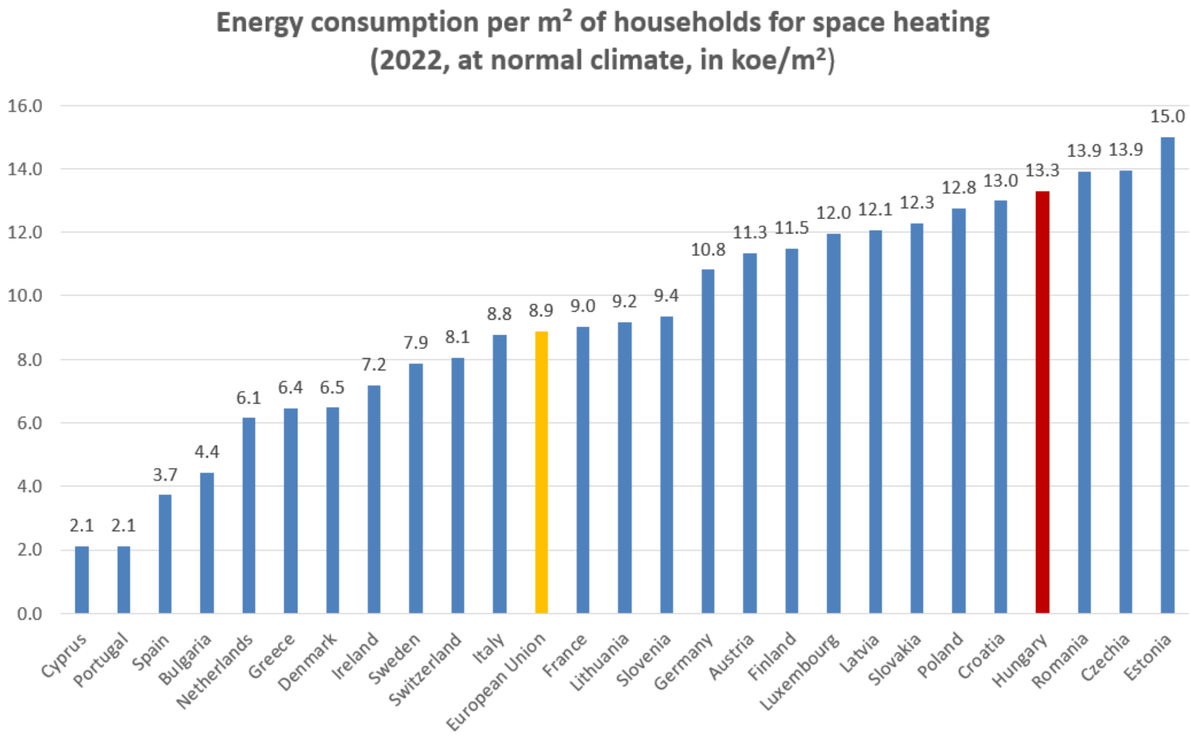

Figure 6. Households' space heating consumption in the EU[42]

The objective of the Hungarian energy cost reduction scheme is to prevent energy exposure which, according to the NECP, "is highly dangerous and likely to develop due to the almost exclusive nature of natural gas heating, the low degree of energy-efficient construction of residential buildings (panel dwellings, small family houses built under socialism) and the country's low energy supply. According to the Government's policy, the result of the overhead protection system is that the proportion of energy poor is 3%, with about 300,000 people." Based on various indicators of energy poverty, however, a significantly higher rate of energy poverty must be assumed in Hungary.

A different concept is used by the Energy Efficiency Law of 2015, which defines households eligible for support ("támogatandó háztartások") as vulnerable households for which the annual energy cost – related to heating the dwelling to 20°C and producing hot water – exceeds 25% of the household's annual income. Both the energy cost and the household income are calculated as the arithmetic average of closed calendar years

[42] Odyssee (2025)

starting from 2020 up to the time of calculation. However, no decision has yet been made, nor has any programme been introduced based on this definition.

