Baseline assessment report for Romania

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

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The Association for Promoting Energy Efficiency in Buildings - ROENEF is a non-governmental, non-profit organization of multinational companies with the aim of promoting and supporting a legislative framework conducive to increased energy efficiency in buildings, in order to achieve national and European objectives of energy security, competitiveness and sustainable development.

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Executive summary

The purpose of this report is to provide an overview of the current state of buildings in Romania, including their energy efficiency related data. This assessment is made in the context of the 2024 revision of the Energy Performance of Buildings Directive (EPBD), which introduces a series of new provisions and sets ambitious targets for the decarbonisation of the building sector. The report points out key aspects of the steps to be taken to ensure the achievement of the national targets in the field of energy efficiency in buildings: (i) the state of the building stock and databases, (ii) the existing legislation and how it should be improved, (iii) the tools available to our country for the transposition of the EPBD and the obstacles that may delay this process.

To begin with, the report aimed to collect and analyse data that can contribute to a more eloquent "x-ray" of Romania's housing stock, focusing on information such as:

- Cadastral characteristics/building surface areas, as well as their urban/rural distribution
- Elements related to energy efficiency of buildings
- The socio-economic reality, which has a direct influence on the energy status of a building and the steps to improve its performance
- Gaps and obstacles that hinder or delay efforts to improve the national building stock.

The next step was to determine the existing data categories, their collection tools and the institutions that manage/use them at national level. At the same time, we identified the existing legislative framework and the status of the steps to update it, in the context of the transposition deadlines of the EPBD.

The report addresses important components of the alignment of national public policies with the new guidelines of the EPBD: protecting vulnerable consumers, reducing and/or eliminating energy poverty and reducing the number of low energy and carbon-intensive buildings. We identify how national legislation deals with these concepts and the potential need to revise the way they are defined to be in line with the EPBD and to facilitate a just transition towards a decarbonised residential sector.

Last but not least, the report points out the obstacles and challenges faced by the Romanian authorities in their efforts to harmonise national legislation with European legislation and to make the national building stock more energy-efficient and decarbonise it.

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1. Overview of the building stock

In any field, the centralisation of information and the creation of databases depends, to a large extent, on digitisation and appropriate regulation. In the absence of these two factors, information is collected manually and managed at the local level; concentrating it centrally takes considerable time and effort.

Despite progress in digitisation since joining the European Union, Romania lags behind other member countries when it comes to digital skills, as shown in the Digital Economy and Society Index (DESI) 2022 – 3.[1] This is directly reflected in the lack of digital infrastructure at the level of public institutions and, implicitly, in the absence of centralised databases containing indicators related to the building stock and its energy performance status.

For mapping real estate at a national level, an essential element is to register it in order to provide a clear picture, both from a legal point of view and from the reality on the ground. Unfortunately, our country is deficient in this area as well, as the old system of data collection is based on analogue data recording by local authorities. However, since 2015, the Romanian authorities have embarked on an extensive and systematic National Cadastre and Land Registry Programme (NCLRP) – one of the most ambitious national projects, carried out under the aegis of the National Agency for Cadastre and Real Estate Publicity. Around two-thirds of properties had been mapped by 31 July 2025: approximately 26,242,000 out of an estimated 40,000,000 properties nationwide, both lands and buildings.[2] However, the process of completing this national systematic cadastre will take time, delaying the availability of concrete information on the country's building stock.

1.2. Building stock data

To compensate for the two major impediments outlined above – low digitisation in the public sector and the lack of a cadastre of buildings – alternative ways of working were used to achieve a realistic picture of the state of buildings in Romania. A first such tool was the 2011 Population and Housing Census, which revealed a depopulation of underdeveloped regions, through massive migration both from rural areas and from urban regions in economic decline to large urban agglomerations or to other European countries. The results of the census were also used in the framework of the long-term renovation strategy (LTRS) to support the renovation of the national stock of residential and non-residential buildings, both public and private, and its gradual transformation into a highly energy-efficient and decarbonised building stock by 2050, approved by Government Decision no. 1.034/2020.

[1] https://digital-strategy.ec.europa.eu/en/policies/desi-romania
[2] www.ancpi.ro/pnccf/stadiu-lucrarilor.html

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This states that: "The national built stock consists of public and private, residential and non-residential buildings, located in urban and rural areas, in areas of development, areas in economic equilibrium and areas in decline both economically and/or demographically."

By 2020, there were approximately 5.6 million buildings in Romania. Residential buildings accounted for 90% of the total stock of buildings, as seen in Figure 1 below.

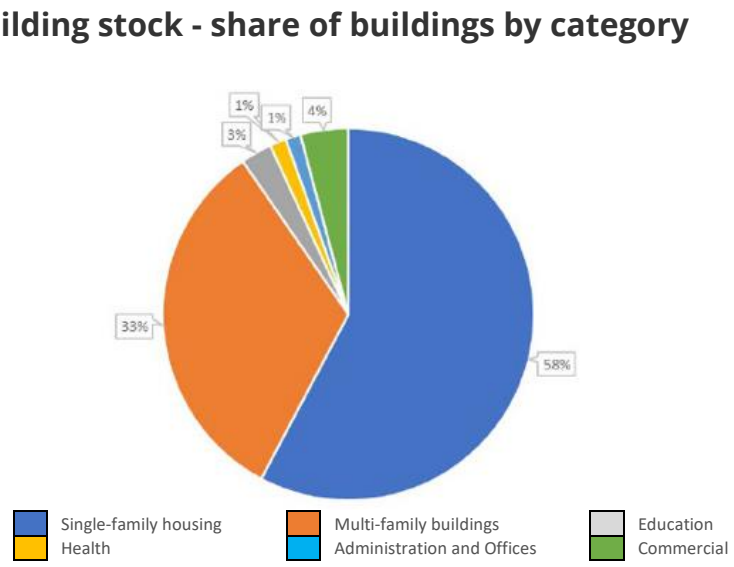

Figure 1: Stock of buildings - share of buildings by category (LTRS, 2020). Source: World Bank Analysis, 2019.

According to the LTRS:

- Most Romanians live in small dwellings, either in single-family houses or apartments in multi-family buildings.
- More than 63% of Romanian dwellings have less than 50 m² of floor area.
- Almost half of all dwellings (47.5%) are located in rural areas, where 95% of living spaces are single-family dwellings.
- In urban areas, 72% of living spaces are located in multi-family buildings – apartment blocks with an average of 40 apartments per block; more than 60% of apartment blocks are at least five storeys (ground floor plus four, G+4) and 16% are at least 11 storeys (G+10).

