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MARKET RESEARCH

AMONG FACILITY MANAGERS, PUBLIC BODIES AND FINANCING INSTITUTIONS IN POLAND REGARDING THE SCOPE OF EXISTING AND REQUIRED SKILLS OF BUILDING MANAGERS ON TOPICS RELATED TO MITIGATION OF CLIMATE CHANGE CAUSED BY BUILDINGS

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1 Introduction

The Long-term Renovation Strategy states " Renovation of building stock is one of Poland's greatest infrastructural challenges until 2050. As in other EU Member States, Polish buildings in the long term should be modernized in a manner consistent with the transformation towards a climate-neutral economy. At the same time, national public policy must respond to the urgent need to replace the most emitting heat sources in order to improve air quality, while ensuring the economic efficiency of renovation. "

Most of the Polish multi-family residential buildings were put into use several dozen years ago. The technical solutions used at that time, as well as the applicable technical requirements for new buildings, were much lower than today, and thus the standard of these buildings was at a correspondingly lower level. However, this standard depends not only on the age of the building, but also on the quality of its construction, applied technologies and building materials, but also on the method of use, maintenance and modernization.

Buildings in Poland are being modernized with the use of national and European Union support measures. The possibility of this support is expected to increase in connection with the need to ensure climate neutrality of all buildings by 2050.

In the context of high-level goals, particular importance is given not only to the declaration of ambitious modernization itself, but also to the method of pursuing the goals set out in the Renovation Strategy, which can only be achieved by the cooperation of building owners and managers, who should complete such a process by 2050. They should have knowledge of what, how and how much can be improved to improve the energy standard of their buildings, with the greatest economic effect for its inhabitants.

Current functioning of the real estate managers' market is not conducive to the obligatory improvement of professional qualifications, therefore all initiatives changing this situation should be supported by both voluntary associations and the managers themselves. Social research has shown that the areas for expansion most often indicated by managers are basic knowledge of the energy efficiency of buildings (21% of responses) and knowledge about obtaining and using funds for investments related to the improvement of the energy efficiency of buildings (19% of responses). An important area seems to be the need to exchange experiences between managers - indicated by 12%, but this is an area with potential. Almost all managers are aware of the economic benefits that result from improving the energy efficiency of multi-family buildings.

To improve the situation of managing and administering the HOAs and reduce their negative impact on climate change, within the European Climate Initiative (Die Europäische Klimaschutzinitiative EUKI), project “CLI-MA — From Housing Manager to CLImate MAnager” is being implemented from

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2 Characteristics of residential sector in Poland

The housing sector in Poland - according to GUS [6] and Ministry of Development [12] data, is now up to 14.4 million apartments, located in almost 6 million buildings. The value of this sector, as estimated by the National Bank of Poland, amounts to PLN 4.14 billion with over 8.5 trillion of the value of the entire real estate market. The estimated housing assets and housing estates in Poland amount to 202% of GDP and 58% of the fixed assets of the national economy.

Buildings included in the sector are in different technical conditions. Suffice it to answer that half of Poles lived in buildings built before 1979, where some of them require modernization, in line with the currently mandatory energy-saving and environmental protection standards.

2.1 Number of buildings by age and type

Building statistics in Poland mainly include the number of available and newly built apartments. Statistics on buildings are presented on the basis of censuses carried out at 10-year intervals. The data presented below are based on the 2011 [15] National Census of Population and Housing, supplemented by available up-to-date statistics.

Polish building stock was divided into four types and seven periods of construction. Four types of buildings represent the most typical buildings in Polish housing construction:

- single family (SF) – buildings with 1 apartment
- terraced (TH) – buildings with 2 – 4 apartments,
- multifamily (MFH) – buildings with more than 4 apartments – up to 8 floors
- tower buildings – apartment blocks (AB) - buildings higher than 8 floors

The construction periods were selected based on the construction tradition in previous periods and on the basis of changes in energy requirements specified in Polish regulations.

Building type		*number of buildings*	*number of apartments*
SFH	up to 1944	1 065 940	1 065 940
	1945-1966	785 600	785 600
	1967-1985	625 740	625 740
	1986-1992	678 000	678 000
	1993-2002	533 230	533 230
	2003-2008	444 370	444 370
	2008-2013	678 900	678 900
	total	***4 811 780***	***4 811 780***
TH	up to 1944	156 200	312 400

	1945-1966	76 150	152 300
	1967-1985	72 900	145 800
	1986-1992	40 100	80 200
	1993-2002	35 180	70 360
	2003-2008	3 025	6 050
	2008-2013	3 435	6 870
	total	**386 990**	***773 980***
MFH	up to 1944	193 510	967 550
	1945-1966	20 090	100 450
	1967-1985	19 134	95 670
	1986-1992	19 446	97 230
	1993-2002	12 667	76 000
	2003-2008	38 367	230 200
	2008-2013	16 750	100 500
	total	***319 963***	***1 667 600***
AB	up to 1944	38 929	700 719
	1945-1966	54 494	980 900
	1967-1985	25 582	1 125 600
	1986-1992	30 839	1 356 900
	1993-2002	31 198	1 622 300
	2003-2008	8 271	413 560
	2008-2013	9 652	420 560
	total	***198 965***	***6 620 539***
	total	**5 717 698**	**13 873 899**

