



A I.1 Baseline assessment report for Poland

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

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Executive summary

The purpose of this report is to describe the current housing situation in Poland. The report consists of three main parts. Firstly, an overview of the building stock in Poland, focusing on quantitative housing data, energy efficiency of buildings and socio-economic aspects. Secondly, the governance of building stock data in Poland – focusing on the policy and legislative context as well as the differences between national and local level. Lastly, key concepts and definitions such as vulnerable consumers, energy poverty and worst-performing buildings are described and discussed from the Polish perspective. Each part addresses country-specific gaps and challenges to describe the current state of housing in Poland, and to assess what steps should be taken to improve the situation.

The majority of dwellings in Poland are located in urban areas, and their energy performance differs depending on various aspects, including the year of construction, types of HVAC systems, quality of building envelope and window area. The report emphasises the importance of reliable data, which is currently lacking in many cases, for improving the current housing situation in Poland. The main challenges primarily concern the accuracy, quality and accessibility of data. The data availability varies significantly depending on the age of the building. Another major challenge is the increase of the degree of digitisation and automation of information on Polish building resources, which would facilitate the work of numerous industries and help building residents.

Thanks to EU policies and rising awareness of the challenges the construction sector is facing, Polish regulations and data collection methods are in the process of continuous improvement and are moving in the right direction. However, there is still a lot of work to be done.

1. Introduction

Table 1. Residential building stock overview

Indicator	Value	Source/reference
Number of residential buildings	6,189,000 units	<i>Housing conditions in Poland according to the results of the National Population and Housing Census 2021</i>
Total floor area of residential buildings	1,190,667,900 m ²	<i>Housing economy in 2023 - SP (as of 31.12.2023)</i>
Total floor area of single-family houses	707,048,490 m ²	Values estimated on the basis of the total area of residential buildings and data from <i>Housing conditions in Poland according to the results of the National Population and Housing Census 2021</i>
Total floor area of multi-family houses	483,619,410 m ²	
Total number of dwellings	15,779,200 units	<i>Housing economy in 2023 - SP (as of 31.12.2023)</i>
Number of single-family houses	5,931,700 units	<i>Housing conditions in Poland according to the results of the National Population and Housing Census 2021</i>
Number of multi-family houses	8,608,900 units	
Urban floor area of residential buildings OR number of dwellings	694,424,500 m ² 10,705,200 units	<i>Housing economy in 2023 - SP(as of 31.12.2023)</i>
Rural floor area of residential buildings OR number of dwellings	496,243,400 m ² 5,074,000 units	



2. Overview of the building stock

In Poland, as of 31 December 2023, residential buildings make up an area of 1,190,667,900 m², which corresponds to a total of 15,779,200 dwellings. More residential space is located in urban areas (58%) than in rural areas (42%). Single-family buildings cover a greater floor area than multi-family buildings (59% to 41%). There are 5,636,800 single-family buildings and 552,100 multi-family buildings (as of 31 December 2021).

The analysis of the building stock focuses on three topics: general building stock data, energy performance data and socio-economic data.

2.1. Building stock data

The main sources of data on the building stock in Poland are reports prepared by Statistics Poland (SP) and Land and Building Register (LBR).

SP reports primarily contain statistical and quantitative data, allowing the overall situation in the country to be assessed. The reports contain many values averaged over the whole country or individual voivodeships (provinces). The data provided by SP originates mainly from annual construction reports, censuses and administrative registers. A definite advantage of SP studies is that a large part of them are updated on an annual basis, which allows easy comparison between individual years and identification of numerous dependencies between the analysed parameters.

The LBR database is a service that enables work on maps and more detailed analysis of specific cases. LBR is updated on the basis of surveying work, building permits, administrative decisions and field inventories. The multitude of sources can cause issues with the coordination of information transfer, which sometimes prolongs the data update process. However, a major advantage of the database is its interactivity and easy access, which allows for numerous analyses and the acquisition of a lot of valuable information, as the scope offered by LBR is relatively broad.

There are approximately 6,189,000 residential buildings in Poland. The vast majority of these are single-family buildings – around 81% in urban areas and 97% in rural areas.



While there are far fewer multi-family buildings in total, they contain more dwellings – approximately 79% of dwellings in urban areas and 14% of dwellings in rural areas.¹

Residential buildings by type (single-family and multi-family buildings)

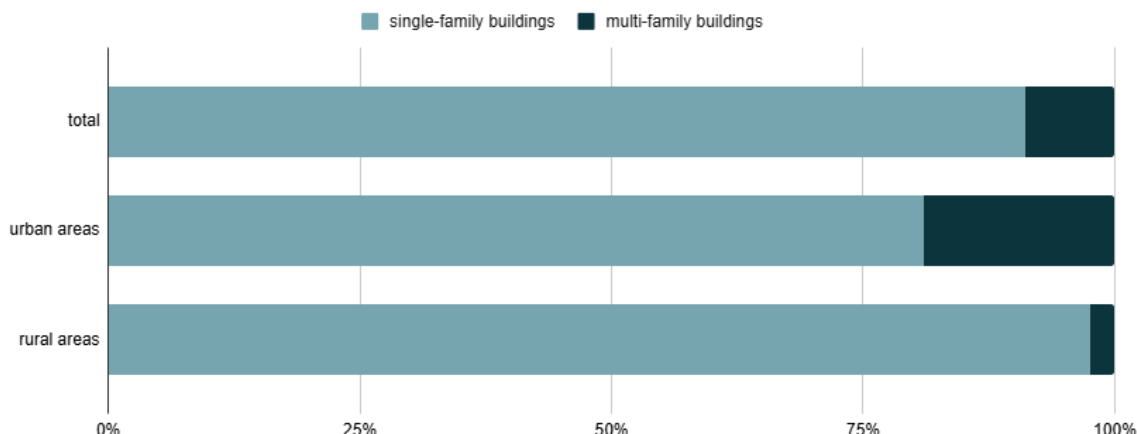


Figure 1. Residential buildings by type (single-family and multi-family), as of 31 December 2021. Source: SP.

In 2023, the average usable floor space per person in Poland was 31.6 m². This varies slightly between cities (31.0 m²) and rural areas (32.5 m²), and between single-family houses and multi-family buildings.² In 2021, the average usable floor space of a dwelling in a single-family building in an urban area was 123.56 m², while in rural areas it was 109.11 m². The number of dwellings in a building is also influenced by its location. Most multi-dwelling buildings in rural areas (60.3%) have three-to-five units. In cities, however, the largest category is buildings with 10 to 19 dwellings, which account for 26.8% of all multi-family buildings in cities. The number of dwellings in a building also depends on the age of the building.

The age of residential buildings also affects the standard of flats, their energy performance and technical condition. Most flats in Poland were built between 1945 and 1970. The second largest group are flats built between 1989 and 2002. The charts below show the percentage share of residential buildings constructed in specific time periods.

¹ All figures in this section come from Statistics Poland, *Housing conditions in Poland according to the results of the National Population and Housing Census 2021*, unless otherwise stated.

² SP, *Housing economy in 2023*

Figure 2 refers to all inhabited buildings, while Figure 3 shows the division into urban and rural areas.

Residential buildings by year of building construction
% of total inhabited residential buildings

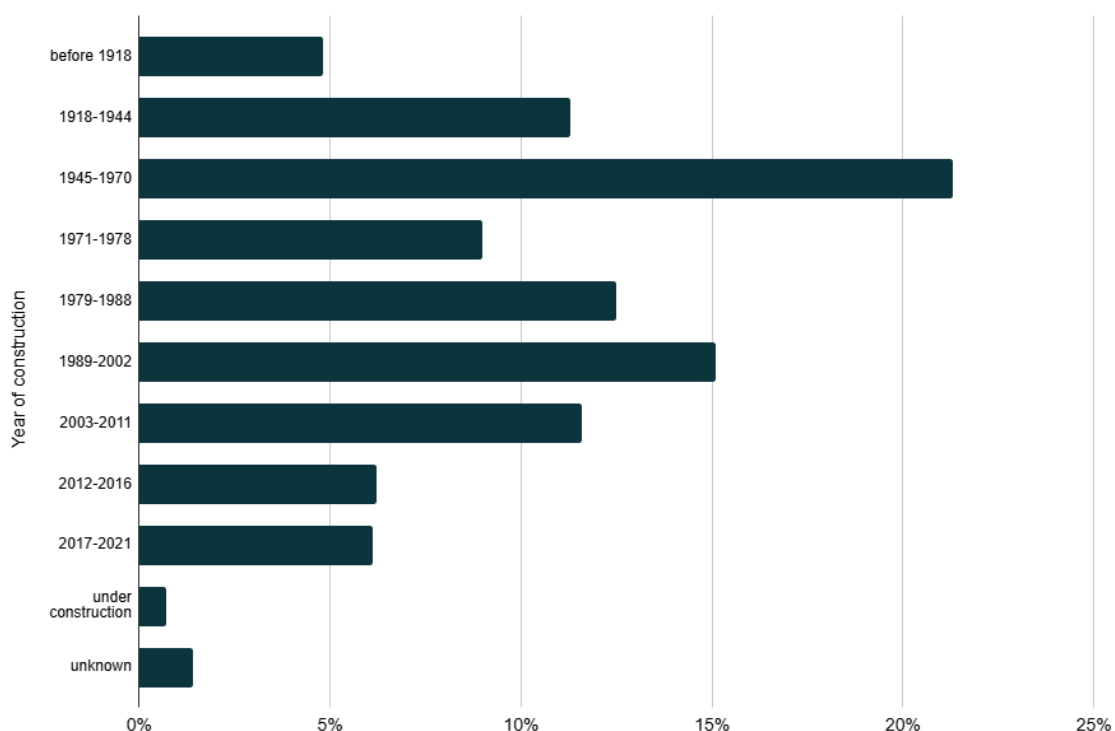


Figure 2. Residential buildings by year of building construction (percentage share of total inhabited residential buildings), as of 31 December 2021. Source: SP.