The distribution of buildings in urban/rural areas and their characteristics can be seen in the table below.

Table 1 - Main characteristics of the stock of residential buildings (LTRS, 2020)

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Type of building	Category	Number of buildings	Heated surface area (million m²)	Built-up area by 2020 (million m²)	Renovated buildings by 2020 (%)
Single-family housing	Rural	3,810,737	247.80	217.84	3%
Single-family housing	Urban	1,354,263	124.46	203.01	8%
Multi-family buildings	≤ G+4	92,332	94.51	77.50	7%
Multi-family buildings	> G+4	61,554	114.51	94.72	7%

Source: World Bank analysis 2019

The conclusions of the LTRS are complemented by more recent data, contained in the Housing Stock Report,[3] published by the National Institute of Statistics in 2023 and based on information from the Population and Housing Census conducted in 2021 (see Table 2).

Table 2: Housing Stock Report statistics

Indicator	Value at end of 2023	Source
Total number of dwellings	9,722,223	NSI Report 2023 - Housing Stock
Distribution urban/rural	55.4% urban / 44.6% rural	
Average area/location (urban)	48.7 m²	
Average area/household (rural)	49 m²	
Average room surface area (urban)	18.9 m²	
Average room surface area (rural)	16.2 m²	
Average number of rooms/occupancy (urban)	2.6	
Average number of rooms/dwelling (rural)	3	
Living surface area	474,517,092 m²	

Data for the year 2023 on housing stock, dwelling rooms and living space are estimated and provisional until the results of the Population and Housing Census 2021 are finalised.

As can be seen, the distribution of individual dwellings is reasonably balanced between urban and rural areas, with the exception that in urban areas two-thirds of all living spaces are in multi-family buildings. Analysis of the data shows a relative homogeneity between urban and rural areas in terms of the surface area of dwellings, but the surface area per room is higher in urban areas.

[3] https://insse.ro/cms/ro/tags/fondul-de-locuinte

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1.2. Energy performance data

Romania has a large number of buildings constructed before 1990, as shown in Figure 2 below (LTRS, 2020). Much of the building stock is outdated and has a low energy efficiency level, taking into account the fact that 94% of buildings were constructed before 2000, when technical building regulations had lower energy performance requirements (LTRS, 2020). The introduction of Normative C107/2000 ('Calculation of the Energy Demand for Heating Buildings') in 2000 marked the first significant technical regulations on the energy performance of buildings. All buildings constructed before this reference years are considered energy inefficient and suitable for interventions, especially if other criteria related to high energy consumption are also met.

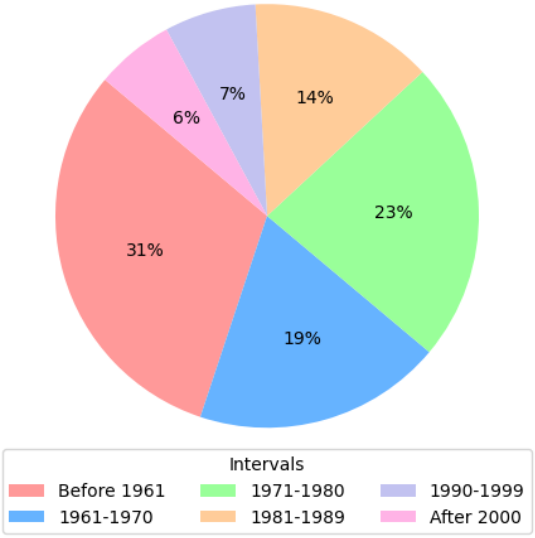

Figure 2: Breakdown of building stock by year of construction

In terms of energy consumption, according to the LTRS:

- The majority of buildings with the highest energy consumption (specific final energy consumption greater than 400 kWh/m^2/year and specific final energy consumption for heating greater than 250 kWh/m^2/year) are single-family dwellings with gas and wood heating sources located in all climate zones.

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- The majority of the buildings in the second (total specific final energy consumption 300–400 kWh/m^2/year and specific final energy consumption for heating 200-250 kWh/m^2/year) are public/private office buildings with gas and district heating systems.
- The majority of buildings in the third highest energy consumption category (specific final energy consumption 200-300 kWh/m^2/year and specific final energy consumption for heating 100-150 kWh/m2/year) are multi-family buildings and educational establishments with gas and district heating sources.

In Romania, the residential sector is responsible for 34% of the final energy consumption and the non-residential sector for 8%, totalling 42% of the final energy consumption at national level.[4] In the residential sector, the largest share of total energy consumption (3.11 million tonnes of oil equivalent Mtoe) is from on-site energy generation using wood or biomass heating sources, mainly in rural areas. (LTRS, 2020). In second place (2.16 Mtoe) is the consumption of natural gas for heating. In the service sector, gas accounts for the largest share of energy use (0.78 Mtoe).[5]

Energy consumption and year of construction were therefore the key elements used to establish the characteristics of the national building stock in the LTRS, as well to estimate the rate of renovation of buildings up to 2020, which was considered necessary for buildings constructed before 2000 (see Table 3).

Table 3: Characteristics of the Romanian building stock, based on LTRS

Building types	The main possible categories	Number of buildings [-]	Total heated area [million m^2]	Built surface area< 2000 [million m^2]	Renovated by 2020 [%]	Unrenovated area [million m^2]
Single-family housing	Rural	3,810,737	247.80	217.840	3%	211.30
	Urban	1,354,263	124.46	102.012	8%	93.85
Multi-family building	<=G+4 floors	92,332	94.51	77.50	7%	72.07
	>G+4 floors	61,554	115.51	94.72	7%	88.09
Education	Educational institutions	18,000	17.50	16.63	15%	14.13
Health and social care	Hospitals	547	5.47	5.42	1%	5.36
	Other health and social care services	50,766	3.80	3.61	1%	3.58
Administration/offices	Administrative building	6,000	5.26	4.73	5%	4.50
	Glass and steel building	1,500	3.10	0.05	5%	0.05

[4] Table 6 - Energy consumption by building use and fuel used. LTRS, 2020.

[5] www.mdlpa.ro/uploads/articole/attachments/64d0e8f0f2213216455587.pdf - Analiza diagnostic privind stadiul actual existent în românia pentru atingerea nivelurilor nzeb în renovarea fondului construit existent și în construirea clădirilor noi - realizată sub egida MDLPA în cadrul proiectului SIPOCA – 731.