Average EP index for buildings determined on the basis of energy performance certificates prepared using the Central Register of Energy Performance of Buildings [14]

	<1994	1995-1988	1999-2008	2009-2013	2014-2016	2017-2018	2019-2020
single family	263,7	147,9	143,5	126,3	109,1	94	89,3
multifamily	258,9	139	110	142,7	97,5	87,6	84,9

2.2 Requirements for the energy efficiency of buildings in Poland

The buildings under consideration were constructed in different periods with different technical requirements for their design and construction. Of particular importance from the point of view of the energy consumption for heating buildings are the regulations concerning heat protection requirements at the beginning and, more recently, energy efficiency. The first one appeared in the Polish construction industry in the 1930s and concerned heating, indirectly only mentioning thermal insulation of building envelopes without specifying the requirements in this respect. The next one was the Polish Standard PN-53/B-02405 which came into force in 1955.

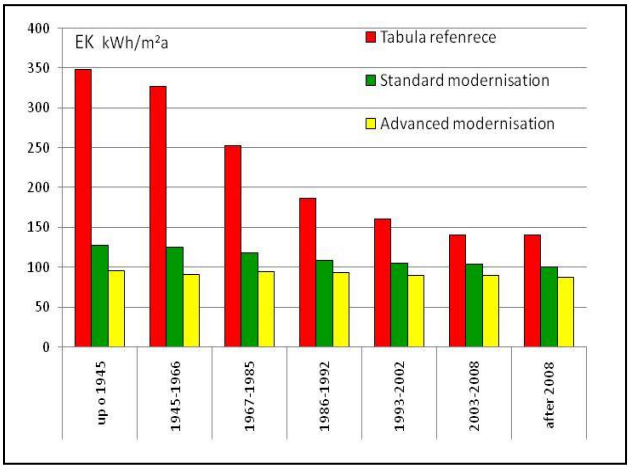
The quality level of these requirements, however, for many years differed from their counterparts in Western European countries with similar climatic conditions to Poland. It was not until 1998 that Poland began to gradually catch up in this area, with significant progress in recent years. Buildings from different time periods have different energy characteristics, most influenced by the energy demand for space heating, accounting for around 70% of the total energy consumption of a building.

This, together with low thermal insulation of all buildings, is a direct cause of the relatively high energy consumption of these facilities.

According to a 2013 report on energy efficiency in Poland [2], 72% of single-family buildings have a low or very low energy efficiency rating. At the same time, 70% of single-family buildings in Poland still use coal, which means 3.5 million working coal boilers (which collectively consume more than 9 million tonnes of coal per year). 29% of buildings have boilers that are more than 10 years old. About 3 million of these installations are based on manually fed boilers, an outdated technology which leads to significant air pollution.

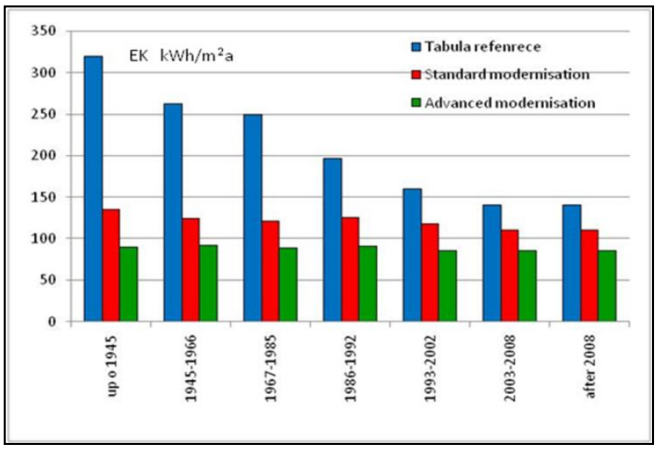
Energy demand reduction potential (according to the calculation made by the TABULA Tool)

Reduction potential in single family buildings



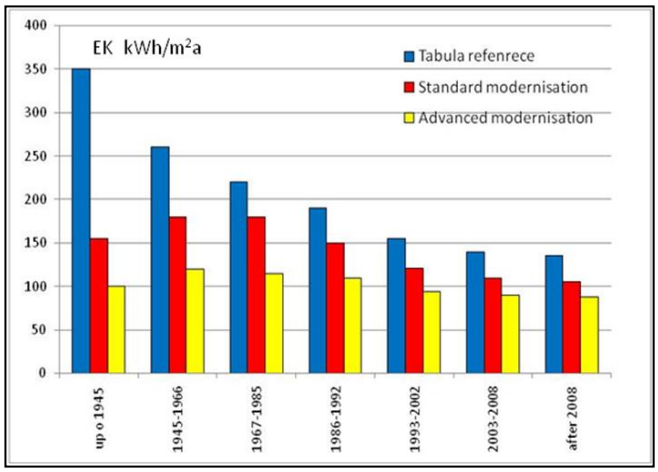
construction period	reduction potential SFH	
	standard modernisation	advanced modernisation
up to 1945	63,2%	72,7%
1945-1966	61,8%	72,2%
1967-1985	53,4%	62,8%
1986-1992	41,9%	50,0%
1993-2002	34,4%	43,8%
2003-2008	25,7%	35,7%
after 2008	29,1%	38,3%

