iBRoad

Individual Building Renovation Roadmaps

Factsheet: Romania

Current use of EPCs and potential links to iBRoad

Romania's building stock is made up of about 85% residential buildings. Up to 80% of the CO_2 emissions from the Romanian building stock could be reduced through a comprehensive renovation programme [1]. The energy expert is responsible for the compliance and for the accuracy of the Energy Performance Certificate (EPC). The market for energy audits/consultancy for residential buildings is currently not working effectively.

Overview of the building stock

Total building floor area:
417 Mm² (2013)

Share of residential floor area:
85%

Number of single-family houses:
5.2 million (about 59% of residential buildings)

Percentage of buildings built before 1990:
82%

Average residential energy consumption:
308 kWh/m²

Average residential envelope performance:
1.58 W/m²°C (2014)

Major renovation rate:
0.47% (2014)

All data comes from the EU Building Stock Observatory

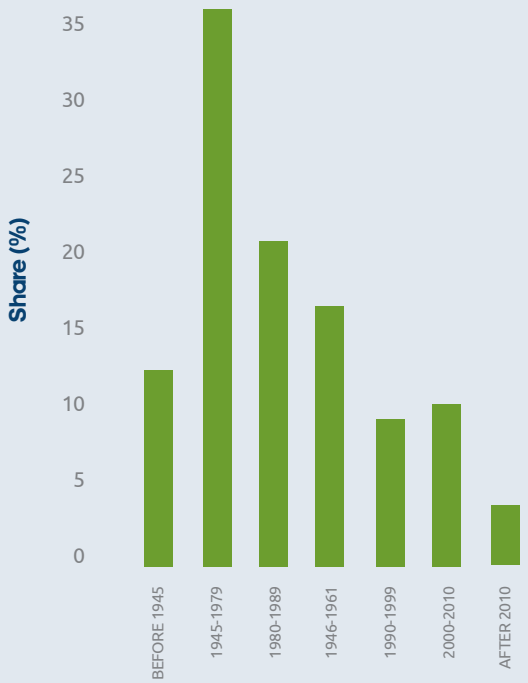

Figure 1: Romanian building stock per construction year (Source: EU Building Stock Observatory)

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 754045

Buildings account for the largest share of energy use in Romania, which is mainly due to their overall poor energy performance [2]. Energy used for heating represents around 55% of the overall energy use in apartments and up to 80% in individual houses. Depending on the climatic zone, a single-family house consumes on average 24% more energy per m² than a multi-family dwelling [1]. Nearly half of all homes (47.5%) are located in rural areas, which is above the European average [1].

There are three main heating types for Romanian buildings: biomass, gas and district heating. Three out of four single-family houses have some kind of biomass heating system [1]. In rural areas, heating through burning wood in old stoves is also common. In urban areas, while district heating is still important, there is a trend of shifting to individual heating systems based on gas [1].

Romania's population has decreased by more than 3.5 million since 1990 [3], while the residential floor area has been increasing. This has resulted in an increase of the average living floor area per inhabitant.

Overview of existing policies and financial schemes

The building stock is considered a fundamental element of the Romanian energy efficiency goals. Romania's indicative target for 2020 is to save 10 million toe of primary energy, which represents a reduction of 19% of its energy consumption (52.99 million toe). The Ministry of Regional Development and Public Administration and European Funds (MDRAPFE) is the responsible authority for the Romanian implementation of the EU Energy Performance of Buildings Directive (EPBD) [4].

Most renovations in Romania are 'shallow', in terms of their energy savings. The energy performance level of what is considered to be deep renovation is far from nZEB levels, both in terms of design specifications and performance of works (e.g. limited insulation, attention to thermal bridges, no mandatory airtightness levels or mechanical ventilation with heat recovery) [5].