Commercial buildings	Hotels	7,642	4.23	0.85	5%	0.80
	Restaurant/cafes	36,000	1.82	1.28	5%	1.21
	Stores	122,000	20.83	14.58	10%	13.12
Residential subtotal	90%	5,318,886	582.27	492.06	5%	465.31
Commercial and public subtotal	10%	242,455	62.01	47.14	9%	42.75
Total	100%	5,561,341	644.29	539.20	6%	508.07

The country's 5.6 million buildings total 644 million m^2 of heated floor area, of which residential buildings account for over 90% (582 million m^2). Of this, single-family dwellings account for the largest share (58%), followed by multi-family buildings at about 33% (LTRS, 2020). The residential sector therefore generates significant energy consumption at the national level, and this is closely related to the low energy performance of buildings and the lack of renewable energy use.

In this context, the steady increase in living standards, even if it has not brought our country up to the European average, has led to an implicit increase in consumption, but this has not been accompanied by a corresponding increase in the renovation rate. In fact, estimates of the renovation rate show that, when the LTRS was prepared, 6% of buildings in Romania were to be renovated for energy performance by the end of 2020 (5% of residential buildings and 9% of public and commercial buildings), with the remaining 77% of buildings requiring renovation having a deadline of 2050. The largest share (about 91%) of the buildings in need of renovation is in the residential sector, of which single-family dwellings in both urban and rural areas (including depopulated villages) account for about 65%.

1.3. Socio-economic data

Steps towards decarbonisation of the building sector have been made, especially since 2000, but the situation of individual dwellings, which represent more than 90% of the total housing stock, continues to be precarious, as stated in the LTRS: "Some of these dwellings are well below EU standards for minimum conditions of public utilities (connection to sewerage and access to drinking water from public networks)" and "Multi-family buildings have an average heated area of 48 m², compared to 73 m² for single-family houses".[6] This reinforces the idea that these dwellings have not received attention in terms of energy performance.

[6] National Long-Term Renovation Strategy (LTRS) to support the renovation of the national stock of residential and non-residential buildings, both public and private, and its gradual transformation into a highly energy-efficient and decarbonized building stock by 2050 – p.20.

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The poor quality of housing in our country is also highlighted by a study conducted by the Economic and Social Council of Romania for the period 2021-2022,[7] which points out some worrying aspects in Romania, comparing them with similar indicators in other EU countries:

- Romania leads the EU-28 in the number of owner-occupied dwellings, but has the lowest number of bedrooms per person (1.1) and the highest rate of overcrowding (45.1% of dwellings).
- 21.1% of Romania's population does not have a toilet, shower or bathtub (almost triple the percentage of Bulgaria, the next highest in the EU), compared to the EU average of 1.5% of the population.

Economically, Romania has seen consistent growth, which is also confirmed by the urbanisation process (according to World Bank statistics, the urban population share increased to 54.4% in 2014, from 34% in 1960[8]), which shows an implicit increase in the standard of living. However, purchasing power remains below the European average (50% of the European average in 2021) and has not kept pace with the economic progress recorded at the national level. This is an important factor in the existence of an ageing building stock and the lack of proper renovation in the residential sector. In addition, construction costs for new housing increased by approximately 49% between 2010 and 2020, compared to the European average of 17% (CES 2021-2022 study).

In the context of an outdated housing stock, an important component of raising the standard of living is providing decent living conditions. Given that our country's economy is still unable to provide a significant increase in purchasing power, public strategies must take into account the existing socio-economic aspects to ensure a fair increase in the rate of renovation of buildings. The new EPBD (1275/2024) is shares this vision, clearly emphasising the need to pay particular attention to concepts such as protection of vulnerable consumers and energy poverty alleviation in the context of a just transition to energy independence.

To achieve these objectives, given that social and economic development disparities directly influence these goals, public policies need to address various issues to ensure the right measures are taken to:

- Provide as accurate a picture as possible of the current state of the national building stock, including both energy performance indicators and those related to the socio-economic situation, in the analysis and databases.
- Give an overview of the existing legislative framework and the new European regulations, with concrete proposals for amending national legislation to introduce support measures for socio-economically disadvantaged groups.

[7] www.ces.ro/newlib/PDF/2022/CES_Studiu-locuire_digital.pdf
[8] https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=RO

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- Highlight potential obstacles, challenges and solutions in contexts where socio-economically disadvantaged groups need guidance, assistance and direct support in initiatives aimed at improving living conditions through energy efficiency measures.
- Identify all instruments that can be used to ensure a just transition towards decarbonisation of the buildings sector.

1.4. Main gaps and challenges

There are multiple and diverse obstacles to ensuring a high degree of energy efficiency of buildings in Romania. The LTRS summarises them as follows:

All types of buildings	- Public policy: low energy prices (especially for heating), lack of methodological framework for cost optimisation. - Technical: low baseline values (poor heating), part of the building stock with old structural and safety deficiencies requiring strengthening interventions prior to energy efficiency interventions; different quality of documents produced by building energy auditors (including inconsistent data reporting, uncontrollable or unverifiable in terms of accuracy of data in EPCs/audit reports/inspection reports). - Financial: high commercial interest rates, lack of or over-guarantees, small project sizes leading to high transaction and development costs, lack of creditworthy borrowers and lack of specialised loan products (dedicated to major energy renovation of buildings). - Institutional and informational: lack of adequate data on buildings and energy use, limited capacity to oversee implementation/contractors or insufficient monitoring tools, lack of knowledge on the opportunities and benefits of energy efficiency, resulting from insufficient information/education system, leading to a certain behavioural inertia.
Specific barriers in public buildings (central and municipal)	- Public policy: restrictive budgeting (lack of multi-year budgeting, inability to carry forward energy savings to local budgets in future years, use of operating cost savings to pay for capital expenditures), limits on public borrowing, procurement regulations (favouring lowest price and limiting contracting with energy service companies). - Financial: high commercial interest rates, lack of guarantees or over-guarantees, small project sizes leading to high project development and transaction costs, lack of creditworthiness of municipalities. - Institutional and informational: lack of adequate data on buildings and energy use, low administrative capacity of public institutions, insufficient correlation of actions at governmental level, lack of leadership on energy efficiency at governmental level, fragmentation of energy efficiency policies, communication on energy efficiency.