Reduction potential in terraced houses



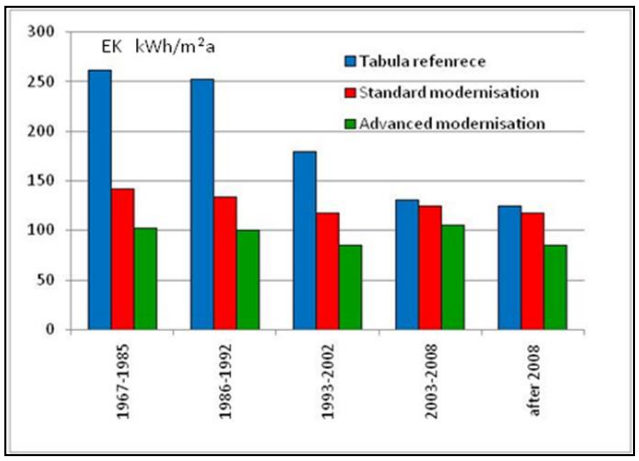
construction period	reduction potential TH	
	standard modernisation	advanced modernisation
up o 1945	55,7%	71,4%
1945-1966	30,8%	53,8%
1967-1985	18,2%	47,7%
1986-1992	21,1%	42,1%
1993-2002	21,9%	39,4%
2003-2008	21,4%	35,7%
after 2008	22,2%	34,8%

Reduction potential in multifamily houses



construction period	reduction potential MFH	
	standard modernisation	advanced modernisation
up o 1945	57,8%	71,9%
1945-1966	52,7%	64,9%
1967-1985	51,6%	64,4%
1986-1992	36,5%	53,8%
1993-2002	26,3%	46,9%
2003-2008	21,4%	39,3%
after 2008	21,4%	39,3%

Reduction potential in apartments blocks



construction period	reduction potential AB	
	standard modernisation	advanced modernisation
1967-1985	45,6%	60,9%
1986-1992	46,8%	60,3%
1993-2002	34,1%	52,5%
2003-2008	4,6%	19,8%
after 2008	5,6%	32,0%

This means that in Poland, despite the over 20 years of thermomodernization program, there is still a lot of space for further thermal modernization, and energy reduction may reach about 40-50% of the current consumption.

3 Management of housing buildings In Poland

3.1 Legal situation

Managing residential buildings requires more and more knowledge, skills and social competences. It has always been an interdisciplinary profession and it was recognized as such already in 1997, when the notions of "real estate administrator", "real estate broker", "real estate appraiser" were introduced to the Real Estate Management Act for the first time. Until the end of 2013, the profession of property manager required a state professional license. When the law entered into force in 1997 [9], approximately 5,000 administrators with at least 5 years of experience were licensed without any additional conditions. Many of them have never taken up employment in this

profession. The remaining people, with at least secondary education, in order to obtain a license, according to the regulations in force at that time, had to complete a six-month training, and then complete a six-month internship and write a management plan for the selected property. Passing the exam before the State Qualification Committee - which resulted in obtaining a license, was only entitled to perform the profession of a manager. This professional group was also obliged to continue vocational education in the field of law, finance and technology. The minimum training was 20 hours a year and had to be confirmed with a training certificate.

The regulations obligated the training company or organization (associations, professional federations) to apply for approval of the subject of the training by the Minister responsible for real estate management. After obtaining the approval of the Ministry, the subject of the training was included in the list of scored training published on the Ministry's website.

Additionally, a Professional Responsibility Commission (the so-called KOZ'a) was established, which task was to assess and sanction cases of improper management of real estates. Currently, the lack of such an institution as KOZa means that all disputes go to civil courts. A small percentage of them becomes the subject of mediation that is not very popular on this market.

At the time of deregulation in 2013, as then reported by the Central Statistical Office, the group of people practicing professions related to building management amounted to approx. 50,000, of which half were managers. The register of real estate managers and real estate agents was available on the website of the then Ministry of Infrastructure.

Currently, the management of multi-apartment buildings is practically not regulated by any law. It is true that the provisions in force before the deregulation have been partially restored to the Real Estate Management Act [9], but they are quite laconic and reduce the profession of a manager to the activity of an insured entrepreneur. Despite this, they turned out to be useful for the community, because they allowed, for example, to conclude contracts with insurance companies, which - without the statutory regulation of the scope of activity of managers - had a problem with assessing the risk "inherent" in this profession

3.2. The Act on real estate management, and management of buildings

As it was mentioned above there are no requirements regarding education, experience and qualifications confirmed by an exam to act as a professional manager, and only few chapters refer to the requirements for managers

3.1.1 The Real Estate Management Act [9]

It is worth quoting the provisions of Chapter 3 "Real Estate Management".