The definition of households eligible for support is particularly relevant in this context, as it is the concept also used in the EEOS introduced in 2021. According to the legislation,[43] revenues from the energy efficiency contribution – to be paid by obligated parties as a buy-out fee – are intended to fund measures that enhance energy efficiency in vulnerable households or public institutional buildings. However, as of summer 2025, no publicly available information exists regarding how the funds collected through these buy-out fees have been used to support vulnerable households.

4.3. Indicators and drivers of energy poverty

The most common indicators of energy poverty fall into three main categories: expenditure-based, self-reported and housing-related. A recent Joint Research Centre (JRC) analysis[44] using national SILC-HBS microdata shows that different indicators capture different households – those who can't pay bills, can't keep homes warm or spend too much on energy often don't fully overlap. Each measure highlights different populations, suggesting many are overlooked when using only a single metric. Hungary has low rates of energy poverty when measured by relative expenditure (the 2M indicator, which looks at households spending more than twice the national median share of income on energy). However, when using a fixed threshold (10% of income spent on energy), the rate jumps significantly – up to 60% of households – revealing much broader energy cost pressures.

Survey-based indicators show that energy poverty is more common based on self-reported indicators. Around 11% of Hungarian households report being in arrears on utility bills and about 10% say they cannot adequately heat their homes.[45] Interestingly, there is little overlap between households identified by expenditure-based measures and those reporting difficulties. This means different groups are affected depending on which indicator is used. The fact that Hungary ranks high in energy poverty based on expenditure indicators but low when using subjective measures indicates that many affected households do not self-identify as energy poor, possibly due to adaptation, low

[43] Energy Efficiency Law of 2015, https://net.jogtar.hu/jogszabaly?docid=a1500057.tv
[44] JRC (2024)
[45] JRC (2024)

expectations or social stigma. The study concludes that relying only on a single measure underestimates energy poverty. A more complete picture requires using multiple indicators, including absolute expenditure thresholds and self-reported hardship.

Energy poverty in Hungary disproportionately affects vulnerable households, such as the elderly, single-parent families, the Roma population, and residents of rural or marginalised communities. These groups often face a convergence of risks: lower income, poorer housing conditions, and weaker access to social or financial support.[46]

Housing quality is another major contributor: Hungary has one of the least energy-efficient residential building stocks in the European Union. Poor insulation, outdated heating systems and a lack of modernisation exacerbate energy needs. Solid-fuel dependence further compounds the issue, particularly in rural areas, where many households heat with firewood or coal in inefficient stoves, leading to higher energy use and health risks.[47] According to recent HCSO data,[48] about a fifth of Hungarian households are not connected to the gas network or district heating. They rely solely on solid fuels such as wood or coal, with an additional one-fifth of households using mixed heating systems (firewood and gas).[49] Rural households are much more likely to depend on solid fuels and be cut off from infrastructure investments like gas grids or district heating systems. Firewood use is more characteristic of lower-income households.

[46] Gál & Szép (2023)
[47] Bajomi et al. (2020)
[48] HCSO (2025)
[49] Habitat for Humanity Hungary (2023)

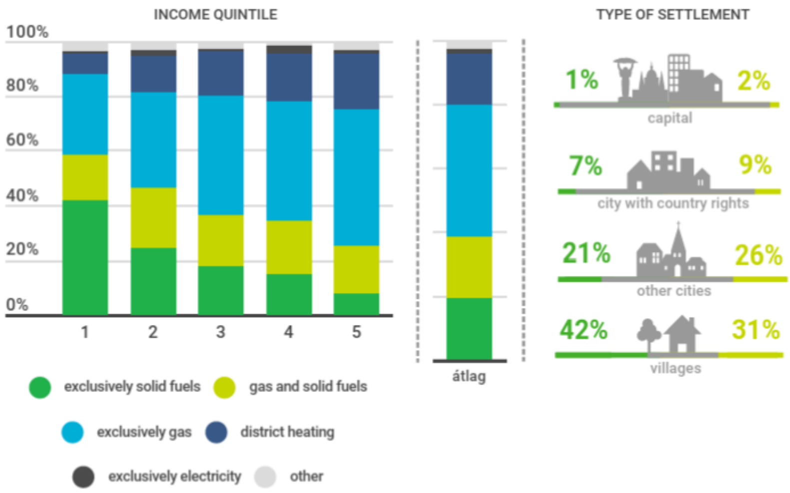

Figure 7. The share of households using solid fuels per income quintile and type of settlement[50]