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Specific barriers in the residential sector – multi-family buildings	- Public policies: not billing based on actual consumption at apartment level, legislation on owners' associations imposing collective decision-making processes, lack of interest of owners' associations or ability to borrow from banks to pay debts, poor quality of district heating services. - Financial: low incomes/low disposable incomes of homeowners, existence of homeowners' associations that are not creditworthy and generate dependency on public grants. - Institutional and informational: lack of clear and credible mechanisms for renovation work, mistrust of neighbours to pay instalments, lack of possibility of regulation (thermostatic taps on heating units), lack of information on costs associated with poor air quality
Specific obstacles in the residential sector: single-family housing	- Public policy: low prices/unregulated solid fuels, lack of standards for existing heating equipment and buildings, lack of legislation on non-clean fuels that affect air quality and generate CO_2 emissions. Financial: low income/low disposable income of landlords, high immediate costs and long payback periods, higher costs for green fuels, insufficient access to existing programmes (GO 69/2010). - Institutional and informational: lack of clear and credible mechanisms for energy renovation, lack of information on costs associated with poor indoor air quality.
Specific obstacles for commercial buildings	- Financial: other investment priorities, perception that energy efficiency investments are risky. - Institutional and informational: insufficiently perceived impact of the importance of energy efficiency on customers, multinational firms may have centralised decision-making processes (outside Romania). - Ownership regime necessitating the development of state aid schemes.

In addition to the issues identified in the LTRS, it is important to emphasise the lack of a database on buildings in our country, including energy performance indicators. This is a crucial first step towards the decarbonisation of the buildings sector, in accordance with the targets of the EPBD. However, promising steps have been taken in this direction that can contribute to achieving this objective:

- ⇒ The National Cadastre and Land Registry Programme – the national systematic cadastre process will take a few more years to complete, but will be able to provide accurate information on all buildings in our country.
- ⇒ National Building Register, financed through the National Recovery and Resilience Plan, for which the public procurement procedure was launched at the beginning of 2025. This procedure has been completed, but the public procurement contract cannot be concluded until an outstanding appeal has been resolved. When finalised, the register will contain all the information extracted from the energy performance certificates (EPCs) issued, providing concrete data on the energy status of buildings.
- ⇒ Finalising the centralisation of the information collected through the Census of Population and Buildings carried out in 2021, which contributes important data on real estate in Romania.

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Another shortcoming is the lack of coherence of public policies in the buildings sector. Intersecting policies should ensure synergy between the targets set towards decarbonisation of the building stock, the current socio-economic context (the purchasing power of Romanians is still well below the European average) and the focus on protecting/supporting vulnerable groups/energy-poor households. For example, financing strategies should be harmonised in order to maximise the efficient use of scarce financial resources. A first step towards convergence of public policies was the LTRS, which was adopted in 2020 and is being updated by the relevant ministry.

Another aspect that needs to be addressed are the legislative acts that follow on from the European directives, which set objectives/action lines. In addition to directly transposing European legislation, these should also focus on creating instruments for putting the targets into practice, customised according to the administrative dimension of local authorities and their real capacity to use them. At the same time, since the measures required to meet national targets have a direct impact on civil society, it is essential that all the above-mentioned steps are taken with the involvement of all stakeholders, by consulting and involving them in the legislative process.

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2. Governance of building stock data in Romania

2.1. Policy and legislative context

In Romania, concerns regarding the improvement of the building stock began to emerge during the pre-accession period to the European Union, when Law no. 372/2005 on the energy performance of buildings was adopted. This law transposed Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings. Through this national regulatory act, several key concepts were introduced, laying the foundation for a coherent system aimed at enforcing minimum energy efficiency requirements in the construction or renovation of buildings, setting the parameters for assessing the performance status of a building, and establishing a framework for the control of such assessments. Specifically, the essential elements introduced by the new law include:

a) The general framework for calculating the energy performance of buildings and building units.
b) Minimum energy performance requirements for new buildings and building units.
c) Minimum energy performance requirements for existing buildings, building units and elements of the building envelope undergoing major renovation, as well as in cases of installation/replacement/upgrade of technical building systems.
d) Minimum energy performance requirements for components of the building envelope that have a significant impact on the building's energy performance, when these components are upgraded or replaced.
e) Energy certification of buildings and building units.
f) Periodic inspection of heating systems, combined heating and ventilation systems, air conditioning systems, and combined air conditioning and ventilation systems in buildings.
g) The control system for energy performance certificates, energy audit reports and inspection reports for technical building systems.
h) Minimum energy performance requirements for technical building systems when they are newly installed or partially/totally replaced;
i) National plans for increasing the number of nearly zero-energy buildings.
j) Technical building systems and electromobility.[9]

[9] Law no. 372/2005 on the Energy Performance of Buildings (republished and subsequently amended) - www.mdlpa.ro/uploads/articole/attachments/600ed0ab05354888349843.pdf

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The introduction of the energy certification concept created the first relevant tool for assessing the building stock in Romania, the energy performance certificate (EPC) – a technical document that certifies the energy performance of a building by ranking it from class A to G, based on its condition.

Law no. 372/2005 gradually mandated the use of EPCs in the following cases:

- Upon the handover/acceptance of newly constructed buildings, after the final inspection from the representatives of the State Construction Inspectorate – within the City Hall.
- For the sale and rental of existing buildings (including residential units), in which case the certificate also includes recommended measures for reducing energy consumption and for increasing the share of renewable energy sources.
- For public buildings with a usable floor area greater than 500 m² (later reduced to 250 m²).

The same legal act assigned the responsibility for issuing EPCs to energy auditors for buildings, certified by the Ministry of Development, Public Works and Administration (MDLPA). These auditors were required to prepare the certificates in accordance with the *Methodology for calculating the energy performance of buildings*[10] and to keep records of them in their own registers. The obligation to submit energy efficiency data from EPCs and energy audit reports only came into effect after 31 December 2020, as stipulated in Article 31, paragraph (3) of Law no. 372/2005, which states: "*After December 31, 2020, energy auditors for buildings and, where applicable, certified technical experts shall be required to submit to the Ministry of Public Works, Development and Administration, along with the certificates and summaries of energy audit reports, as well as inspection reports of technical building systems, an editable electronic document containing relevant energy information about the audited building, for the purpose of establishing databases at the level of the Ministry*." The creation of these databases, along with the system for transmitting and centralising the information online, falls under the responsibility of the MDLPA, which must identify the necessary financial resources for this undertaking, either from national funds or external financing sources.

As previously mentioned, the introduction of energy certification marked a first step toward creating a mechanism for mapping the condition of buildings in Romania. However, the centralisation of information collected through EPCs depends on the establishment of an online reporting system and an associated database. In this context, other data sources have also been used to gather relevant information, such as the 2011 Population and Housing Census, conducted at the national level, which included an entire section dedicated to the condition of dwellings in Romania. This section provided data and aspects relevant from an energy perspective, such as:

[10] The latest version of the methodology was approved by Order no. 16/2023 for the approval of the technical regulation "Methodology for calculating the energy performance of buildings, code Mc 001-2022."