Art. 184a [Real Estate Manager]

A real estate manager is an entrepreneur who conducts business in the field of real estate management.

Art. 184b. [Activities as part of real estate management]
Real estate management consists in making decisions and performing activities which goals is ensuring rational real estate management, in particular:

1) *proper economic and financial management of real estate;*
2) *safety of use and proper operation of the real estate;*
3) *proper energy management within the meaning of the provisions of the energy law;*
4) *day-to-day administration of real estate;*
5) *maintaining the property in a non-deteriorated condition in accordance with its intended use;*
6) *reasonable investment in real estate*.

The provision contained in art. 184 b, point 5 on the maintenance of the property in a non-deteriorated condition in accordance with its intended use does not meet the needs of the dynamically developing housing market. Currently, real estate management is managing the value, risk and expectations of owners and tenants. It is worth referring to the above-mentioned NBP Report on the condition of housing in Poland and the data on the value of this sector, exceeding PLN 4 trillion.

The property manager / administrator is responsible for the physical condition of the property and the well-being of its residents, who must take care of the property for the longest period of the building's life - the operation stage. Therefore, she/he should be a professional, equipped with appropriate knowledge, skills and social competences.

Currently, responsible real estate management requires, among others:

• knowledge about the operation of the building, regardless of its purpose and legal status,

• ability to assess modernization needs,

• knowledge of new techniques and modern technologies,

• tracking the possibilities of financing investments that increase the value of the building object, the ability to establish interpersonal relations, allowing for the assessment of the satisfaction of users / owners of the facility,

• flexible adaptation to changing needs, incl. due to demographic phenomena, i.e. the aging of the society, as well as the growing level of technological advancement of buildings, or the need to build a community of place, which is awakening in the younger generation.

The growing expectations towards people who manage real estate can only be deduced from job offers, which show that the real estate administrator / real estate manager / person employed in the position of real estate management is to be responsible for supervising the object or group of objects of a specific nature: tenement house, housing estate, recreation center, industrial building or

production hall or warehouse etc. The catalog of duties in this position - according to job offers - is wide and varied (depending on the facility being administered): from taking care of the cleanliness of residential buildings, carrying out maintenance and repair works, taking care of the technical condition of devices and installations, as well as accepting complaints or notifications of a different kind from inhabitants, service in the field of delivery to managed facilities of all media, making decisions on budget implementation.

Unfortunately, there is no hard data on the supply and demand of people practicing property management. Only the available, yet reliable numbers refer to employment in the real estate market service section (GUS, Economic entities by types and places of doing business in 2018). In this publication, the Central Statistical Office reports that 88,000 people are involved in servicing the real estate market (section L of the PKD). As a result, when estimating market needs, analysts rely on the number of registered companies that provide real estate services, and also on the number of cooperatives (3,300) and housing associations (over 180,000) and development companies operating in voivodeship cities.

Art. 185 [Agreement about the property management]
The scope of real estate management must be specified in a real estate management contract signed by the owner, a housing association or another person holding the right to the real estate.

Art. 185 of the APM obliges only to conclude a contract and does not interfere with its scope. However, the market itself regulated these issues through detailed provisions in agreements on the scope of obligations of persons who undertake the management of common real estate, the manner of which - ownership or entrusted - is determined on the basis of the provisions of Art. 18 of the Act on Ownership of Premises. The form of management is entered in the land and mortgage register of the common real estate in section III "Personal law and claims". A change in the management of a common real estate does not require a change in the entry in the land register to be effective.
For the sake of clarification: own management is one or several natural persons selected by voting from among the owners of apartments or not belonging to a housing association. Such resolutions may be taken by the owners of the premises at a community meeting, by individual voting or in a mixed manner.

If the community does not appoint its own administration, it must entrust property management to an external person, i.e. administrators. Then it is referred to as an entrusted board. All details regarding the obligations and rights of both parties to the contract (the administrator and the housing community) are set out in the property management contract, part of which is the administrator's declaration on valid third party liability insurance related to the performance of property management activities.

3.1.2 Property manager vs administrator of the property

The most popular form of management in Poland is own management, which most often does not fulfill its duties related to property management on its own, but entrusts this role to an external person or company, i.e. the administrator. However, there is no concept of "administrator" in the Real Estate Management Act. Currently, we can only speak (in accordance with applicable law) about the management board entrusted with a civil law contract and various responsibilities.

However, the market has divided this professional group into managers and administrators, and the scopes of contracts concluded indicate that the administrator and manager were assigned different roles. The administrator is not responsible for the management of the property. The duties entrusted to the administrator are strictly defined in the contract between him and the housing community, signed by the board of the housing community.

Property management and administration companies usually inform to what extent they can take care of the administration of the building and what tasks they will cover. Some offer specific packages to choose from that are pure administration or management and administration.