Residential buildings by year of building construction % of total inhabited residential buildings

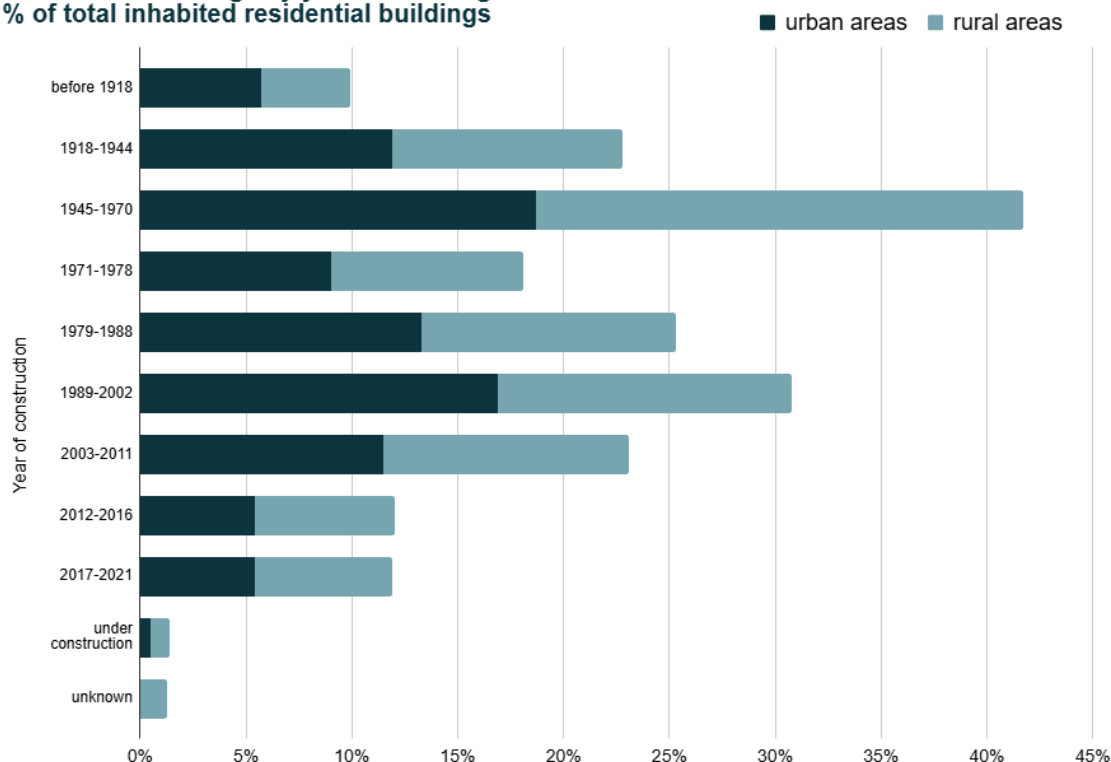


Figure 3. Residential buildings by year of building construction divided into urban and rural areas (percentage share of total inhabited residential buildings), as of 31 December 2021. Source: SP.

The age structure of buildings is also influenced by location. The age of buildings can vary significantly depending on the voivodeship. The oldest buildings, i.e. those built before 1918, are most numerous in the voivodeship of Lower Silesia, Lubusz and Opole. Every tenth building was built between 1918 and 1944, with the largest number located in Lower Silesia and Silesia, and the smallest number in Podlaskie and Świętokrzyskie. Almost 30% of buildings were built between 1945 and 1978. The largest number of buildings from this period are located in the provinces of Mazovia and Silesia, and the fewest in Lubusz. New buildings, constructed after 2017, account for the smallest percentage (6.1%) of Polish residential buildings.

In Poland, the vast majority of residential buildings are owned by individuals. This is true both in urban and in rural areas. In total, buildings owned by individuals account for 89.1% of all residential buildings. The second largest group are jointly owned flats, accounting for less than 8.7% of the total. The remaining 2.2% belong to housing



cooperatives, municipalities, the State Treasury, work establishments, social housing associations or other entities.³ Another interesting aspect is the rental of residential space. According to Eurostat, 87.3% of people in Poland live in owner-occupied flats rather than rented accommodation. This is higher than the European Union average of 69.2%.⁴

One of the largest and most important databases available in Poland is the Land and Building Register (LBR), which is maintained by local authorities. The data is primarily collected and maintained by district administration authorities – district governors and mayors of cities with district rights – which results in 380 entities responsible for maintaining this database. They use various IT tools to collect and manage the data available in the LBR. The main instruments are WMS (Web Map Service) and WFS (Web Feature Service) network services, which enable access to and downloading of geographic data and the generation of cadastral maps. The information contained in the database covers a much broader scope than housing, but it can also be useful for analyses related to the country's building stock. The LBR provides data on, among other things, the number of buildings and dwellings, area (usable, built-up), age, function and technical condition of buildings. It can also be used to carry out slightly more advanced analyses, using data on, for example, flood risk or information on whether given buildings are connected to the water, gas or heating networks. The database is used, among other things, in the implementation of tasks related to economic planning and spatial planning. Consumers of LBR data include district courts, municipalities, real estate agents, property managers, property appraisers and construction companies.

An example of good practice in the collection and dissemination of data on building resources and related topics is the map service of the capital city of Warsaw (www.testmapa.um.warszawa.pl). This map service provides maps containing a wealth of information useful in planning processes or in assessing the modernisation potential of buildings. Among other things, maps are available on land ownership, local spatial development plans, monuments, noise and renewable energy sources.

³ SP, *Housing conditions in Poland according to the results of the National Population and Housing Census 2021*

⁴ Eurostat (2024) Housing in Europe



2.2. Energy performance data

The most important source of data on the energy efficiency of buildings in Poland is the Central Register of Energy Performance of Buildings (CREPB), maintained by the Ministry of Development and Technology. The register contains a list of energy performance certificates (EPCs), which provide general information on the energy performance of buildings. The following data is provided: annual useful energy demand, annual final energy demand, annual non-renewable primary energy demand, share of renewable energy sources in annual final energy demand, and unit CO₂ emissions. The methodology assumes that the calculations take into account the building's heating and ventilation requirements, hot water preparation and cooling; when issuing certificates for non-residential buildings, built-in lighting should also be included. EPCs are required for new buildings and premises put into use and existing ones sold or rented. Existing buildings and premises used 'for own use' do not need to have an EPC. For this reason, not all buildings and premises in Poland are included in the CREPB and data on their energy performance is often unknown.

It is also worth mentioning that EPCs are not always prepared for the entire building. In cases where premises in one building have different owners, it is possible that each premises has a separate EPC. This can also lead to potential inconsistencies and mistakes, for example when each EPC is prepared by a different person. The accuracy and quality of certificates depend to a large extent on the author and the assumptions they make, as well as the degree of accuracy of the calculations. The calculation methodology imposes basic rules, but allows for a lot of freedom, which results in varying quality of the documents prepared. Poor quality of input data also affects the accuracy and reliability of the EPC prepared.

Based on the national building renovation plan, it is possible to describe in more detail the types and age structure of buildings included in the CREPB. The analysis carried out there focuses on buildings and does not take into account the EPCs of parts of buildings (such as individual premises). At the time of the analysis carried out in the national building renovation plan, there were 2,009,202 EPCs in the CREPB, including 526,192 for entire buildings. Figure 4 shows the percentage share of EPCs for each type of building in the analysed group. Most documents (over 85%) were drawn up for residential buildings.



The second largest group are public buildings (10.60%) while EPCs for other types of buildings account for 4.28%.⁵

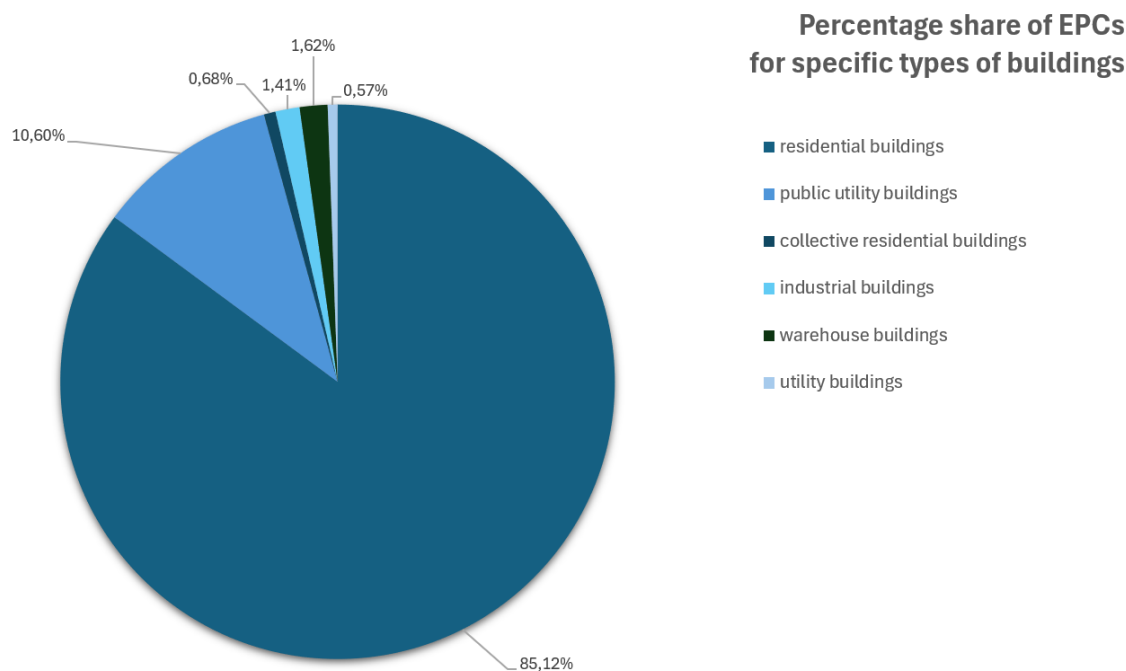


Figure 4. Percentage share of energy performance certificates for specific types of buildings. Source: National Energy Conservation Agency, 2024.