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- Surface areas of dwellings and individual rooms, including the percentage of heated space
- Type of heating system used
- Type of building and materials used in its construction
- Whether thermal rehabilitation had been carried out or not
- Category of use
- Year/period of construction, based on which the degree of compliance with minimum energy efficiency requirements could be estimated.[11]

In 2021 another Population and Housing Census was launched, whose results served as the basis for the publication of the 2023 report titled *Housing Stock – An Updated Analysis of Romania's Building Stock*.[12]

Another important tool in assessing the status of buildings in Romania is the National Cadastre and Land Registry Programme, discussed above. The results of this comprehensive exercise are expected to become visible in the next few years and will provide a clear overview of properties in the country, in terms of their surface and ownership. This will complement the overall picture of Romania's building stock.

As observed, several national initiatives have been undertaken to provide useful information for mapping real estate assets in Romania. However, since collecting data on buildings and their energy performance status requires a significant and coordinated effort, there was a need for public policy documents to provide coherence to these actions and to place them within an updated context, including recent legislative changes at the European level. The Romanian authorities' intention to develop such a programmatic document was evident with the adoption of Law no. 372/2005, which mandated the creation of the LTRS – the most important and comprehensive public policy document dedicated to supporting the renovation of the national building stock. The strategy must be updated every 10 years and submitted to the European Commission as part of the national integrated energy and climate plan (NECP), developed by the Ministry of Economy, Energy and Business Environment. The entry into force of the revised EPBD brought the need to develop another public policy document, the national building renovation plan (NBRP), which is currently under development and is expected to be approved in the near future.

The LTRS, approved in 2020, established a roadmap with measurable progress indicators at the national level, including target milestones for 2030, 2040 and 2050, along with tools to monitor the achievement of goals derived from Romania's commitments at the European level. It also consolidated all data collected up to that point, providing a useful overview of

[11] www.recensamantromania.ro/rpl-2011/rezultate-2011
[12] https://insse.ro/cms/sites/default/files/field/publicatii/fondul_de_locuinte_2023.pdf

the national building stock. It outlined directions for action aimed at decarbonisation and identified the institutions responsible for implementing these measures.

According to the LTRS, *"an efficient monitoring and evaluation system must be developed to better track progress and provide feedback for future improvements of policies and programs. Currently (as of 2020), the only existing monitoring system regarding energy efficiency is the one designed within the framework of the National Energy Efficiency Action Plan IV (NEEAA IV), approved by the Romanian Government Decision no. 203/2019, which supports data collection by National Energy Regulatory Authority (NERA) concerning broader measures targeting energy efficiency. However, the monitoring of building renovations remains quite limited and fragmented, and building owners are not obligated to report periodically. The scope of monitoring and evaluation under NEEAA IV needs to be expanded to include all available building renovation programs for energy efficiency funded by the budget, through credit offerings, and estimates of building renovations carried out with fully private funding."*

The LTRS calls for the creation of a comprehensive database that ensures the automatic centralisation of information on the building stock in Romania, data from EPCs, energy fuels, and energy consumption. Information from EPCs should be processed through the MDLPA website. The LTRS nuances the provisions of Law no. 372/2005 – republished, stating that "*The process of drafting and collecting energy performance certificates (EPC) must be digitized; it should be accessible online, and energy auditors must have electronic signatures/secure access, ensuring better quality and accountability in case of low-quality energy performance certificates*." Currently, this process operates in a rudimentary form, based on the submission of certificates issued by energy auditors via email and their electronic storage by the MDLPA. Consequently, the authority holds a very large archive of such certificates, which remain unprocessed, and the information has not been centralised in a database.

Regarding the content of the EPC database, the LTRS outlines the framework for its development: "*For the EPC database, initially, the existing databases (from the National Institute for Research and Development in Construction, Urban Planning and Sustainable Territorial Development "URBAN-INCERC," INSEE, and others) could be consolidated into a single model. The model should include not only information about renovations related to energy efficiency but also data regarding the building's characteristics, fuel consumption, and similar aspects. A transition must be made towards a national system for the calculation, preparation, and online submission of EPCs. The database should support online submission, with the possibility to implement compliance checks at the moment of submission. For renovation and energy consumption reduction programs, the database must include mandatory reporting requirements for completed renovation works, data on energy savings, and other useful information regarding energy performance*."

The LTRS identified the National Recovery and Resilience Plan (NRRP) as a potential funding source for this comprehensive data storage platform. Through this plan, the National

Building Registry will be created – a georeferenced IT system, correlated and interoperable with local urban databases and other national registries, which would contain the foundational information for all initiatives aimed at decarbonising Romania's buildings sector. Following negotiations with the European Commission, the NRRP will finance both the National Building Registry and the national building renovation plan and work is ongoing. The Ministry of Development, Public Works and Administration has also initiated a collaboration with the World Bank for the automation of information extraction from EPCs, with both objectives expected to be achieved during 2026.

Since the LTRS outlines many courses of action and involves coordinating numerous entities responsible for their implementation, it was deemed necessary to establish a monitoring body. A coordination and monitoring committee was created, which includes representatives from several ministries, academia, and research and development institutes. It is chaired by a representative of the General Secretariat of the government and technically coordinated by a representative of the Ministry of Development, Public Works and Administration as the ministry responsible for energy efficiency in buildings and operationally managed by the State Adviser leading the Department for Sustainable Development, as the integrator of sustainable development policies. The establishment of the committee was also seen as a way to strengthen the level of responsibility and cooperation among all those involved in carrying out specific action plans, including the collection of information from the field, facilitating the creation of an accurate database.

In addition to the LTRS, commitment to decarbonising the building sector has also been reflected in a series of funding lines launched in recent years, at both national and regional level. These are dedicated to the public and private sectors alike and have a significant financial impact. Among the most relevant are the following:

At national level

- The Energy Efficiency in Public Buildings programme, launched by the Environmental Fund Administration under the coordination of the Ministry of Environment, Waters and Forests, has already approved 667 funding applications for the deep renovation of approximately 1,000 public buildings, with a total value of around €320 million. In addition, projects worth approximately €240 million have been submitted.
- The Energy Efficient Home programme, also launched by the Environmental Fund Administration, has a financial allocation of approximately €26 million. Over 1,235 residential buildings have been approved for the implementation of energy efficiency measures.
- The National Multiannual Programme on Increasing the Energy Performance of Residential Blocks, coordinated by the Ministry of Development, Public Works and Administration, is aimed at homeowners' associations in apartment buildings built before 2005. It has allocated approximately €177 million since 2019.