The administrator's duties may include:
• maintaining order and cleanliness in the property or supervising the property cleaning company;
• carrying out and supervising renovation works;
• collecting fees for the maintenance of common real estate;
• keeping and updating housing documents;
• availability of employees in emergencies after working hours and establishing an administrator's duty;
• developing specimen resolutions, regulations, statutes and other legal acts of the community;
• collection of fees due from owners of premises in court and bailiff proceedings.

Companies dealing with management and administration often also offer banking and accounting services (opening a bank account for the community and conducting settlements) and technical services (organizing tenders for repairs, construction, gas, electric and chimney inspections, keeping technical documentation of real estate).

<u>Property manager</u>

According to the law the responsibility of property manager is comprehensive services, including making decisions related to the management, monitoring and analyzing the factors affecting the rational operations of the property. The property manager is also responsible for running the property in the most efficient way. He also advises the owner on activities aimed at maintaining the good condition of the property and its development.

The real estate manager's permissions include the performance of all activities aimed at representing its owner. The manager has the right to initiate debt collection activities (if any), to arrange community meetings or signing contracts with property's services providers.
The manager is also obliged to keep financial and technical documentation of the real estate, prepare and implement resolutions (after their approval by the community). It also keeps a registration list of inhabitants and takes care of the good technical condition of the building.

Administrator of the property

The administrator of the building mainly deals with the implementation of urgent matters reported to him by the residents, as well as monitoring the current situation in property
His tasks also include collecting rent and necessary fees as well as keeping all required documents. It is the administrator who contact the tenants in day-by-day life, eg. In the event of a breakdown or other problems related to the apartment.
Administrator main responsibilities:

- taking care of the proper functioning of a given facility
- removal of failures in the building
- carrying out conservation works
- controlling the technical condition of the property

No specific education is needed to perform this type of work. However, knowledge in the field of construction law and regulations regarding the administration of facilities is very useful.

3.2 Building Law [16]

According to the Building Law the following the most important duties of the real estate owner are :

1. Possession of the so-called "building logbook"
2. Obligatory surveys of the building
3. Monitoring the changes in the spatial development plans

Ad .1 "Building logbook"

The Building Law states that the owner or manager of a building must have the so-called logbook, which should be created on the day of obtaining the building use permit. According to the ordinance of the Minister of Infrastructure, it must include:

- all basic identification data, including:
  - address,
  - data about the owner or manager, if the owner instructs someone to run the property, with changes,

- the date of building acceptance protocol,
- date of establishment of the facility book,

- technical data (building area, usable area, volume, length, width, height),
- architectural documentation of the building or its reconstruction, extension, additional building area or other changes,
- all administrative decisions, i.e. a building permit, a reconstruction permit, a decision to put the facility into use,
- site plan showing the route of connections, plot boundary,
- protocols from periodic inspections

Ad. 2 Periodic inspections of buildings

From September 2020, the amended provisions of the Construction Law [16] apply, concerning, inter alia, the scope of obligatory periodic inspections of building structures, commonly known as technical inspections.

The construction law constitutes Art. 5 sec. 2, that at the stage of operation of construction facilities, including in particular used residential buildings, the general rules for the use of facilities apply, i.e .: to excessive deterioration of its functional properties and technical efficiency, in particular to the extent related to the requirements referred to in paragraph 1 points 1-7.

A more detailed scope of responsibilities of the owner or manager of the building object is set out in Art. 61. According to Art. 61 the owner or manager of a building object is obliged to:

1) maintain and use the facility in accordance with Art. 5 sec. 2 PB;

2) ensure, with due diligence, the safe use of the facility in the event of external factors affecting the facility, related to human activity or natural forces, such as: atmospheric discharges, seismic shocks, strong winds, intense precipitation, landslides, ice phenomena on rivers and the sea, as well as lakes and water reservoirs, fires or floods resulting in damage to a building structure or a direct threat of such damage, which may endanger human life or health, property safety or the environment.

Mandatory periodic inspections of building objects are to ensure the safety of their use, as a result of which the person conducting it [according to a specific standardization - PN] is to determine whether the condition of individual elements requires repair, maintenance or renovation. Its purpose is to determine whether the state of the controlled object is safe or not; if not to what extent. He must also indicate irregularities and issue appropriate post-inspection recommendations that are binding on every owner of a building, including a housing community.

The legal basis for the due obligation for five different periodic inspections is Art. 62 sec. 1, talking about:

1) periodic inspection [at least once a year], called annual, consisting in checking the technical condition of:

a) building elements, structures and installations exposed to harmful weather conditions and damaging effects of factors occurring during the use of the facility,

b) installations and devices for environmental protection,

c) gas installations and flues (smoke, exhaust and ventilation);

2) periodic inspection (at least once every 5 years), called the five-year inspection, consisting in checking the technical condition and suitability for use of the building, the aesthetics of the building and its surroundings; this control should also include testing the electrical and lightning protection systems in terms of the efficiency of connections, equipment, security and protection measures against electric shocks, insulation resistance of cables and earthing of installations and devices;

3) periodic inspection in the scope such as the annual inspection, at least twice a year, until May 31 and November 30, in the case of buildings with a building area exceeding 2,000 m2 and other construction objects with a roof area exceeding 1,000 m2; the person carrying out the inspection is obliged to immediately notify the construction supervision authority in writing of the inspection;

4) control of the safe use of the facility, carried out each time in the event of crisis circumstances (Article 61 (2));

5) checks upon the notification of a person residing in the premises of interference or violations that are not justified by technical or functional reasons, causing that the conditions specified in Art. 5 sec. 2; such control is obliged to carry out such control within 3 days of receiving the notification.