Energy poverty in Hungary is shaped by a lack of a unified definition, limited and outdated housing infrastructure, and structural socio-economic inequalities. While various indicators attempt to capture the extent of the issue, many vulnerable households remain invisible under narrow definitions. Policy responses have historically relied on universal pricing measures, which have had limited success in reducing poverty for those most at risk. The profile of households most at risk of energy poverty includes several common characteristics: they are primarily located in rural areas and have very low disposable incomes. Their homes are often in poor condition, with very low levels of energy efficiency. More targeted interventions – such as income-based subsidies, building renovation programmes and localised energy support – are needed.

4.4. Worst-performing buildings

There is currently no national definition for the worst-performing buildings. In the proposal for the recast of the EPBD, worst-performing buildings were initially defined as the 15% of buildings with the poorest energy performance within each EU Member State's building stock. However, the final adopted text of the EPBD no longer explicitly refers to the bottom 15%. Instead, it allows Member States the flexibility to define worst-performing buildings in a way that aligns with their national context.

[50] HCSO (2022) in: Habitat for Hungary (2023)

The recast EPBD introduces minimum energy performance standards, prioritising the renovation of the worst-performing residential buildings. Member States must identify the 43% worst-performing residential buildings, either in terms of the number of buildings or in terms of floor area. At least 55% of the energy savings must be achieved through the renovation of these buildings.

In the chapter on energy performance certificates and the estimation of the building stock's energy performance, we provided a detailed analysis of the energy distribution of the Hungarian residential building stock. There, we saw that the greatest potential for energy savings in Hungary lies in single-family houses built before 1990. If we consider only building energy efficiency, the 43% of buildings with the highest energy demand are almost all single-family houses. In line with the expectations of the EPBD, these buildings should be prioritised when planning the renovation sequence.

Other indicators might also be considered to further elaborate on this building segment.

Between 2001 and 2016, the Hungarian Central Statistical Office (HCSO) published data on the quality of the national housing stock, including the share of substandard dwellings as a percentage of the total occupied housing stock.[51] Substandard housing was defined as any dwelling meeting one or more of the following criteria: lacking a toilet or bathroom; not connected to a sewage system; constructed of adobe without foundation; lacking running water. Additional criteria included the absence of a kitchen combined with a total floor area of 50 m^2 or less or having only one room smaller than 12 m^2. These dwellings were classified as substandard due to their unsuitability for basic living conditions. However, since 2016, the HCSO has discontinued the publication of housing quality statistics.

Dwellings that do not meet basic housing needs are likely also among the worst in terms of energy performance. However, their renovation may not be justified, as expanding, upgrading their condition or connecting them to utilities would require such a substantial investment that it would far exceed the reasonable costs of an energy renovation.

Similar indicators at the national level are available on EU data platforms, including data for Hungary. Particularly relevant to the JustReno project are the EU-SILC modules on

[51] KSH [HCSO] (2025)

Eurostat, especially the *Households' energy efficiency* (ilc_lvhe)[52] and *Housing difficulties* (ilc_lvhd)[53] datasets. The Energy Poverty Advisory Hub also provides valuable information on the poorest-quality housing stock at the Member State level. The Energy Poverty Indicators Dashboard includes metrics such as the *Share of population living in a dwelling with presence of leak, damp and rot*, presented as disaggregated national-level data. In 2023, 12.6% of Hungary's total population lived in such conditions.[54] Based on this data, Hungary falls within the mid-range of European countries, with a share slightly better than the EU average. It is important to note that this value is calculated using national data and is not provided by Eurostat. Using a simple calculation based on Hungary's population in 2022 (9.644 million), the average household size (HCSO: 2.6), and the average number of households per building (HCSO: 1.62), approximately 757,000 buildings are affected by this indicator.