For the residential buildings analysed, the median and weighted averages of the primary energy indicator and specific CO₂ emissions are presented, broken down into groups depending on the year of commissioning of the building. Figure 5 and Figure 6 present data for single-family buildings, while Figure 7 and Figure 8 present data for multi-family buildings.

⁵ National Energy Conservation Agency (2024) *National building renovation plan*

Median and weighted average of the EP indicator [kWh/(m²rok)]



Figure 5. Median and weighted average of the annual primary energy demand indicator for single-family residential buildings by year of commissioning. Source: National Energy Conservation Agency, 2024.

Median and weighted average per unit area of CO₂ emissions [t CO₂/(m²rok)]

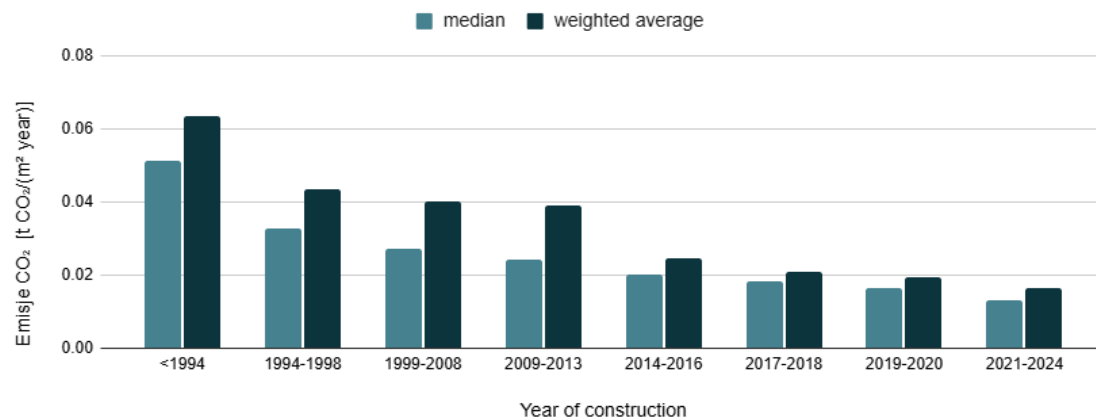


Figure 6. Median and weighted average per unit area of CO₂ emissions from single-family residential buildings depending on the year of commissioning. Source: National Energy Conservation Agency, 2024.

Median and weighted average of the EP indicator [kWh/(m²rok)]

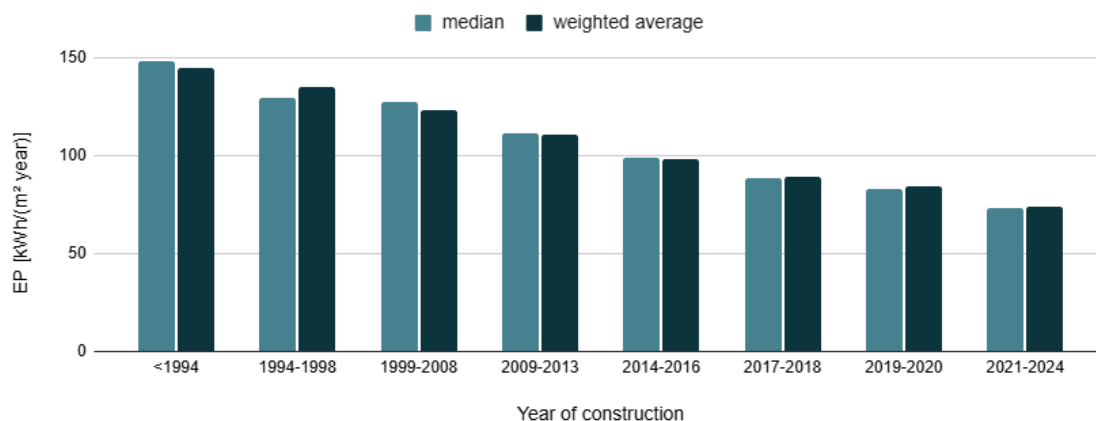


Figure 7. Median and weighted average of the annual primary energy demand indicator for multi-family residential buildings by year of commissioning. Source: National Energy Conservation Agency, 2024.

Median and weighted average per unit area of CO₂ emissions [t CO₂/(m²rok)]

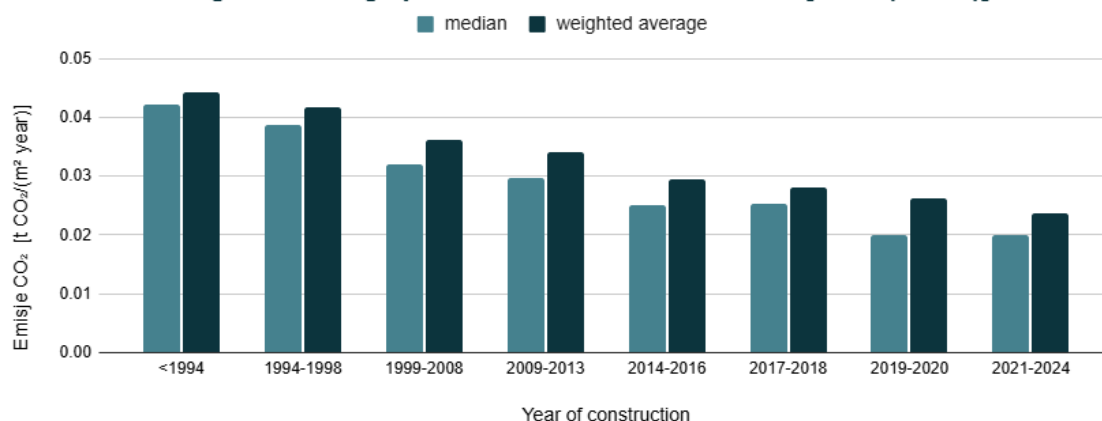


Figure 8. Median and weighted average per unit area of CO₂ emissions from multi-family residential buildings depending on the year of commissioning. Source: National Energy Conservation Agency, 2024.

Both single-family and multi-family buildings show a downward trend in both parameters. Both the primary energy indicator and unit CO₂ emissions are lower for newer buildings. Because only the median and weighted average are presented above, there may still be buildings with exceptionally low or high parameters in each group. However, the general relationship, which should be true for a large proportion of the buildings analysed, shows that the more recent the building, the lower the primary energy and CO₂ emission values. This may be due to the introduction of regulations on the



energy efficiency of buildings in Poland and throughout the European Union, as well as the growing awareness of designers, investors and the general public on issues related to energy in buildings, sustainable development and climate change. It should be noted that the values presented are mostly calculated values and not actual values.

As of 1 July 2025, there are 2,445,345 EPCs for buildings in the CREPB. The requirement to prepare an EPC for rented and sold properties has been in force since the implementation of the certificate system in Poland, but it was reinforced by an amendment to the law on 28 April 2023. This is reflected in the number of documents uploaded to the CREPB. Figure 9 shows a summary of the annual number of EPCs issued from 2021 to 2025. In 2023, there was a significant increase of 623% compared to the previous year. The number of EPCs prepared in 2024 is similar to that of 2023 and amounts to 784,032. The latest figures for 2025 show that 331,012 EPCs had been issued by 1 July.

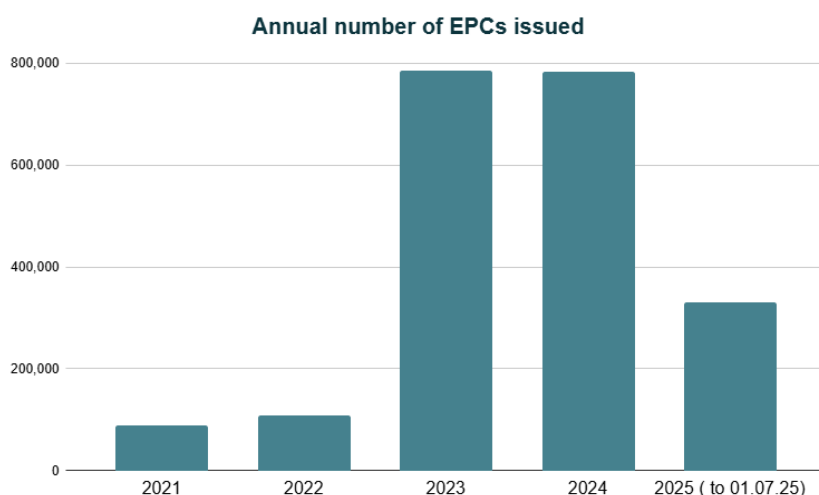


Fig. 9. Annual number of energy performance certificates issued, own study based on data from CREPB

Detailed, up-to-date data on the number of EPCs issued for specific types of buildings (e.g. residential) is not publicly available. There is also a lack of publicly available data on the age structure of buildings included in the CREPB. A large number of buildings constructed after 2009 will have an EPC, as this is when EPCs were introduced in Poland. A study published by the Economic Analysis Department of Pekao B.P. provides information on the number of certificates in relation to the number of dwellings,

depending on location.⁶ Figure 10 shows the number of EPCs per 1,000 dwellings. It can be seen that more EPCs were issued in the western than the eastern part of Poland. The number of EPCs issued is consistent with market transaction activity, which means that more reports of this type are issued in large cities and tourist areas.

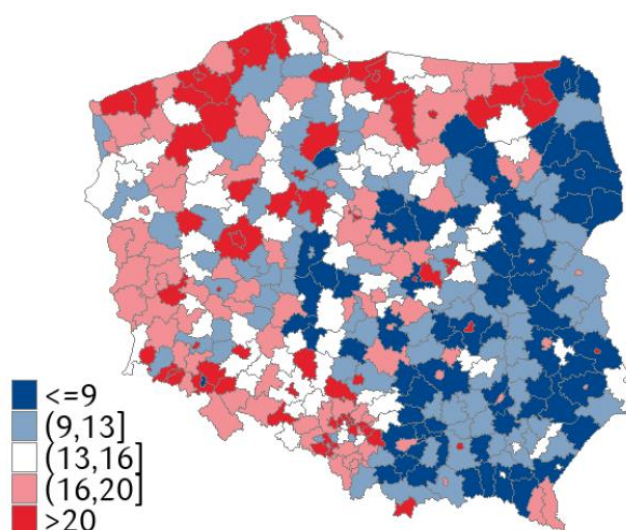


Figure 10. Number of EPCs per 1,000 dwellings since the introduction of mandatory energy performance certificates. Source: PKO Bank Polski.