The detailed scope of the annual and five-year control is specified in the secondary legislation to the Construction Law, i.e. 1 of the Regulation of the Ministry of Interior and Administration of August 16, 1999 on the technical conditions of use of residential buildings [10], which provides that the periodic inspection referred to in Art. 62 sec. 1 point 1 lit. a) of the Act, the elements of the building are exposed to harmful weather conditions and the destructive effects of factors occurring during use, the damage of which may pose a threat to the safety of people, environmental safety, building structure.

The most important, however, is the provision of §5 section 2 of the Regulation [10], stating that in the course of such an annual inspection, the technical condition should be covered in detail:

1.outside layers of external partitions (texture layer), elements of external walls (attics, pillars, cornices), balustrades, loggias and balconies,

2. devices attached to the walls and roof of the building,

3. elements of building drainage and flashing,

4. roofing,

5. devices constituting the fire protection of the building,

6. elements of the sewage system discharging sewage from the building.

Periodic inspection reports are specified in §4 section 4 of the Regulation [10]. According to this provision, they should include the following:

1.the technical condition of the building elements covered by the inspection,

2.size of wear or damage to the controlled elements,

3.the scope of renovation works and the sequence of their execution,

4. methods and means of using building elements exposed to the harmful effects of atmospheric influences and damaging to other factors,

5. the scope of non-performed renovation works recommended for implementation in the protocols from previous periodic inspections.

Knowledge of the obligations arising directly from the provisions of the Construction Law is a specific element of the manager's work.

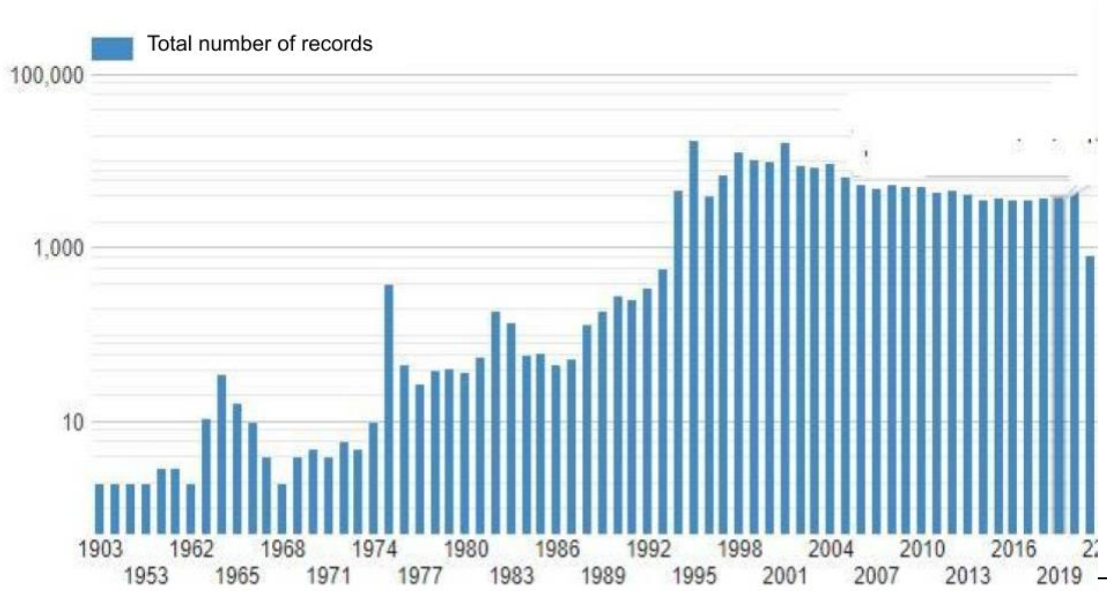
4 Property managers market

4.1 Property managers in Poland

The database with current data of active Polish enterprises and institutions registered in the CEIDG, REGON and KRS registers, for which the code of the predominant type of activity according to the Polish Classification of Activities 2007 is 68.32.Z (Real estate management performed on request) has 189 211 records.

According to this classification, a real estate administrator is defined as a natural person who takes responsibility for the rational disposal of a given real estate or real estate. The legal basis for the real estate manager's activities is the Real Estate Management Act.

The figure below presents the number of real estate managers registered in the database depending on the year in which they started their activities.



4.2 Associations and federations

The database of managers is also maintained by the Polish Real Estate Federation. About 2,350 managers with valid licenses are registered in it.

There is also the Polish nationwide Register of Property Managers of the Federation “Polish Real Estate Market Agreement”. It is a register of natural persons who obtained an optional - voluntary license of this federation. About 3,000 managers are registered there.