Another possible indicator is the market value of the property, which may better reflect whether the renovation of a house is economically viable. In the "What Do We Live On?" wealth survey of the HCSO,[55] households reported the value of their privately owned real estate. Based on these responses, an estimate was made of the value of the dwellings that people live in. There are relatively large regional differences in housing prices. The highest average housing prices are in Budapest, while in recent years the lowest average prices have been found in the counties of Jász-Nagykun-Szolnok and Borsod-Abaúj-Zemplén. Based on the data, it appears that the value of 1.2 million single-family homes is below 10 million forints (approximately €25,000[56]), which can be considered a financial threshold below which a major energy renovation cannot be carried out. This means that the value of these properties does not reach the cost of renovation, so even though they fall into the worst-performing buildings category, their renovation cannot be carried out economically. The economics could shift significantly in the long run if operational and embodied carbon were priced in.

Further research is necessary to comprehensively assess the demographic and urbanisation trends anticipated over the coming decades. In Hungary – mirroring

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[52] Eurostat (2025c)
[53] Eurostat (2025d)
[54] European Commission (2025d)
[55] KSH (2018) in: MNB (2023)
[56] €25,124 based on Oanda Currency Converter, 25 July 2025

developments in many other countries – urbanization is accelerating. This trend is accompanied by the decline of certain rural settlements, where population numbers are decreasing and opportunities for employment and economic development are becoming increasingly limited. Depopulating villages pose significant challenges from territorial, economic development and social policy perspectives. The issue of renovating the building stock in these areas extends far beyond the scope of energy efficiency policy and demands a broader, integrated strategic approach.

5. Conclusions and recommendations

Hungary's existing building stock is predominantly composed of older structures with inherently poor energy performance. Monitoring renovation activity remains challenging, as national census and micro-census data is collected only every five years, rendering it inadequate for capturing short-term or ongoing changes in building conditions and renovation activities. Although EPC data provides more frequent insights, it reveals concerning trends: between 2016 and 2022, there was only a modest increase in dwellings certified at the BB level, with no significant shift toward the highest energy efficiency categories. Most buildings assessed during this period still fall short of advanced standards, with over half rated F or lower – indicating high energy consumption and poor efficiency. Alarmingly, over 1.25 million homes – mostly single-family – are rated in the lowest "I" energy category, representing the building segment with the greatest energy-saving potential.

To assess the lowest-performing segment of Hungary's building stock, several specific subsets can be highlighted. First, unoccupied dwellings account for 14.3% of the total housing stock. Second, Hungary possesses a relatively robust dataset of EPCs, which provide detailed and precise information on various energy performance attributes of individual dwellings. However, this continuously expanding dataset tends to overrepresent marketable properties in relatively better condition, resulting in a biased picture. An additional limitation stems from a regulatory change introduced in 2023, which replaced the previous two-letter rating system with a new single-letter classification, reducing direct comparability.

As Hungary plans the trajectory for the progressive renovation of the residential building stock, and prepares to implement instruments like minimum energy performance standards and to develop its social climate plan under the new EU buildings regulations, there is **a pressing need to establish robust systems for monitoring the rate, depth and impact of renovations**. Equally important is improving access to information on available support schemes and the results and wider benefits of energy upgrades. One of the key barriers to home renovation is not only the lack of financial resources but also the limited availability of clear, accessible information for households – where to begin, how to navigate the process, and what types of assistance are available. **A proven way**

to scale up renovation efforts and support renovators throughout the process is by establishing a nationwide network of one-stop shops.

In terms of the governance of building stock data, Hungary currently lacks a unified, comprehensive and up-to-date system covering the full building stock. Existing datasets are fragmented, inconsistent in structure and difficult to integrate, which significantly hampers the ability to monitor renovation progress or plan interventions based on actual needs. Municipalities typically have only partial information – mostly on public or municipally owned buildings – while data on privately owned homes is either unavailable or only partially accessible. **To enable effective planning and policy implementation, we recommend developing an integrated national database that brings together reliable, complete information across all building types**.