The biggest source of funding for energy efficiency comes from EU Cohesion Policy Funds. Between 2014 and 2020, Romania intends to allocate more than €1.25 billion to the renovation of residential and public buildings. Most funds will be used as grants for the building owners association, covering (some of) the cost of the thermal renovations [6]. The most relevant national programmes for the renovation of residential buildings are:

Thermal Rehabilitation of Residential Buildings Financed by Bank Loans with Government Guarantee. This scheme provides building owners access to loans for thermal rehabilitation. The loans are supported by a government guarantee which generates lower interest rates for the lenders. The loan amount cannot exceed €400 for dwellings in residential blocks and €1,600 for individual residences, while at least 10% of the costs should be financed by the beneficiaries. Eligible buildings must have been built before 2000, while allowed measures include thermal rehabilitation of the building envelope and replacement/repair of the heating system [7].

Multiannual National Programme for Increasing the Energy Performance of Blocks of Flats. The main objectives of this programme are to reduce the annual specific consumption for heating below 100 kWh/m²/year and improve indoor environmental quality. 60% of the cost is covered by governmental and EU (Cohesion Policy

Funds) funds while 40% should be paid by the owner-association or by using other funds available locally. The target buildings of the programme are multi-store blocks built between 1950 and 1990 [7].

Call for projects under the Regional Operational Programme (2014-2020) for improving energy efficiency in public buildings, residential buildings and public lighting provides minimum requirements in terms of energy performance of buildings, which could pave the way to nZEB levels [6].

Another instrument for financing renovation and energy efficiency in buildings is the newly launched **Green Economy Financing Facility (GEFF) by the EBRD**, with €100 million available for supporting Romanian households to save energy and money. The framework is designed to help Romanian households invest in energy efficiency, renewable energy and water-saving solutions. It is the first time that the EBRD is financing energy efficiency in Romania's residential sector. Loans will be provided via local partner banks (Banca Transilvania will be the first partner bank to start lending under the GEFF) [8].

The experts' opinion*

- **The biggest barriers to energy efficiency investments, according to the experts, are the lack of awareness about available financial support and insufficient awareness about the benefits of energy renovations. In addition, high renovation costs are considered an important obstacle.**
- **There is an increasing lack of trust in the quality of renovation, materials and construction methods used, leading to distrust in the benefits associated with energy renovation.**

* based on interviews and feedbacks received from national experts

The implementation status of the EPC

The Romanian EPC system was first developed in 2001 as a voluntary system. Following the transposition of the EPBD (in 2005) into national law (in 2005), and the revisions in 2013 and 2016, the EPC is compulsory for new and existing buildings when either sold or rented [4]. In reality, real estate agencies rarely ask for EPC information when advertising properties for sale [5].

The general framework for verification and compliance of EPCs was introduced in 2013 and reinforced in 2016, according to which 10% of issued EPCs must be checked for quality assurance [4]. The EPC compliance control is performed only by checking the form and existence of key information within the EPC, while the content (e.g. input data, calculations) is not verified by checking the actual values [5].

The energy expert is responsible for the compliance with requirements of the certification and for the accuracy of the EPC. Every building energy expert must keep a registry with all EPCs issued, including all relevant information [4]. The energy expert is required to transmit an electronic version of the EPC to the central database. Since there is no standardised template defined for the EPC, there is a great diversity in the formats received [4]. The central register of the EPC and the national database is managed by the research institute NIRD URBAN-INCERC since 2008.

The EPC contains information about specific energy consumption related to space heating, domestic hot water installations, lighting, mechanical ventilation and space cooling (Annex). Label A ranges from 125 kWh/m²/year (heating, DHW and lighting) to 150 kWh/m²/year (all energy uses). A definition of energy classes, based on a primary energy indicator and for different building categories (e.g. residential, offices, educational, health, commercial, etc.), is under revision [5].

The EPC is based on an official calculation methodology (Ministerial Order 1057/2007), considering the EPBD standards (especially the EN 13790 for heating and cooling). There is also an alternative calculation method for heating and hot water consumption, based on previous Romanian research. The calculation methodology in force is not fully clear and detailed, and, in some cases, provides room for interpretation. The methodology is currently under revision, with intention to include a new set of standards, but no draft document is available at this time [4].