It is worth recalling here that the Real Estate Market Agreement was an initiative of 9 federations in response to deregulation. The plans included, inter alia, establishing a common minimum curriculum for adepts in the art of management and keeping a common register of real estate professionals and legislative initiatives.

The plans eventually collapsed, and the "agreement" remained only in the name of one federation.

Currently, licenses are issued by almost all federations after training. The minimum curriculum provides an average of 40 to 60 training hours and does not provide for internships or the ability to create economic plans for real estate, which seems to be crucial in real estate management.

Federation licenses, however, do not have the importance of a state document, but the launch of such courses was forced by the market after deregulation, which demanded a license, although the term "licensed manager" disappeared from the law.

4.2.1 Polska Federacja Stowarzyszeń Zawodów Nieruchomościowych (PFSZN)

Currently, it has 12 associations and is one of the most important on the market.
Its main goal is to create professional services for the real-estate market in the field of management and administration, its development and efficient operation. Additionally, the federation cares about the observance of the rules of professional ethics in this market and the rules applicable to the members of the organization.
The leaders of this organization claim that in a situation where anyone can manage real estate, regardless of knowledge and professional experience, the goals and tasks of all professional property management organizations have changed. Today, their main mission is to shape the image of the property manager - a member of the organization - as a competent specialist, working for property owners with the utmost diligence, according to their best knowledge and in accordance with the Code of Ethics in force at PFSZN. They conduct trainings in various fields and courses, the completion of which is guaranteed by the issuance of a federal license.

4.2.2 Polska Federacja Rynku Nieruchomości

The federation believes that after several years of building managers' "free market", prospective customers are beginning to understand that services provided by low-skilled people can be cheap but of poor quality. In this way, a voluntary database of licensed managers was created, run by the Polish Federation of Real Estate Market, which, in cooperation with other federations and associations, introduced the (voluntary) license of facility managers to the market. The license, on the terms adopted by the Federation, is issued for 3 years, and its number, for people holding such a document before January 1, 2014, coincides with the state license number, and people who started working in the profession after this date can obtain a license after completing a specialist course or postgraduate studies and passing the exam.

4.2.3 Other organizations

There are now over a dozen associations on the market, including :

Name	www	address	Founded in	Members
Polskie Stowarzyszenie Zarządców Nieruchomości (PSZN)	http://www.polski-zarzadca.pl	ul. Grzybowska 45 00-844 Warszawa	1999	76
Polska Federacja Organizacji Zarządców, Administratorów i Właścicieli Nieruchomości	http://pfozaiwn.org	Beniowskiego 84B 80-355 Gdańsk	2005	n/a
Polska Federacja Stowarzyszeń Zawodów Nieruchomościowych (PFSZN) :	https://www.pfszn.pl	ul. Nowogrodzka 49 00-695 Warszawa	1998	12
• Stowarzyszenie Zarządców Nieruchomości „WARECKA” w Warszawie			•	•
• Wielkopolskie Stowarzyszenie Zarządców Nieruchomości w Poznaniu			•	•
• Polskie Stowarzyszenie Zarządców Nieruchomości w Gdańsku			•	•
• Lubelskie Stowarzyszenie Zarządców Nieruchomości w Lublinie			•	•
• Warszawsko-Mazowieckie Stowarzyszenie Zarządców Nieruchomości w Warszawie			•	•
• Dolnośląskie Stowarzyszenie Zarządców Nieruchomości we Wrocławiu			•	•
• Dolnośląskie Stowarzyszenie Zarządców Nieruchomości we Wrocławiu			•	•
• Katowickie Stowarzyszenie Zarządców Nieruchomości w Katowicach			•	•
• Stowarzyszenie Zarządców Nieruchomości „Trójmiasto” w Gdańsku			•	•
• Warszawskie Stowarzyszenie Zarządców Nieruchomości w Warszawie			•	•
• Łódzkie Stowarzyszenie Zarządców Nieruchomości			•	•
• Stowarzyszenie Europejski Instytut Gospodarczy w Warszawie			•	•
Kujawsko-Pomorskie Stowarzyszenie Zarządców Nieruchomości (KPSZN)	http://kpszn.pl	ul. Łęczycka 55 85-737 Bydgoszcz	1999	219