Another source of data on the energy performance of buildings is the Central Register of Building Emissions (CRBE) administered by the General Building Control Office (GBCO). This contains information on heat sources and emission sources in buildings. It applies to residential and non-residential buildings. The register does not contain quantitative data on energy consumption related to a specific heat source, but only information on the heat and combustion sources used by a given building. There is also no distinction between main and, for example, peak sources, only information on what sources are present in a given building. The CRBE is created on the basis of declarations submitted by building owners and managers. Submitting such a declaration is mandatory for buildings with a heat/fuel combustion source with a nominal capacity of up to 1 MW. Importantly, the CRBE is not only used to collect data, but also serves as a tool for citizens who can use it to apply for funding to replace old, inefficient heating sources in their buildings. The

⁶ Economic Analysis Department of PKO Bank Polski S.A., *Housing stock through the prism of energy performance certificates* (pl. Zasób mieszkaniowy przez pryzmat świadectw energetycznych)



register aims to support digitisation, low-carbon policies and air quality improvement. CRBE provides less accurate data than CREPB, but it can still be an important tool in creating building modernisation plans.

A voluntary activity within the CRBE is to carry out an inventory of the technical parameters of a building. This involves collecting information related to heat loss and CO₂ emissions in the building. The inventory is carried out by completing an inventory form, which can be done independently or with the help of a specialist (order on the GBCO website or during a chimney inspection). Thanks to the CRBE inventory, it is possible to automatically generate a simplified energy efficiency analysis, which focuses on heat transfer coefficient, annual useful, final and primary energy demand indicators, recommended annual energy demand indicator and CO₂ emissions of the building. This is not a mandatory element of the inventory, but it is worth considering as it provides simplified results that can aid the decision-making process when analysing heating cost reduction or planning thermal modernisation renovations.⁷ The results of such simplified analyses may contain a significant margin of error, and for larger and more complex investments, it is advisable to consider developing a more accurate energy model as part of the design and decision-making process.

As of 30 June 2025, the number of declarations submitted to CRBE is 9,627,232, and the number of building and premises inventories is 4,622,166.⁸ The register also contains information on the structure of heat sources, with gas heat sources accounting for the largest share (28%), followed by solid fuel boilers with manual fuel feeding (17%) and electric heating (15%).⁹ A current breakdown of the data into residential and non-residential buildings is not publicly available. It is only possible to analyse data from 20 April 2022, when the total number of CRBE declarations was only 3,060,044, of which 96.2% were residential buildings and the remaining 3.8% were non-residential.¹⁰ However, a more detailed analysis can be made of the structure of single-family buildings for the comparison of central heating sources, as GBCO publishes reports containing information on the percentage of single-family buildings using a given type of heat

⁷ CRBE GBCO, *Inventory of technical parameters of a building – what it is, what it involves and what benefits it brings*

⁸ GBCO, *CRBE in numbers*

⁹ GBCO, *Heat source structure*

¹⁰ GBCO, *CRBE Latest statistics, 20.04.2022*



source. The version of the report published on 1 July 2025 states 55.33% of single-family buildings use only solid fuel heating sources, while 27.95% use only low-emission heating sources.¹¹

Recent government action may have undermined the credibility of the CRBE. In 2022, the Polish government introduced financial assistance in the form of a coal allowance. Income criteria were not taken into account in the process of granting this allowance, and the purchase of coal with the money granted was not controlled in any way. A prerequisite for obtaining the coal allowance was to register or report the heat source to the CRBE. A concerning aspect of the CRBE register is that it is not necessary to specify the main heat source – only the installed heat sources need to be reported, without distinguishing between main and peak sources. Some of the declarations submitted solely for the purpose of obtaining the coal allowance may have reduced the credibility of the CRBE. It is likely that some of the declarations were submitted for buildings where a coal source exists but is not used at all or is only a peak source, solely for the purpose of obtaining a government subsidy. The purchase of coal was not really verified in any way, which may have further encouraged some citizens to include unused coal sources in their declarations, reducing the credibility of the CRBE.¹²

2.3. Socio-economic data

The main sources of data on the socio-economic situation of Polish housing are reports prepared by Statistics Poland (SP), which focus, among other things, on household budgets and the housing situation in the country. They also address issues related to building systems, which directly translate into comfort of use, and discuss social and professional groups living in specific types of buildings.

The financial situation of households varies depending on whether they are located in a large urban or rural area. In a subjective assessment, large cities with over 500,000 inhabitants fare best (65.1% good/fairly good financial situation in 2023), while rural areas fare worst (51.4% good/fairly good). However, this assessment may be influenced by many factors that cannot be clearly classified or ranked.¹³

¹¹ GBCO, *Structure of single-family buildings for comparison of central heating sources*

¹² Jakubiec, M. *CRBE meaningless due to carbon allowance?*

¹³ SP, *The situation of households in 2023, in light of the results of the household budget survey*

Subjective evaluation of financial situation of households by place of residence in 2023

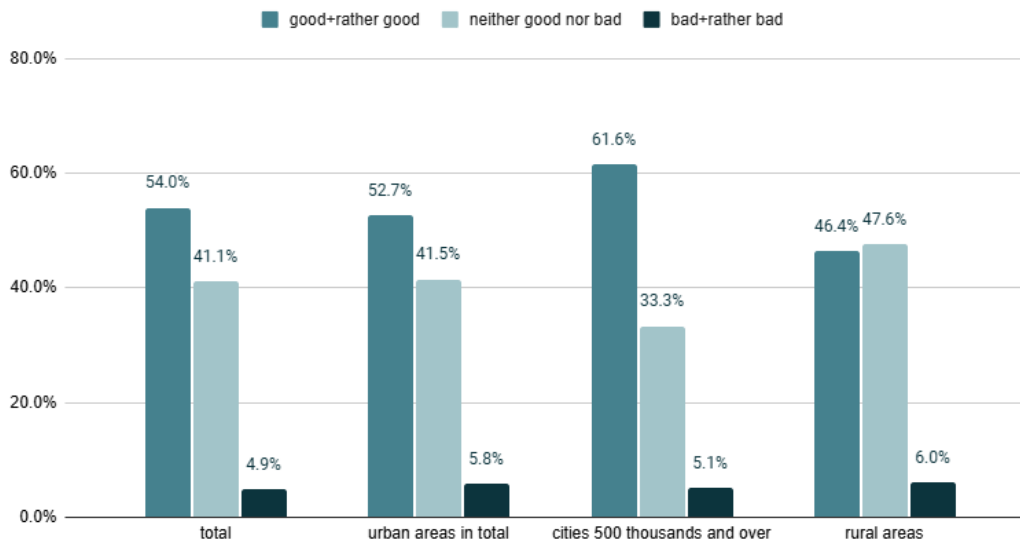


Figure 11. Subjective evaluation of financial situation of households by place of residence in 2023. Source: SP.

Dwellings in Poland differ in terms of their installed equipment. Figure 12 shows the percentage of dwellings equipped with various types of systems, broken down into urban and rural areas. Access to water supply, central heating or simply a bathroom significantly affects the comfort of use of buildings and, consequently, the quality of life of residents. In addition, in the context of the energy performance of residential buildings, information on access to central heating and mains gas is important. This may determine possible future strategies for improving the energy efficiency of these buildings. Approximately 85% of flats in Poland have access to central heating, while approximately 59% of flats have access to mains gas.¹⁴

¹⁴ SP (2023) *Housing economy in 2023*

Dwellings equipped with installations as a % of total amount of dwellings in 2023

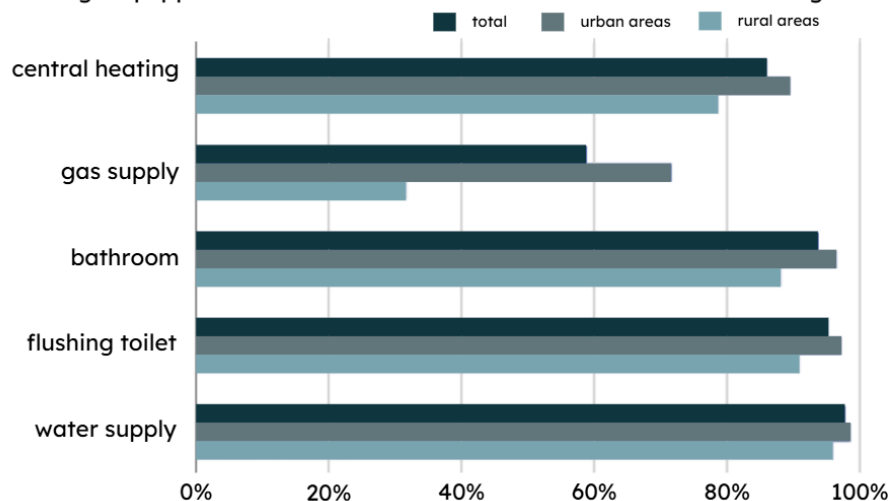


Fig. 12. Dwellings equipped with installations as a percentage of total amount of dwellings in 2023. Source: SP (2023)

Most households are located in multi-family buildings (50.2%), followed by detached single-family buildings (43.5%), and the remaining 6.1% are single-family terraced or semi-detached buildings. The socio-economic group most likely to inhabit multi-family buildings are pensioners (56.4%), while farmers are the least likely (1.9%). By contrast, 94.8% of farmers live in detached single-family houses (94.8%), compared to 38.1% of pensioners. Employees and self-employed people mainly live in multi-family buildings, but the differences are much smaller than in the case of farmers or pensioners.¹⁵

¹⁵ SP, *Household budget in 2023*

Households occupying particular types of buildings by socio-economic groups in 2023