- Component 16, Investment I7 of the NRRP targets energy efficiency improvements combined with the installation of solar panels in 14,850 single-family residential buildings belonging to energy vulnerable households, with a financial allocation of approximately €300 million.
- Component 16, Investment I4 of the NRRP aims to provide approximately 122,000 vouchers for the implementation of renewable energy solutions in households, with a financial allocation of around €611 million.

At regional level

- West Region (ADR Vest) – programme with an allocation of approximately €46.65 million for the energy efficiency of public buildings and around €53.8 million for residential buildings (apartment blocks).
- North-East Region – programme for the energy efficiency of public buildings, with an allocation of approximately €107.7 million.
- Centre Region – programme dedicated to energy efficiency measures in the residential sector (apartment blocks), with an allocation of approximately €16.5 million.

Another financial instrument taking shape to support programmes and projects is the National Social Climate Plan, through which Romania may receive up to €6 billion to finance investments. An initial draft of this plan has been submitted to the European Commission for validation. It includes interventions dedicated to (i) improving the energy efficiency of dwellings and buildings of vulnerable small entrepreneurs through thermal rehabilitation, (ii) installing heat pumps and/or solar panels, and (iii) financing district heating systems in rural areas, At present, work is under way to address the observations received from the Commission, and a round of public consultations on the updated document is scheduled to take place in October of this year.

Although numerous funding programmes have already been launched, with others scheduled to follow in the near future, the financial resources required to achieve the national objectives in decarbonising the building sector are far greater than the current funding potential. For example, according to the 2020 LTRS estimates, the renovation of the worst-performing segment of the building stock alone would require approximately €3 billion in investments between 2021 and 2030. Taking into account the rising inflation rate and the increasing costs of deep renovation investments, the actual amount needed is significantly higher. In this context, it is essential to constantly identify new sources of funding and innovative mechanisms to support vulnerable categories and energy-poor households, in order to reduce disparities caused by socio-economic differences.

2.2. National vs. local level

While public policy at national level is working towards creating a reporting system on the building stock and, implicitly, a comprehensive database, the situation at the local level is not as well regulated. In fact, Romanian legislation does not impose obligations on local authorities to collect and report data on buildings, and any existing databases are the result of voluntary initiatives by territorial-administrative units.

One example is the Sustainable Energy and Climate Action Plan (SECAP), launched as part of the European initiative called the Covenant of Mayors, to which 30 municipalities in Romania have signed up. This local policy document was designed to provide a detailed picture of the energy situation of the municipality and its greenhouse gas emissions, as well as to define measures with quantifiable impact in reducing these emissions through increased energy efficiency and renewable energy production, while also addressing energy poverty. These plans also include provisions on the state of buildings, measures to improve their energy efficiency, and potential sources of funding for investments aimed at their decarbonisation.

Focusing strictly on reporting obligations, although the legislative framework for creating a system to evaluate and collect data on the energy performance of buildings was established as early as 2005 (through Law no. 372/2005), the requirement to submit this information to the MDLPA only emerged at the end of 2020 and is based solely on the results of EPCs and energy audits. However, various other categories of data specific to the building stock are collected by other institutions, such as the National Institute of Statistics (NIS) and the Romanian Energy Regulatory Authority, alongside information coming from voluntary initiatives of local authorities or civil society.

2.3. Main gaps and challenges

The obstacles and challenges related to collecting and centralising data on the building stock and its energy situation were summarised in the LTRS as follows:

1. Institutional fragmentation
    - Data is collected and managed by multiple institutions (NIS, NACLR, local city halls, MDLPA) but without a unified platform or an integrated interoperability system.
    - Difficulties in correlating data (e.g., between the technical cadastre and local fiscal records).
2. Lack of periodic updates
    - Censuses and building databases are not updated annually, and much of the information is outdated or incomplete.
    - The last complete housing census was conducted in 2021, the previous one in 2011.
3. Lack of technical details about buildings

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- In many cases, data on the year of construction, structural framework, energy efficiency, seismic risk is missing.
- This affects renovation planning, thermal rehabilitation and prioritisation of structural consolidations.

4. Uneven digitalisation at the local level
   - There are major differences between cities and communes in technical capacity to collect and digitise data.
   - Some local authorities have GIS databases and building registers, others still operate with paper records.
5. Limited public access and transparency
   - Much data is not accessible to the general public or urban planning specialists.
   - For example, access to cadastral data or local inventories is often granted only upon official request.
6. Absence of a single national building registry
   - Romania does not have an integrated national building registry, with all information (technical, administrative, legal) centralised in a public platform.
   - The Housing Information System (SIML), proposed under the PNRR, should partially address this gap.

Additional challenges

- Insufficient human resources in local administrations to manage the data.
- Poor IT infrastructure in some rural areas.
- Lack of standardized data collection methods (e.g., how to classify a building as degraded or non-compliant).
- Inadequate funding for maintenance and expansion of databases.
- Data governance regarding Romania's building stock faces obstacles related to fragmentation, uneven digitalization, and the lack of an integrated vision. Reforms initiated through the NRRP require inter-institutional coordination, clear standards and open access to data.

The conclusion drawn from the analysis above is that the main obstacles to creating a complete and up-to-date database of Romania's building stock are the lack of centralisation of information within a single entity, and insufficient funding necessary to develop a digitised reporting system accessible to all stakeholders involved in collecting and generating data related to buildings in the country.

The LTRS coordination committee has an essential role in overcoming these impediments, possessing both the prerogatives and institutional capacity to draw decision-makers' attention to these issues and to accelerate the adoption of appropriate measures. Since building energy efficiency is a matter of national interest – considering Romania's commitments and the general quality-of-life benefits of decarbonising the buildings sector –

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it is important that official efforts are complemented by active involvement from civil society, which can support public authorities and monitor the progress of implemented measures.

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3. Key concepts and definitions

3.1. Vulnerable consumer

The latest European trends in energy efficiency place special emphasis on identifying households with low incomes or those that, for various reasons, do not have access to the minimum necessary energy and require support to ensure a decent standard of living. This increased focus on vulnerable groups aims to reduce the socio-economic gap within Member States and to harmonise efforts to reduce emissions associated with the energy consumption of buildings.