While there are no official energy performance software tools, various alternatives based on the current methodology (Mc 001-2006) are available on the market [4]. Commercial software programmes for energy performance calculation, applicable to all building types, are *AllEnergy, Certificat-energetic.com, Doset–PEC, ALLPLAN, Matrix Energ and TermoExpert*. The results obtained by using different tools, or even between distinct versions of the same tool, show varying results. No validation framework exists at the moment to check the compliance of the commercial tools used in the energy evaluation of buildings (except for the software for EPCs issued for apartments in multi-family buildings, which is subject to compliance verification) [5].

FACT BOX
EPCs in Romania

Responsible authority:
Ministry of Regional Development and Public Administration and European Funds (MDRAPFE).

Availability of a central registry of EPCs:
No available database

Number of EPCs issued:
>600,000 (mostly individual apartments/houses).

Percentage of buildings with EPCs:
N/A

Period of validity of an EPC:
10 years

Recommendations included in the EPC:
Yes, but the recommendations are often generic and do not provide detailed information about the costs and benefits of the different potential renovation measures.

Energy label/continuous scale:
Energy label

Price range for an EPC:
€35-€65 per dwelling, €0.1-1/m²

Median EPC:
C (< 259 kWh/m²/year final energy)

Body responsible for performing quality checks:
Central government body (State Inspectorate in Constructions).

Penalties for qualified experts for non-compliance:
Administrative (suspension) and monetary penalty (fine).

Number of certified energy experts:
1,760

Requirements to become a certified energy expert:
hours of university courses at Master level and the candidates must take a specific exam.

Indicative cost of training for energy experts:
€650-€750

The information provided in the EPC is sufficient to conduct an evaluation of the energy performance of the certified building. However, the detailed technical information, which should be provided in the EPC annex, is often incomplete. Recent studies have also shown incomplete or incorrect information in the EPCs (including input data), highlighting issues related to the reliability and validity of the EPC on the market [9].

Including recommendations on possible renovation measures would require a more detailed analysis (like an energy audit). This is likely to increase the costs of issuing and EPC, in a market prioritizsing speed and low prices.

To enhance their value, changes in the EPC and the overarching systems are required. The usefulness of the EPC can be increased through a better structure of the content and by shaping better recommendations to improve the energy performance (linked with clear benefits). This should be supported by an the introduction of an effective technical compliance check and an awareness campaign aiming to increase the acceptance and value of EPC as energy renovation instruments [5].

The experts' opinion

- **Most interviewed experts consider EPCs to play a minor role, at best, when buying a house or preparing renovation measures. The EPC is perceived more as a formal requirement than a guiding document. "The credibility of the data in these documents is low and the measures being recommended are rarely treated with interest, most of the time they are not even read".**
- **Recommendations are not accompanied by implementation scenarios (cost-benefit, payback period, air quality improvements, etc.), which would increase the value for the building owner.**
- **The current EPC class A (< 150 kWh/m²/year final energy) is seen by experts as 'too easy to achieve', not incentivising deep energy renovations.**
- **Improved compliance and quality of the EPC issuing and auditing would increase the trust of EPCs. Renovations of bad quality in the past, which led to humidity, condensation and mould, poor internal air quality and insulation (in terms of design, thermal performance, materials, proper installation), cause building owners to think twice before they invest in energy renovations.**
- **The development of a central EPC database could benefit public authorities. For example, by generating maps describing energy performance levels, which in turn could help authorities to better target measures. It would also enable aggregation of individual building projects, making the investment more affordable and attractive.**

Current status of energy audits and potential market for iBRoad

This section is about energy audits and tools, which are not included in the EPC framework. The audit described here is not identical to the energy check needed to produce an EPC.

The current market for energy audit/consultancy for residential houses is not working properly. Experts highlight low awareness of the benefits of deep energy renovations and overall financial constraints among building owners. In addition, the inadequate work performed by some energy experts has resulted in a bad reputation and limited trust in the whole process [5].

The individual building renovation roadmap (iBRoad) could be coupled with a more effective use of available data, such as a central EPC database. This data could be visualised through maps describing energy performance levels, helping authorities to better target policy measures, which could generate interest and incentivise deep energy renovations. The ongoing H2020 ENERFUND project (enerfund.eu) is developing a tool that would help take the investment decision on energy renovation by making relevant information accessible through maps [5].