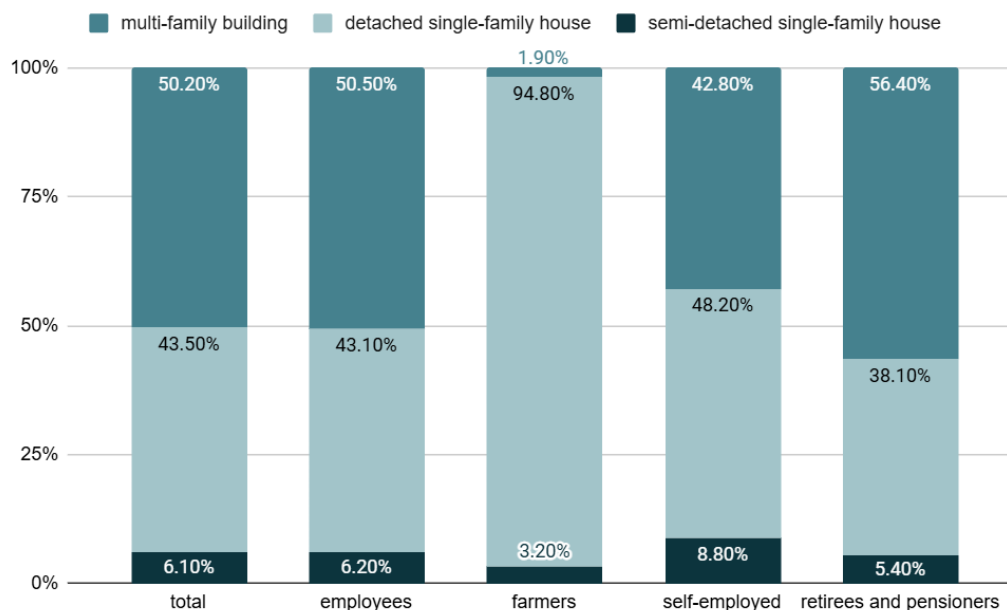


Figure 13. Households occupying particular types of buildings by socio-economic group in 2023. Source: SP (2023)

The comfort of inhabited buildings is influenced by numerous factors. These include access to utilities, but also thermal comfort, proximity to green areas, acoustic comfort and the presence of architectural barriers. Based on SP's 2023 household budget survey, households can be divided into five quintiles based on disposable income, from least wealthy households (20% of people with the lowest incomes) to the wealthiest (20% of people with the highest incomes). The greatest differences between the quintile groups are noticeable in relation to the location of buildings. Approximately 7.7% of buildings inhabited by the lowest income group (first quintile) are located in areas with special advantages, such as access to nature, cultural services and quality public transport, while for the fifth quintile (highest-income group) this figure is 10.8%. Similarly, 5.8% of buildings inhabited by households in the lowest income group are in areas with poor infrastructure, compared to only 2.5% by the wealthiest. Aspects related to adequate access to technical and sanitary conditions, thermal and acoustic comfort, and access to green areas are similar for the analysed quintile groups.¹⁶

¹⁶ SP, *The situation of households in 2023, in light of the results of the household budget survey*.

Subjective evaluation of occupied dwelling in the first and fifth quintile group in 2023

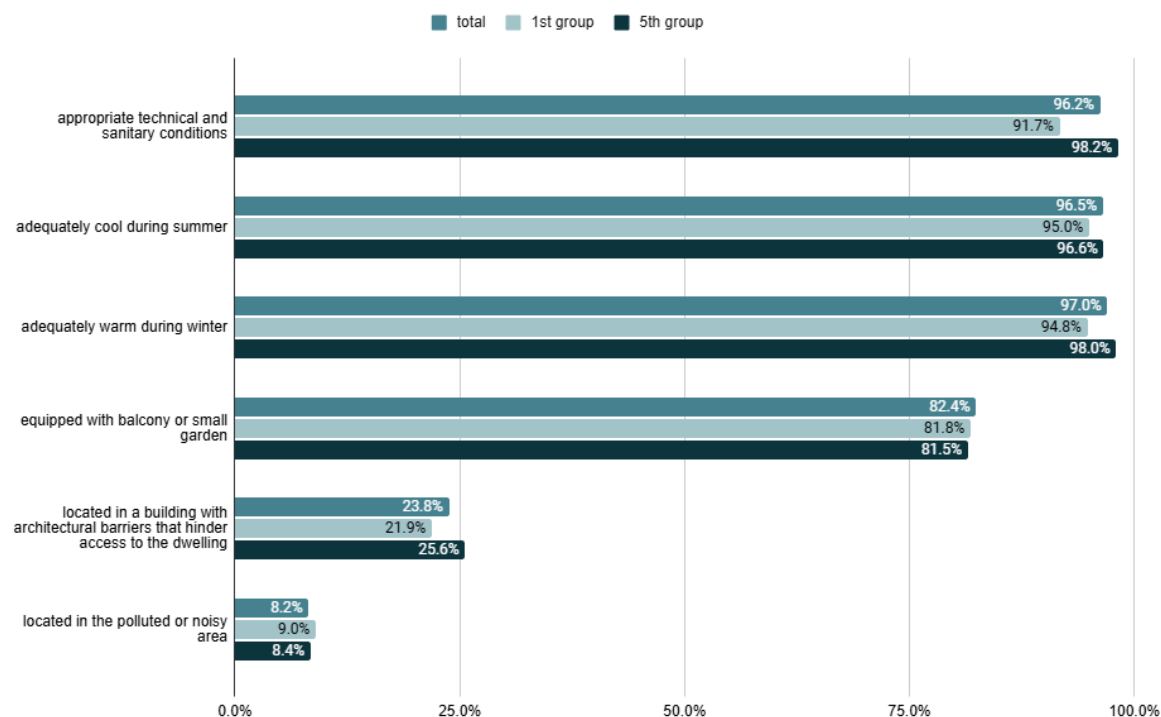


Figure 14. Subjective evaluation of occupied dwelling in the first and fifth quintile group in 2023. Source: SP (2023).

2.4. Main gaps and challenges

The information described above has been selected based on available data. However, the studies cited may also be subject to a greater or lesser degree of error. This is not due to a lack of accuracy in their preparation, but to the difficulty, or often even the impossibility, of obtaining reliable data on building resources in Poland. Data sources are often limited in scope, concern only a few areas, or the accuracy of the data may leave much to be desired. The availability of information on buildings in Poland is increasing every year, but there are still numerous inaccuracies and gaps in the data, as well as challenges that need to be addressed to improve the current situation.

In order to identify the existing gaps and challenges more precisely, three thematic groups related to building data are highlighted below.



Firstly, it is often difficult to obtain data on the building stock. The degree of digitisation of this data is increasing, but there is still much to be done. A lot of information is only available in paper form in various archives, which makes it hard to access and significantly increases the time it takes to work with the data.

In addition, in the case of paper data, there is often a lack of standardisation – different buildings may have different data ranges. This is less of a problem in the case of digital data, where, for example, the scope of the project should be more similar. The timeliness of the data can also leave much to be desired, as not all relevant information is updated on a regular basis. Studies are often published once every few years, which can lead to the need to work with data that is not necessarily up to date. In some cases, finding reliable information is also a challenge, as different sources may sometimes differ. This may be due to the year of publication, but also to the accuracy or scope of the studies, which are not always clearly described. Difficult access to data due to its ambiguous ownership can also be problematic. Not all information about buildings is publicly available, and it is often not easy to determine which institution, or person has information on a given topic, and accessing it may involve costs or be impossible.

Data on the energy efficiency of buildings also requires attention. The main issue here is often the lack of any reliable information for older, non-modernised buildings, which are likely to have low energy efficiency. There is an obligation to prepare EPCs for buildings sold and rented, but older buildings intended for own use very often do not have an EPC and data on their energy consumption is unknown.

The methodology for preparing EPCs is not without its flaws. In the case of residential buildings, it focuses only on heating and ventilation, cooling and hot water preparation, ignoring, for example, the energy needed for lighting. The accuracy of the systems taken into account also leaves much to be desired, with many aspects being calculated on an indicative basis, which can lead to oversimplification and unrealistic results. Similarly, when considering heat gains and losses through building envelopes, the monthly method is used for calculations, which is not the most accurate. Also, the outdoor temperature values used by many were prepared years ago and do not reflect current temperature conditions – the temperatures assumed in winter are too low, and in summer they are underestimated.



It is possible to model energy consumption in a building more accurately by using the hourly method and expanding the range of aspects related to energy consumption that are taken into account. However, in reality, only a few buildings undergo this type of analysis, especially in the case of residential buildings. More detailed analyses are more often carried out, for example, for public buildings, where both the budget and the volume are significantly higher. More accurate studies may be available for residential buildings covered by one of the multi-criteria certification systems, where such analyses allow points to be obtained in these systems. However, this applies to a clear minority of newer residential buildings, excluding numerous older buildings. Due to the lack of publicly available, regularly updated data describing the age structure of buildings with EPCs, it is impossible to provide accurate quantitative data. It can be concluded that a large proportion of buildings constructed after 2009 have an EPC, as the document was introduced in Poland in that year. The data presented above, based on the national building renovation plan, can be considered the most up to date. Residential buildings account for approximately 85% of all EPCs issued and entered into the CREPB, with single-family residential buildings accounting for 66.88% of registered EPCs and multi-family residential buildings 18.25%.

For socio-economic data, a significant problem is the lack of availability of information for smaller urban areas or rural areas. Most data can be found for large cities, while studies on other areas are few and far between, often based on a small amount of data or on an approximation created on the basis of data for neighbouring larger agglomerations. Another aspect is the high degree of subjectivity of the data – it is often impossible to say unequivocally whether a given piece of information is true or not, because socio-economic data is often measured in a subjective way, based on opinion or complex methodology. Similarly, in multi-criteria analysis it is impossible to achieve complete fairness in judgement, as it is always based on greater or lesser simplifications or prioritisation of the parameters being compared. Often, it is not possible to verify the accuracy of responses, as in the case of surveys, where there is never complete certainty that the respondent is answering honestly. For this reason, it is important to use statistical analysis tools when analysing socio-economic data. However, even this does not always allow all potential errors to be ruled out.