In Romania, this concern was first addressed through the Law on Electricity and Natural Gas no. 123/2012, which defined a *vulnerable consumer* as a "*single person/family, final client belonging to a category of household consumers who, due to health conditions, disability, age, insufficient income, or isolation from energy sources, is at risk of social marginalization and who, in order to prevent this risk, benefits from social protection measures, including financial support and additional services to ensure at least the minimum energy needs.*"[13] The definition outlines several criteria for identifying a vulnerable consumer, highlighting economic, health-related and social vulnerability. The aim of this definition was to create the necessary framework for easily identifying people vulnerable in terms of access to essential energy resources, as well as for establishing the corresponding social protection measures.

Romanian legislation initially aimed to regulate the notion of vulnerable consumers in order to help such individuals obtain facilities or exemptions related to energy payments. As Romania gained access to EU-funded programmes and European directives increasingly emphasised the protection of socially disadvantaged groups in terms of energy access, the national legal framework was improved through the adoption of a specific law (Law No. 226/2021**)** on establishing social protection measures for vulnerable energy consumers. This new law outlined an expanded vision of how energy poverty should be addressed, highlighting clear objectives of:

"a) ensuring the affordability of energy in terms of price for all citizens;
b) ensuring the uninterrupted physical availability of energy resources for all vulnerable consumers;
c) promoting access to measures aimed at improving the energy performance of residential buildings;
d) preventing and combating energy poverty and social exclusion."[14]

[13] Article 3.23 of Law no. 123/2012
[14] Article 1, paragraph (2) of Law no. 226/2021

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The renewed perspective of the new law is also reflected in the social protection measures it provides:

"The financial social protection measures consist of providing support to ensure minimum energy needs and include:

a) heating assistance for the home;

b) energy consumption assistance aimed at covering part of the household's energy consumption throughout the year;

c) assistance for the purchase of energy-efficient equipment within a dwelling, necessary for lighting, cooling, heating, and providing domestic hot water, for replacing technically and morally outdated household appliances with energy-efficient ones, as well as for using communication tools that require energy consumption;

d) assistance for the purchase of products and services to improve the energy performance of buildings or to connect to energy sources."[15]

To these are added the non-financial social protection measures, which *"consist of facilitated access and connection to available energy sources necessary to ensure minimum energy needs, including a ban on disconnection from energy sources for all categories of vulnerable consumers during an energy crisis (...), as well as transparent and accessible counselling and information for the population regarding energy sources, costs, and procedures for accessing them."*[16]

As can be seen, the new legislative framework has maintained the directions of action for ensuring social protection related to energy consumption, but has also introduced the concept of "*promoting access to measures for improving the energy performance of residential buildings*" as a tool to support vulnerable groups. In this way, emphasis has also been placed on reducing energy losses and, implicitly, household energy consumption, highlighting the need to implement energy efficiency improvement measures in buildings as part of the strategies to eliminate energy poverty.

3.2. Energy poverty

Although Law no. 123/2012 did not provide a clear definition of *energy poverty*, this concept was closely linked to that of the vulnerable consumer, since someone who cannot access or afford the minimum energy they need consequently cannot ensure a decent living and is likely to be included in social protection measures. The relationship between the two concepts was unequivocally regulated by Law no. 226/2021, which states that energy poverty is the *"inability of the vulnerable consumer (...) to cover the minimum energy needs."*

[15] Article 2, paragraph (2) of Law no. 226/2021

[16] Article 2, paragraph (3) of Law no. 226/2021

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To determine whether a person is experiencing energy poverty, it is necessary to monitor the indicators that define a vulnerable energy consumer, according to the definition provided in Article 3, paragraph (1), letter (a) of Law no. 226/2021 – *"a single person/household who, due to health reasons, age, insufficient income, or isolation from energy sources, requires social protection measures and additional services to ensure at least their minimum energy needs."* From the above, we can identify four categories of vulnerable consumers, each with their specific characteristics:

- ⇒ Income-related – households with a net average monthly income per member below the legal threshold.
- ⇒ Age-related – individuals who have reached the standard retirement age and meet the income criteria.
- ⇒ Health-related – those who require energy for essential health purposes (e.g. for electrical devices) or have restricted mobility.
- ⇒ Place of residence – those living in isolated areas or informal settlements as defined by law.

Although the criteria mentioned above differ in perspective, they all relate to an individual or a household's ability to access and sustain their consumption of energy.

3.3. Worst-performing buildings

When we talk about energy poverty and vulnerable consumers, the primary focus is on energy consumption. When it comes to buildings with poor energy performance, the range of indicators is different, although there are some common elements.

The LTRS, for example, considers that *"the segment with the lowest performance within the national building stock includes buildings constructed before the year 2000, when construction technical regulations with lower energy performance requirements were applicable."* Other elements that can suggest poor energy performance include buildings more than 20 years old, a specific final energy consumption exceeding 300 kWh/m² per year and/or a specific final energy consumption for heating exceeding 200 kWh/m² per year.

Law no. 372/2005 regarding the energy performance of buildings does not provide an explicit definition of the concept of a low-performing building, but clarifies the criteria that should be taken into account when assessing the energy status of a building. Law no. 372/2005 states that the energy performance of a building represents the energy calculated according to the methodology for calculating the energy performance of buildings (Calculation Methodology Mc001 2002, updated by the Order of the Ministry of Development, Public Works and Administration no. 16/2023), to meet the needs related to its use under regulated conditions. These needs primarily include heating, domestic hot

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water preparation, cooling, ventilation and lighting.[17] From the perspective of the Methodology, the *energy performance of the building/building unit/apartment* is the energy estimated by calculation (or actually consumed) under the conditions of use that ensure comfort and safety for the occupants of the building/building unit/apartment, while meeting all minimum comfort requirements regarding heating, domestic hot water use, cooling, ventilation, and lighting. Thus, the energy performance of a building is measured through specific consumption indicators, calculated based on its technical characteristics, energy systems, climatic conditions, comfort requirements, energy sources, and actual use.

From these definitions, we can say that a poorly performing building is one that consumes a large amount of energy (calculated per square metre, per year) to meet these operational needs. This is caused by various factors, whether cumulative or not, such as:

- Poor thermal insulation (walls, roof and windows may be poorly insulated, allowing significant heat loss in winter and heat gain in summer)
- Outdated systems (heating, cooling and ventilation systems may be old and inefficient, contributing to high energy consumption)
- Inadequate ventilation (there may be insufficient or inefficient ventilation, leading to poor air quality and low thermal comfort)
- Lack of consumption automation systems (their absence can increase energy consumption)
- Absence of renewable energy production systems.