Monitoring of renovation activity in Hungary is insufficient. Although a national Building Renovation Monitoring System (ÉMOR) – which could also serve as a tool for data collection – has been announced, it has not yet been established. Without such a system, policymakers and local actors lack a solid basis to assess progress or adapt to changing conditions. **We recommend creating a comprehensive, regularly updated and publicly accessible monitoring system.** It should include geographic and social breakdowns to reflect territorial disparities and the reach of vulnerable groups. Integration with existing EPC and permit databases would improve consistency, while links to funding schemes would enable real-time policy evaluation. **Such a system is essential for improving data on the building stock, tracking renovation efforts and outcomes, and aligning these with national and EU climate and social objectives.**

A major governance challenge lies in the lack of horizontal policy harmonisation. Building renovation policies are not effectively integrated across key sectors and instruments. There has been no systematic effort to align family support measures, housing programmes, tax incentives, housing loan rules, monument protection regulations and social support schemes. This siloed approach leads to missed synergies and administrative barriers that undermine the development and implementation of a coherent, large-scale renovation strategy. **We recommend prioritising horizontal policy harmonisation to address these governance gaps**. This involves systematically aligning building renovation policies with related areas such as housing programmes, social support schemes, tax incentives and family policy measures. A coordinated framework would reduce fragmentation and enhance the effectiveness and scalability of renovation efforts.

There is currently no unified definition of "vulnerable consumer" or "energy-poor household" at the legislative or policy level in Hungary. The NECP defines energy-poor households as those unable to pay energy bills, while the 2015 Energy Efficiency Law and the 2021 EEOS use a 25% income threshold for heating and hot water costs – though no programme has yet been built on this. Three main indicator types generally used in Europe are expenditure-based (e.g., "10% rule," affecting up to 60% of households), self-reported (e.g., heating difficulties, around 10–11%), and housing-quality-based (e.g., poor insulation, outdated systems). These methods capture different groups with limited overlap, making single-metric policies inadequate for addressing the full scope of energy poverty. **We recommend exercising particular care in selecting the appropriate metric for each specific policy objective. We also suggest ensuring transparency around the fact that multiple definitions of "vulnerable consumer" or "energy-poor household" exist.** Any definition should also take into account the broader context of **affordable housing**, as energy poverty and affordable housing increasingly overlap in EU policy.

Although the final adopted text of the EPBD no longer explicitly defines the bottom 15% as the worst-performing buildings, Article 9(2) of the EPBD still refers to targeting the worst-performing 43% of the building stock. In our analysis of Hungarian EPC data, we found that the greatest potential for energy savings lies in single-family houses built before 1990. If we consider only energy performance, **the 43% of buildings with the highest energy demand are almost entirely made up of these older single-family homes**. In line with the EPBD's objectives, **these buildings should be prioritised in the renovation sequence**. To refine this definition of the worst-performing 43%, additional indicators – such as the EU-SILC modules from Eurostat or the Energy Poverty Indicators Dashboard by the Energy Poverty Advisory Hub – should also be considered.

Hungarian residential buildings consume, on average, twice as much energy as modern, energy-efficient buildings. Heating alone accounts for 72–74% of household energy use – one of the highest ratios in the EU. The buildings in the worst energy performance categories (H–I) are typically located in rural areas and are owned by low-income households relying on solid fuels. As a result, there is a significant overlap between the worst-performing buildings and energy-poor households, particularly due to high heating costs, poor building conditions and rural location. **The key target group for renovation policies should therefore be low-income, rural residents living in energy-inefficient homes who often lack the financial means to renovate on their own**. In light of the transposition of the EPBD, a redefinition of concepts – especially around the identification of worst-performing buildings and the treatment of energy poverty and housing affordability – is expected. For domestic policy planning, **it is essential that interventions are based on coordinated, multidimensional indicators and supported by a legal framework that enables targeted financial assistance**.

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