Regardless of the thematic group, the main challenges primarily concern the accuracy, quality and accessibility of data related to residential buildings in Poland. Data availability



varies significantly depending on the age of the building, which can be problematic, especially in the case of older buildings. The degree of digitisation of information on Polish building resources should also be increased, which would facilitate the work of numerous industries and help building residents. It is also worth mentioning that some data is updated relatively infrequently (e.g., every few years), which may cause inaccuracies in further analyses using data from different periods.

In summary, there are numerous data sources and databases on Polish building resources, and in many cases most of the necessary information is available, but the current tools still require changes that are worth working on. A priority should be to combine the existing databases into a single system and automate the process of processing and verifying the data entered.



3. Governance of building stock data in Poland

The aim of this section is to provide an overview of how the building stock data in Poland is collected and managed. This chapter describes main institutions and organisations responsible for data management, as well as main gaps and challenges associated with governance of building stock data in Poland.

3.1. Policy and legislative context

Management of building stock data in Poland is dependent on EU policies. Two of the most important pieces of legislation when it comes to buildings and energy are the Energy Performance of Buildings Directive (EPBD) and Energy Efficiency Directive (EED). These policies apply to the whole EU but in many aspects Member States are required to prepare their own more specific laws and regulations based on general goals and articles contained in the EPBD and EED.

The EPBD aims to achieve a fully decarbonised building stock by 2050. As buildings are the single largest energy consumer in Europe, the EPBD aims to lower energy consumption and introduce more renewable energy sources in buildings. This will lead to a healthier indoor environment and make housing more sustainable and affordable. The revised EPBD from 2024 emphasises the importance of increasing the rate of renovation in the EU, by prioritising the worst-performing buildings. The directive focuses on four main areas:

- Renovation – each Member State must develop its own national building renovation plan for both residential and non-residential building stock. In the case of residential buildings, the average primary energy should be reduced by 16% by 2030 and 20-22% by 2035. The goal is that at least 55% of the decrease in the average primary energy use is achieved through the renovation of the worst-performing buildings. EPCs are meant to be a tool that can facilitate preparation of the renovation plan, improve citizens' awareness about energy performance of buildings and help in obtaining financing from banks.



- Decarbonisation – the EPBD sets the zero-emission building as a new standard for new constructions. Another requirement is that new buildings should be designed to optimise the potential for photovoltaic or solar thermal installations.
- Modernisation and digitalisation – this area is focused mainly on sustainable mobility and building automation and control. It mentions recharging points for electric vehicles and bicycle parking spaces. In addition, it aims to digitise and enhance existing EPC databases.
- Financing and technical assistance – the EPBD aims to lower energy poverty through supporting vulnerable households and obliges EU countries to provide safeguards for tenants, e.g. rent support, caps on rent increases. It also mentions one-stop shops where building owners can seek advice on renovations.

The goal of the Energy Efficiency Directive is to reduce the EU's greenhouse emissions by at least 55% (compared to 1990) by 2030. The revised version of the EED from 2023 establishes 'energy efficiency first' as a fundamental principle of EU energy policy. For the first time, Member States must always consider energy efficiency in all relevant policy and major investment decisions in both energy and non-energy sectors. In terms of the building stock, EED principles align with those already mentioned in the EPBD. Like the EPBD, the EED supports prioritising vulnerable consumers and worst-performing buildings. It encourages actions to help those affected by energy poverty and to raise awareness of all consumers on topics related to energy efficiency.

In Poland, the most important document regarding the EPBD and EED is the Act on Energy Performance of Buildings, which provides principles for the preparation of EPCs and rules for operating the Central Register of Energy Performance of Buildings. In addition, Journal of Laws 2014, item 1200 sets out the requirements for the inspection of heating and air-conditioning systems in buildings and specifies how to develop a national action plan to increase the number of low-energy buildings.

The implementation of the EPBD in Poland, both the previous and the current version, is being carried out in such a way as to meet the minimum requirements. There is a lack of comprehensive solutions that cover various sectors and educational campaigns aimed at the public explaining the context and benefits of implementing the new regulations, such as EPCs.



In its assessments, the European Commission identified several significant gaps and problems in Poland's implementation of the EPBD:

- Poland has not yet fully implemented the provisions prohibiting financial support for fossil fuel boilers, which is a requirement of the amended EPBD. The deadline for implementing this restriction expired on 1 January 2025, and the European Commission has initiated infringement proceedings against Poland due to this delay. The Commission has called on Poland to transpose these provisions urgently, emphasising the need to end support for coal and gas boilers.
- The Commission emphasises the requirement to calculate total primary energy consumption (including renewable and non-renewable energy) for the assessment of energy efficiency in buildings in accordance with the new zero-energy building standards. Meanwhile, in Poland, the non-renewable part of primary energy is still primarily taken into account, which may lead to incorrect assessments and violations of EU requirements.
- The European Commission draws attention to problems with the interpretation and implementation of regulations concerning so-called 'remote' energy (renewable energy supplied by a network outside the building), which is not treated in the same way as locally produced renewable energy, posing challenges for Polish regulations and practices. The lack of appropriate definitions and implementation methodologies, e.g. energy classes, in Polish law may also lead to violations of EU law and hinder the achievement of the 2050 decarbonisation targets for buildings.

The implementation of the EED in Poland is seen as a gradual process that needs more work and legal and organisational changes. Poland is meeting the directive's goals through a system that requires energy efficiency, including energy efficiency certificates and energy audits, which have been mandatory for large companies since 2016. Measures are being taken to increase energy efficiency, in particular by imposing obligations on public institutions to reduce their energy consumption by 1.9% annually compared to 2021.

Currently, the law is being adapted to the amendment to the EED of 2023 (2023/1791), which imposes, among other things, the obligation to implement energy management systems in companies consuming more than 85 TJ of energy per year and the obligation



to conduct audits for companies consuming more than 10 TJ of energy per year. This indirectly contributes to improving energy efficiency in the buildings of these companies as well.

Legal changes are being prepared to, among other things, streamline the verification of energy savings and introduce certified energy efficiency auditors. There are also plans to digitise the energy efficiency certification system and strengthen the energy efficiency monitoring system in the public and private sectors.

As in the case of the EPBD, there is a lack of full awareness of the objectives of the EED. Not all entities fully understand the requirements of the directive and the benefits it brings. Despite progress, Poland still needs to intensively develop the renewable energy sector in order to achieve its emission reduction and renewable energy share targets. This is particularly important for businesses. Existing regulations do not encourage increased production of energy from renewable sources, e.g. additional fees for direct line transmission or the need for lengthy agreements on new renewable energy installations.

The transformation of the heating sector in Poland, which is mainly based on coal, is a very big challenge. District heating in Poland plays a key role in meeting heating needs. It covers 52.2% of households and is used by nearly 70% of city dwellers. According to data from the Energy Regulatory Office (URE), coal has a dominant share in the structure of fuels used in heating (61.2%), although this share is gradually decreasing. At the same time, the share of gas fuels, which reached 13% in 2023, and renewable energy sources (14.4%) is growing. The key aspects of this transformation are:

- Increase in the share of renewables in heat production: The national energy and climate plan predicts that heat production from renewables in district heating will increase to 36.7% in 2030 and as much as 67.6% in 2040. This includes the use of biomass, biomethane, heat pumps, wind and solar energy.
- Electrification and energy efficiency: The heating system is to be based on 50% renewable energy sources, waste heat or cogeneration. The implementation of smart grids, energy storage facilities and dynamic tariff programmes is planned to improve the efficiency and flexibility of the system.
- Investments and modernisation: Expenditure on the transition is estimated at over PLN 200 billion, and investments totalling PLN 1.1 trillion are planned by



2030, aimed at expanding renewable energy capacity, modernising the grid and thermally upgrading buildings.

The implementation of the EED is crucial for accelerating the decarbonisation of the economy and construction sector and achieving EU targets, but it requires full transposition of the provisions into Polish law by 11 October 2025, very large financial outlays and further development of energy management systems and energy efficiency audits.

3.2. National vs. local level

Building stock data is managed at both national and local level, depending on the level of detail and type of data. On a national level more aggregated and average data is available, while on a local level it is possible to access more specific information.

On a national level the main entity responsible for collecting and managing data on building stock in Poland is Statistics Poland. SP reports primarily contain statistical and quantitative data, allowing the overall situation in the country to be assessed. The reports contain many values averaged over the whole country or individual voivodeships. The data provided by SP originates mainly from annual construction reports, censuses and administrative registers. A definite advantage of SP studies is that many are updated on an annual basis, which allows easy comparison between individual years and identification of numerous dependencies between the analysed parameters.

On a local level the Land and Building Register (LBR) is an important source of information, maintained by local authorities. The LBR is maintained by heads of counties, which results in 380 units being responsible for the data. The LBR database consists of a service that enables work on maps and more detailed analysis of specific cases. The LBR is updated on the basis of surveying work, building permits, administrative decisions and field inventories. The multitude of sources can cause issues with the coordination of information transfer, which sometimes prolongs the data update process. However, a major advantage of the database is its interactivity and easy access, which allows for numerous analyses and the acquisition of a lot of valuable information, as the scope is relatively broad.



In terms of cities, building stock data is usually managed by city halls and the data format varies depending on the specific building. Not all data is digitised and a lot of information about the building stock is still only available in paper form. This data is often located in various archives. As discussed in section 2.4 above, this makes it hard and sometimes impossible to access.

In addition, on a local level some cities have developed city-specific tools that can be used to access building stock data. A good example is Warsaw's map service (www.testmapa.um.warszawa.pl). The service provides maps containing data useful in planning processes or in assessing the modernisation potential of buildings. Another example is Cracow's Urban Spatial Information Services (<https://msip.krakow.pl/>), which provides access to numerous maps showing e.g. property prices, solar potential, noise and public transportation.