For the energy classification of a building, the Calculation Methodology Mc001 - 2002, updated by the Order of the Ministry of Development, Public Works and Administration no. 16/2023, outlines a set of rules and standards that establish how to evaluate and classify the energy efficiency of buildings. These include key energy performance indicators such as the specific primary energy consumption, the CO_2 equivalent emission index, the specific energy consumption from renewable sources[18] and the energy class. Energy auditors use the criteria from the methodology to classify buildings according to energy classes, from A (the most efficient) to F (the least efficient). These aspects are detailed in EPCs and audit reports they prepare.

Recently, *Law no. 238/2024 amending and supplementing Law no. 372/2005 regarding the energy performance of buildings* introduced stricter minimum energy performance requirements to align Romanian legislation with the nearly zero-energy building standard. The new regulations classify buildings that do not meet these requirements and fall into energy classes F and G as "sub-standard".[19]

[17] Article 3.2 of Law no. 372/2005 regarding the energy performance of buildings:
[18] The indicators regarding CO_2 equivalent emissions and consumption from renewable sources were recently introduced through Law no. 238/2024, which amends Law no. 372/2005
[19] Energy class G is not yet regulated by Romanian legislation but will be included in the transposition of Directive no. 1275/2024 regarding the revised energy performance of buildings.

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As discussed above, vulnerable consumers are those who require financial support as a social protection measure to ensure access to adequate energy sources, while people experiencing energy poverty do not have the necessary funds to implement energy efficiency measures at their homes. Based on this, it is tempting to conclude that those consumers considered vulnerable and experiencing energy poverty live in the worst-performing buildings, with energy classes of C or lower. This conclusion could be useful in establishing social protection measures, in the form of support for energy efficiency interventions in the homes occupied by vulnerable consumers.

However, this is not applicable in all cases, since some consumers are classified as vulnerable for non-financial reasons such as health, which would not prevent them from implementing energy efficiency measures in their homes. The legislation should therefore make a clear distinction between these concepts. It is essential that legal regulations define *worst-performing buildings*, based on a clear analysis of energy performance indicators, reflected in EPCs and other documents prepared by specialised personnel.

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4. Conclusions

Reviewing public policy documents, regulations and information on the building sector in Romania and its energy efficiency has highlighted several gaps in establishing a solid and comprehensive framework. These shortcomings hinder the success of efforts to decarbonise the national building stock. Below, we present a brief analysis of the main issues and the current state of play.

Lack of databases providing a comprehensive overview of the national building stock

- The data collection system relies on energy auditors sending information from EPCs and audit reports via email. The data sent by energy auditors is stored but not processed.
  The process of creating the national building renovation plan, the National Building Registry, and implicitly the IT system for issuing EPCs and reporting building energy performance indicators, is ongoing. It is being carried out by the Ministry of Development, Public Works and Administration with support from World Bank representatives, expected to be completed by 2026.
- Not all buildings in the country are registered in the cadastre, which is why data about these buildings is missing from the information system.
  The continuing systematic cadastral registration, started in 2015, will ultimately provide information about all buildings in Romania to be included in the National Building Registry.
- EPCs and/or audit reports are prepared upon request when properties are constructed, renovated or sold, meaning that not all buildings in the country undergo an energy efficiency analysis.
  It is necessary to establish a mandatory census or reporting system regarding the status of all buildings in Romania, regardless of ownership and context of construction/ renovation/sale.

Lack of digitalisation in the data collection and reporting system

- Romania is still deficient in terms of institutional digitalisation, and this is evident in the processes of collecting and centralising information related to buildings.
  With the implementation of the National Building Registry, the digitalisation issue will be partially addressed through the automation of reporting EPCs and audit reports. However, for the database of the building stock to be truly comprehensive and accurate, it should result from a national effort based on periodic reports from all institutions managing relevant information.

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Lack of coherence in regulation and in establishing responsible institutions

- Since the first regulations on the energy efficiency of buildings, a series of acts have been developed, initiated by different institutions in various legislative contexts. This has led to multiple parallel public policy documents which, in some cases, instead of being complementary, have addressed the same concepts but in different ways.
  The LTRS has brought balance in this regard, offering a consolidated perspective on the concepts and provisions in the field of building energy efficiency and outlining action directions in a coherent and coordinated manner.
- Over time, monitoring the implementation of legislative provisions related to the energy efficiency of buildings has fallen to different bodies depending on the authority initiating the effort, but these bodies were not coordinated at a centralised level. This resulted in a lack of institutional communication and, implicitly, poor collaboration between entities responsible for similar areas of interest.
- *The establishment of the coordination committee for monitoring LTRS implementation created an improved system of control, coordinated by the relevant ministry (MDLPA) and led at the highest level (General Secretariat of the Government). In our opinion, all initiatives and measures related to the efficiency of Romania's building sector should be conducted and monitored under the same umbrella, with the MDLPA acting as the unifying element.*

Lack of adequate funding for the needs of the building sector and lack of coherence between funding programmes

- The outdated nature of the national building stock complicates Romania's fulfilment of its decarbonisation commitments, as these efforts require considerable financial resources. This is happening during a difficult economic and budgetary period. This unfavourable context has led to the suspension of some support programmes for investments aimed at increasing the energy efficiency of buildings, with no clear timeline for their resumption.
- Existing funding programmes need to be harmonised to (i) avoid confusion and competing funding lines, (ii) ensure complementarity of financing, and (iii) introduce performance indicators to quantify results in terms of energy consumption reduction targets.
  Ideally, all funding programmes for investments in the buildings sector should take into account the directions set out by the LTRS and be coordinated by a single monitoring, control and reporting body.

Lack of education regarding the energy efficiency of buildings

- In the context of Romania's decarbonisation targets, improving the energy efficiency of buildings must be a national effort, jointly undertaken by both the public and private sectors. Given that investments in energy efficiency involve considerable costs, mobilisation for their implementation cannot happen without raising awareness of the potential benefits. While legislation imposes obligations on the

public sector in this regard, renovation in the private sector relies solely on the voluntary initiatives of homeowners. In this situation, homeowners must be encouraged to initiate investments through both funding schemes and education and awareness programmes.

In closing, we emphasise the importance of civil society's involvement in the initiatives of public institutions at both central and local levels, as part of the civic responsibility that should guide the collective mindset of a nation. In this way, the private sector can make a valuable contribution to public life, both by supporting authorities and by serving as a monitoring mechanism for their activities.

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