The iBRoad tool could also alleviate some of the financial constraints, by coupling measures with energy/financial savings. First, it would increase the building owner's awareness of the potential savings. Secondly, it would increase the building owner's prospect to get a good loan, as the financial institution can be more confident that the investment is sound. Thirdly, innovative business models using data to aggregate renovation projects could lower the price [5].

The iBRoad tool could also be used to nudge building owners' behaviour by providing easy-grasping information about how to use the building effectively. Energy renovations should e coupled with clear guidance, in order to fully exploit the potential energy savings and increased comfort [5].

The renovation rate in Romania is locked due to several factors: the high cost of renovation, inadequate trust in the construction sector and overall low awareness of the benefits of (deep) energy renovations. The iBRoad tool ought to consider all these factors in its development in the Romanian context [5].

According to the experts, the current financial and regulatory framework is not effectively incentivising deep renovations. The iBRoad tool should make sure these investments do not create lock-in effects, making it less cost-effective to fit more comprehensive measures in the future [5].

The experts' opinion

- **To limit expenses, it is common that building owners rely on non-professionals for advice (for example a neighbour or a relative), sometimes leading to unsatisfactory results.**
- **The individual building renovation roadmaps could successfully illustrate the multiple benefits of deep renovation to the building owners and increase the interest for staged deep renovation.**
- **Recommendations mapping out a roadmap for the building would allow the building owner to predict the budget and make plans to access available subsidies/support.**
- **Reliable quantifications of energy savings of the potential measures would be positive. Currently, there are no available online tools for home-owners to make simplified energy calculations and estimations of renovation measures on the Romanian market [7].**

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iBRoad would like to acknowledge the following organisations for their contribution to this report, taking the time to be interviewed and providing challenging feedback: Romanian Association of Energy Auditors for Buildings (AAECR), Asociatia Inginerilor De Instalaţii Din România (AIIR), Saint GobainLiga, Asociaţiilor de Proprietari Habitat, Asociatia Romana Pentru Locuinte - Casa Plus, MDRAPFE, Transilvania University of Braşov, Universitatea Tehnică de Construcţii din Bucureşti, Asociaţia Patronală Surse Noi de Energie SunE, SC KIMOSERV SRL

All of iBRoad's reports, analysis and evidence can be accessed from **ibroad-project.eu**.

iBRoad project partners

Annex

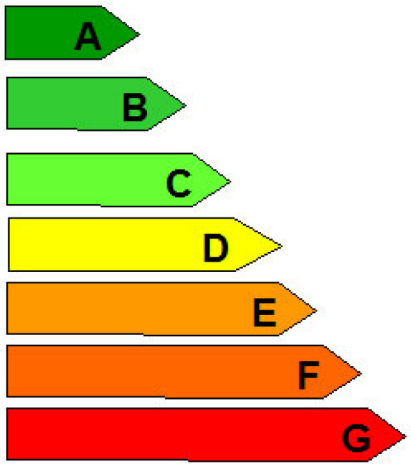
Romanian Energy Performance Certificate

Cod poştal localitate	Nr. înregistrare la Consiliul Local	Data înregistrării
010208		zz ll aa: 23 12 09

Certificat de performanță energetică

Performanța energetică a clădirii — Notare energetică: **96,11**

Sistemul de certificare: *Metodologia de calcul al Performanței Energetice a Clădirilor elaborată în aplicarea Legii 372/2005*



	Clădirea certificată	Clădirea de referință
	B	B
Consum anual specific de energie [kWh/m²an]	162,63	128,81
Indice de emisii echivalent CO_2 [kg_{CO_2}/m²an]	**33,34**	**26,40**

Consum anual specific de energie [kWh/m²an] pentru:		Clasă energetică: Clădirea certificată B	Clasă energetică: Clădirea de referință B
Încălzire:	102,47	B	B
Apă caldă de consum:	48,92	C	B
Climatizare:	-	-	-
Ventilare mecanică:	-	-	-
Iluminat artificial:	11,24	A	A

Consum anual specific de energie din surse regenerabile [kWh/m²an]: 0

Source: Romanian Green Building Council: https://rogbc.wordpress.com/2012/02/