3.3. Main gaps and challenges

Although both the EPBD and EED are being implemented in Poland, this is a gradual process that requires further action and legal and organisational changes. The process focuses mainly on meeting the minimum requirements set out in the directives, which significantly limits the potential for change and positive impacts that could result from their implementation in Poland. Full implementation of both directives is crucial for accelerating the decarbonisation of the construction sector and economy in general, as well as achieving EU goals.

At both national and local level, there is a clear need to increase digitisation of building stock data. This is particularly problematic in the case of older buildings, where documentation is often incomplete and only in paper form. The lack or poor quality of data on certain buildings significantly hinders work on them. Effective renovation requires a thorough assessment of the current condition, which is not always possible due to the poor quality of data.

Another issue is the lack of tools and information enabling automation of the building assessment process. Tools that can enable comparisons between buildings are also not available. In addition, it is worth considering how to encourage citizens to participate more in decision-making processes. Activities such as public consultations can help



assess the current needs of the community, which can facilitate the creation of renovation plans better tailored to the everyday needs of the people.



4. Key concepts and definitions

The following section is focused on three key topics: vulnerable consumers, energy poverty and worst-performing buildings. Both general and country-specific definitions of the concepts are presented, along how they are measured. Main gaps and challenges for each concept are discussed in the last subsection.

4.1. Vulnerable consumer

In the context of buildings and energy, vulnerability is associated with energy poverty. Energy vulnerability can be described as a type of supply vulnerability, where a consumer is unable to afford an essential service (in this case energy) or has less choice within an affordable price range. For households, the main focus is on heating and electricity, which are both crucial to fulfil basic daily needs. The amount and price of energy have a significant impact on people's lives. As stated in the Electricity Markets Directive and the Gas Directive, EU Member States are required to take measures to address energy poverty, e.g. provide benefits through the social security system.

Two financial subsidy programmes in Poland are worth mentioning in connection to vulnerable consumers: the Clean Air Programme and Stop Smog Programme. Both are primarily aimed at people with lower incomes and those vulnerable to energy poverty.

The Clean Air Programme is focused on improving air quality and energy efficiency in buildings by replacing inefficient heat sources and retrofitting homes. Individuals who own or co-own a single-family house or a separate residential unit within it with a separate land and mortgage register may apply for funding. In addition, they must meet the income criteria specified in the programme, and in the case of the highest subsidy, they must also meet the requirements regarding the energy standard of the building. There are three subsidy levels, depending on income thresholds:

- Basic level – up to 40% subsidy, income threshold: PLN 135,000 per year
- Increased level – up to 70% subsidy, income threshold per household:
 - o PLN 2,250 per year per person in a multi-family building
 - o PLN 3,150 per year per person in a single-family building



- o Annual income from self-employment up to 40 times the minimum wage (From 1 January 2025 the minimum wage in Poland is PLN 4,666 gross)
- Highest level – up to 100% subsidy, income threshold per household:
 - o PLN 1,300 per year per person in a multi-family building
 - o PLN 1,800 per year per person in a single-family building
 - o Annual income from self-employment up to 12 times the minimum wage
 - o Receiving benefits (permanent, temporary, family, special care).

The subsidy is only available for one building/premises and can only be received once. It can be combined with other programmes but only if they relate to a different scope of the investment.¹⁷

The Stop Smog Programme is aimed mainly at those affected by energy poverty. It focuses on low-carbon projects implemented by municipalities in areas where anti-smog resolutions are in force. Subsidies for the elimination or replacement of heat sources with low-emission ones and for thermal modernisation in single-family residential buildings of the least wealthy can be applied for by municipalities, inter-municipal associations and counties, as well as the metropolitan association in Silesia. Applicants can receive up to 70% of the investment costs. The remaining 30% is their own contribution. Thanks to this, residents of municipalities located in areas where the so-called anti-smog resolution is in force can receive a non-repayable grant covering up to 100% of the project costs. The beneficiaries of the Stop Smog Programme are people who cannot afford to carry out thermal modernisation on their own (e.g. replacing furnaces, insulating their homes). The programme specifies that these are people whose average monthly income per household member does not exceed 175% of the minimum wage in a single-person household and 125% of this amount in a multi-person household.¹⁸

¹⁷ Clean Air Program - Q&A, <https://czystepowietrze.gov.pl/wez-dofinansowanie/pytania-i-odpowiedzi/nowy-program-czyste-powietrze-obowiazujacy-od-31-marca-2025>

¹⁸ Stop Smog 2.0 programme – new, improved rules from 31 March. www.gov.pl/web/arimr/stop-smog-20---nowe-lepsze-zasady-od-31-marca2

4.2. Energy poverty

Polish and EU definitions of energy poverty are similar. They both describe a comparable situation and focus on similar factors. Both definitions are stated below.

According to the Social Climate Fund Regulation from 2023 and the EED, energy poverty is *"a household's lack of access to essential energy services that provide basic levels and decent standards of living and health, including adequate heating, hot water, cooling, lighting, and energy to power appliances, in the relevant national context, existing social policy and other relevant policies, caused by a combination of factors, including but not limited to non-affordability, insufficient disposable income, high energy expenditure and poor energy efficiency of homes."*¹⁹

According to Statistics Poland, energy poverty refers to a situation where a household is unable to provide itself with sufficient heating, cooling, lighting, and energy to power appliances due to a combination of low-income, high-energy expenditure, and low energy efficiency of the building.²⁰

Energy poverty is a complex concept, and it should not be measured by a single indicator. There are numerous ways of assessing the severity of energy poverty and indicators compared focus on various aspects – from technical to subjective ones. We describe three approaches in further detail. The first is based on the EED. The second was created by the Energy Poverty Observatory (EPOV), while the last is the approach used by SP in reports on household energy consumption.

The EED presents four indicators that could be taken into account when assessing energy poverty:

- Inability to keep home adequately warm
- Arrears on utility bills
- Population living in a dwelling with a leaking roof, damp walls, floors and foundation, or rot in window frames or floor
- At-risk-of-poverty rate

¹⁹ European Parliament, *Energy poverty in the EU*

²⁰ SP, *Energy consumption in households in 2021*



The EPOV approach describes both primary and secondary indicators to measure energy poverty. The four primary indicators are:

- Arrears on utility bills
- Low absolute energy expenditure
- High share of energy expenditure in income
- Inability to keep home adequately warm.

As can be observed above, these indicators refer to similar issues: the EPOV focuses on financial aspects and thermal comfort of the indoor environment, while the EED refers also to the technical condition of buildings.

In the report on energy consumption in Polish households prepared by SP,²¹ five measures to evaluate energy poverty are described:

- Low income, high costs
- Double median of energy expenditure
- Ability to pay bills on time
- A building with a leaking roof
- Insufficient thermal comfort.

Figure 15 presents how these indicators have varied over time. The first two indicators can be described as objective ones. Low income, high costs focuses on energy costs and the material status of households, while the second indicator refers to households where actual energy expenditure is at least twice the median value in the population. The third indicator, an ability to pay bills on time, can be categorised as subjective. It is related to the severity of energy poverty, and it shows a downward trend through the years analysed. The fourth and fifth indicators are related to the technical and functional qualities of the buildings. They have similar values in 2021 and both show a significant decrease between 2012 and 2021.

²¹ SP, *Energy consumption in households in 2021*

Energy poverty indicators in 2012, 2015, 2018 and 2021

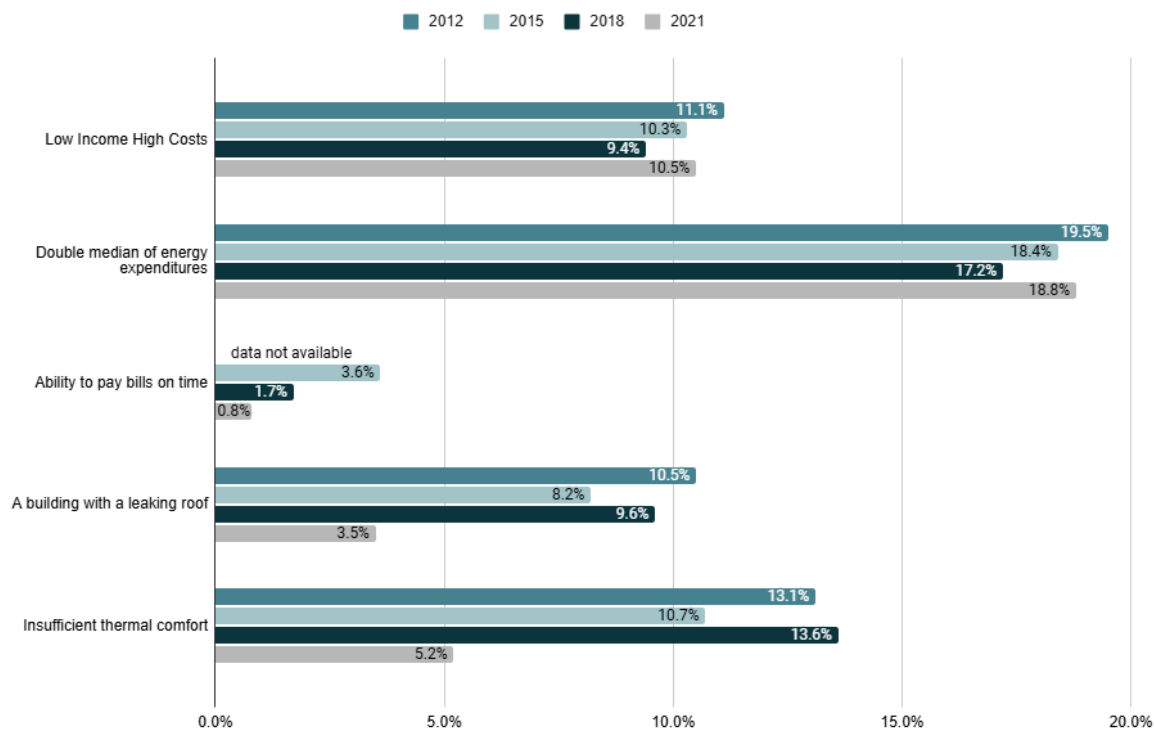


Figure 15. Energy poverty indicators according to SP in 2012, 2015, 2018 and 2021. Source: SP.

4.3. Worst-performing buildings

Worst-performing buildings are those that have the highest final energy consumption (in kWh/m²/year) of the national building stock. These buildings are often occupied by the most vulnerable groups in society.

Different types of energy demand can be distinguished. EPCs in Poland include three main annual energy demand indicators: useful energy, final energy and non-renewable primary energy. In most cases in residential buildings in Poland, worst-performing buildings can be identified as those with the highest final energy values for heating, ventilation, hot water preparation and cooling (if applicable). This indicator should also be the easiest for consumers to understand and compare, as it should correspond to the amount of energy stated in their bills.



Worst-performing buildings can also be associated with energy performance classes that are based on the annual non-renewable primary energy demand. Their aim is to provide an easy understanding about the energy standard of the building, allowing users to easily determine whether there is a need to improve the current condition of the building. In Poland, the idea of such classes was introduced in 2024, but their general use is planned to be mandatory from 2026. There are eight classes from A+ (best-performing) to G (worst-performing).

An amendment to the regulation on EPCs in Poland is planned for 2026. It adds a fourth energy demand indicator of net energy supplied – the difference between the final energy supplied and the final energy exported. The proposed amendment will introduce energy classes that can be assessed based on the non-renewable primary energy and net energy supplied demand indicators. Threshold values for both single-family and multi-family buildings are presented in Table 2 and Table 3 below.²²

Table 3. Energy class threshold values for single-family buildings

Threshold values for single-family buildings		
Energy class	Annual non-renewable primary energy demand indicator [kWh/(m ² year)]	Annual net energy supplied demand indicator [kWh/(m ² year)]
A+	PE ≤ 0	NES ≤ 0
A	0 ≤ PE ≤ 63	0 ≤ NES ≤ 57
B	63 ≤ PE ≤ 75	57 ≤ NES ≤ 65
C	75 ≤ PE ≤ 94	65 ≤ NES ≤ 81
D	94 ≤ PE ≤ 113	81 ≤ NES ≤ 97
E	113 ≤ PE ≤ 131	97 ≤ NES ≤ 113
F	131 ≤ PE ≤ 150	113 ≤ NES ≤ 129
G	150 < PE	129 < NES

²² Ministry of Technology and Development, *Draft Regulation of the Minister of Development and Technology on the methodology for determining the energy performance of a building or part of a building and energy performance certificates*

Table 4. Energy class threshold values for multi-family buildings

Threshold values for multi-family buildings		
Energy class	Annual non-renewable primary energy demand indicator [kWh/(m ² year)]	Annual net energy supplied demand indicator [kWh/(m ² year)]
A+	$PE \leq 0$	$NES \leq 0$
A	$0 \leq PE \leq 59$	$0 \leq NES \leq 53$
B	$59 \leq PE \leq 70$	$53 \leq NES \leq 61$
C	$70 \leq PE \leq 88$	$61 \leq NES \leq 76$
D	$88 \leq PE \leq 105$	$76 \leq NES \leq 91$
E	$105 \leq PE \leq 123$	$91 \leq NES \leq 106$
F	$123 \leq PE \leq 140$	$106 \leq NES \leq 121$
G	$140 < PE$	$121 < NES$

The national building renovation plan distinguishes eight ranges of initial energy performance. Table 4 and Table 5 show the percentage of buildings assigned to each range for single-family and multi-family residential buildings in 2020. Each energy performance range is characterised by an average energy demand indicator based on the EPC indicators: useful energy, final energy and non-renewable primary energy.

Table 4. Initial energy performance for single-family residential buildings in 2020. Source: National Energy Conservation Agency, 2024

Range	Definition	Average energy demand indicator [kWh/(m ² year)]			
		% of buildings	useful energy	final energy	non-renewable primary energy
EU0	Energy-plus building	0%	53	-	-
EU1	Zero-emission building	0%	66	-	-
EU2	Nearly zero-energy building	0%	74	-	-

EU3	Even distribution of buildings below range B and above range E	29%	110	122	98
EU4		29%	142	158	127
EU5	17% of buildings more energy efficient than EU7	17%	187	208	167
EU6	10% of buildings more energy efficient than EU7	10%	244	287	231
EU7	Least energy-efficient 16%	16%	305	381	306

Table 5. Initial energy performance for multi-family residential buildings in 2020. Source: National Energy Conservation Agency, 2024

Range	Definition	Average energy demand indicator [kWh/(m ² year)]			
		% of buildings	useful energy	final energy	non-renewable primary energy
EU0	Energy-plus building	0%	55	-	-
EU1	Zero-emission building	0%	69	-	-
EU2	Nearly zero-energy building	0%	77	-	-
EU3	Even distribution of buildings below range B and above range E	29%	103	139	103
EU4		29%	133	178	133
EU5	17% of buildings more energy efficient than EU7	17%	154	207	154
EU6	10% of buildings more energy efficient than EU7	10%	199	267	199
EU7	Least energy-efficient 16%	16%	360	482	360

One of the financial subsidy programmes in Poland is the Clean Air Programme. It aims to improve air quality and energy efficiency in buildings by replacing inefficient heat sources and thermally upgrading homes. Individuals who own or co-own a single-family house or a separate residential unit within it with a separate land and mortgage register may apply for funding. The Clean Air Programme defines worst-performing buildings as ones where the annual useful energy demand for heating is higher than 140 kWh/(m²



year). Such buildings can receive the most substantial modernisation support from the programme. The amount of funding also depends on income thresholds (as described above in 4.1 *Vulnerable consumer*). There are three possible funding levels depending on income: basic (subsidy up to 40%), increased (up to 70%) and highest (up to 100%).²³

4.4. Main gaps and challenges

It can be assumed that the Polish definitions discussed above (where they exist) were based on definitions previously created at EU level, which means there are no significant differences between them. The main challenge concerning all three aspects is in measuring their impact.

In the context of buildings and energy poverty, households that have difficulty meeting their heating and electricity needs can be described as vulnerable. In Poland there are two main financial subsidy programmes aimed at those vulnerable to energy poverty. The programmes focus on increasing the efficiency of heat sources and home retrofit.

Energy poverty is also a rather broad definition and applies to various categories, from financial to subjective ones. The factors being compared belong to different categories, which makes it difficult to make a fair evaluation. As energy poverty can be associated with worst-performing buildings which influence e.g. utility bills, it might be useful to evaluate these two concepts together.

Worst-performing buildings can be quite precisely measured and compared on the basis of annual energy demands. The most common indicator refers to annual final energy demand. In addition, energy performance classes – which focus on non-renewable primary energy – can be compared. Here, the main challenge is comparing different methodologies where different indicators are required.

The definitions of three concepts this chapter is focused on are broadly described but it is not always an easy task to measure their impact. For vulnerable consumers and energy poverty, many aspects are subjective and represent diverse categories that are difficult to compare with each other. Worst-performing buildings can be measured using different

²³ Clean Air Program - Q&A



indicators, but it is crucial to compare the same indicator and to have access to real energy consumption to make the assessment plausible.



5. Conclusions and recommendations

Residential buildings in Poland, as of 31 December 2023, cover an area of 1,190,667,900 m². The total number of dwellings in the country is 15,779,200, most of which are located in urban areas (58%). The energy performance of dwellings in Poland differs depending on the year of construction, types of HVAC systems, quality of the building envelope and window area, among other factors.

The starting point for potential measures to improve the energy efficiency of buildings is the knowledge of their current condition, which is not possible without reliable data. The main challenges primarily concern the accuracy, quality and accessibility of data related to residential buildings in Poland. Data availability varies significantly depending on the age of the building. In many cases, there is almost no documentation available, which makes it difficult to examine anything without the risk of error. Digitisation of information on Polish building resources should also be increased, which would facilitate the work of numerous industries and help building residents. There are numerous data sources and databases on Polish building resources, and in many cases most of the necessary information is available, but the current tools still require changes that are worth working on. A priority should be to combine the existing databases into a single system and automate the process of processing and verifying the data entered.

Regarding key concepts, such as vulnerable consumers, energy poverty and worst-performing buildings, the Polish and EU definitions are for the most part consistent. In some cases, definitions are based on different indicators, or they vary in the level of detail. As vulnerable consumers and energy poverty focus on numerous different aspects, they are virtually impossible to evaluate using only quantitative assessment based on numerical values. Although household income thresholds or the share of energy expenditure in income are important, they do not cover the whole issue. By contrast, worst-performing buildings can be assessed using different methodologies based on one or a few energy demand indicator values. Depending on the method used, the assessment might be based on useful, final, primary or net supplied energy demand. However, we cannot precisely determine which buildings in Poland are the worst-performing. This would require a tool, preferably publicly available, to enable easy acquisition of data on buildings and further automation of the assessment process.



It is worth following the example of countries that have already done a great deal of work to improve access to data. The Danish Data Portal provides an example of good practice. This is an open-source data catalogue that provides users with an overview of the many types of datasets available for re-use by companies, researchers, public authorities and citizens.²⁴ The scope of the portal is far broader than what existing Polish open-source datasets can offer.

Thanks to EU policies and rising awareness of the challenges the construction sector is facing, Polish regulations and data collection methods are in the process of continuous improvement and are moving in the right direction. However, there is still a lot of work that needs to be done. The main priorities are data digitisation and the automation of data verification and processing. Increased access to open-source data on the building stock is necessary as well.

²⁴ Agency for Digital Government Denmark, The Danish Data Portal
<https://en.digst.dk/digital-governance/data/the-danish-data-portal>

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Glossary of abbreviations

SP - Statistics Poland

LBR - Land and Building Register

EPC - Energy performance certificate

CREPB - Central Register of Energy Performance of Buildings

CRBE - Central Register of Building Emissions

EU - annual useful energy demand indicator

FE - annual final energy demand indicator

PE - annual non-renewable primary energy demand indicator

GBCO - General Building Control Office

EED - Energy Efficiency Directive

EPOV - Energy Poverty Observatory

UCPD - Unfair Commercial Practices Directive

EPBD - Energy Performance of Buildings Directive