Stowarzyszenie Zarządców Nieruchomości	http://stozani.pl	Tadeusza Czackiego 3/5, 00-043 Warszawa	1995	n/a
Stowarzyszenie Zarządców i Administratorów Nieruchomości	https://szan.org.pl	ul. Morawskiego 5/129; 30-102 Kraków	1996	420
Stowarzyszenie Zarządców Nieruchomości	https://www.stozan.pl	41-303 Dąbrowa Górnicza ul. Kasprzaka 46	n/a	n/a
Federacja Porozumienie Polskiego Rynku Nieruchomości	http://www.pprn.pl	02-657 Warszawa ul. Wielicka 40	2008	7
• Częstochowskie Stowarzyszenie Zarządców Nieruchomości			•	•
• Opolskie Stowarzyszenie Rynku Nieruchomości			•	•
• Płockie Stowarzyszenie Rynku Nieruchomości			•	•
• Podkarpackie Stowarzyszenie Pośredników i Doradców Rynku Nieruchomości			•	•
• Powszechne Towarzystwo Ekspertów i Doradców Rynku Nieruchomości			•	•
• Stowarzyszenie Profesjonalistów Rynku Nieruchomości Polski Centralnej			•	•
• Stowarzyszenie Przedsiębiorczości w Nieruchomościach			•	•
Polska Federacja Rynku Nieruchomości	https://rejestr.pfrn.pl	ul. Grzybowska 45 00-844 Warszawa	1995	17
Dolnośląskie Stowarzyszenie Pośredników w Obrocie Nieruchomościami i Zarządców Nieruchomości	http://www.dospon.pl	53-674 Wrocław, ul. Legnicka 46-46A lok. 16	1994	115
Stowarzyszenie Specjalistów Rynku Nieruchomości POLONIA	http://ssrn-polonia.eu	ul. Czapelska 38, 04-081 Warszawa	1994	180

4.3 Trainings for facility managers

These associations (in which the first 4 are FPE partners in the CLI-MA project) provide basic vocational training for managers. A person who completes the course and passes the test exam receives the License of the Property Manager of the Polish Federation of Real Estate Market and is registered in the Central Register of Managers run by the Polish Federation of Real Estate Market.

The course program is based on the program assumptions of the Polish Real Estate Federation (PFRN), which were prepared on the base of CEPI-CEI (European Real Estate Council)course program for managers, of which PFRN is a member. The course is organized in the form of four weekend meetings, during which 60 educational hours are carried out:

1. Property manager as a professional activity 2 hours
2. Legal elements in real estate management 8 hours
3. Technical aspects in real estate management 10 hours
4. Economic and financial basics in real estate management 6 hours
5. Residential property management 10 hours

6. Management of non-residential real estate	6 hours
7. Sources of information about real estate	4 hours
8. Interpersonal communication in the profession of a real estate manager	6 hours.
9. Local inspections of the property	6 hours

Both the Federation and individual associations also offered (unfortunately still voluntary) training courses that help raise the qualifications of the members concerned. Currently, these are on-line trainings lasting from 4 to 8 hours, and among them:

1. Conducting meetings in housing communities - documentation, resolutions
2. Reports - principles of drawing up and accounting
3. Debt collection
4. How to properly guide the prince of the facility
5. Access to the property
6. Energy performance certificate - obligations of the owner-manager
7. Technical conditions for the use of residential buildings
8. Assessment of the state of thermal protection of buildings
9. Application of RES
10. Technical and economic aspects of building management in a housing cooperative
11. Planning of repairs and maintenance

The AGH University of Science and Technology is organizing a course for property managers in April 2021, which includes 180 hours of classes covering the following topics:

1. Professional standards of property managers
2. Professional ethics of property managers
3. Real estate markets and legal regulations
4. Property management
5. Real estate management contracts - examples
6. Property management plan
7. Information about the property
8. Construction Object Book (KOB)
9. Current financial analysis of real estate
10. Acquisition of real estate for management
11. Financial management
12. Spatial development plan
13. Real estate appraisal - real estate appraisal
14. Taxes on real estate
15. Property administration
16. Social communication and negotiations
17. Analysis of Polish, EU and other legal acts
18. Didactic and substantive consultations (if necessary and questions)

As i is presented above, in practice, none of the training, even the 180-hours one, covers topics related to energy efficiency in relation to the internal climate of the building and increasing internal thermal comfort. Even training on issues related to energy use treats them in the context of presenting the applicable regulations and requirements, rather than as the necessity to take measures to reduce energy demand, reduce emissions and improve thermal comfort.

5 Poland's energy efficiency policy after 2020

5.1 National policy

The state's energy policy is presented in strategic framework documents among others:

- Policy of energy sector in Poland, which is currently in the process of updating ,
- public draft of Poland's Energy Policy until 2040 (as part of the strategic impact assessment on the environment
- Strategy for Responsible Development until 2020 - with a perspective until 2030, adopted in 2017

On December 30, 2019, Poland submitted the National Energy Plan to the European Commission and climate for the years 2021-2030 [8], thus fulfilling the obligation imposed on Poland by the provisions of the Regulation of the European Parliament. The document was adopted by the Committee for European Affairs at the meeting on December 18, 2019.

The National Climate Energy Action Plan [8], for 2021-2030 sets out assumptions, goals and policies and actions to implement the 5 dimensions of the Energy Union:

1. Energy security;
2. Internal energy market;
3. Energy efficiency;
4. Emission reduction;
5. Research, innovation and competitiveness.

An important element of the Energy Union is the area of energy efficiency. Currently, the most important legal act of this area in Poland is the Energy Efficiency Act [18], on the basis of which entities are obliged to implement projects increasing energy efficiency (or in a limited part of the purchase of white certificates). The act covers both the private and the public sector imposing savings obligations on all actors.

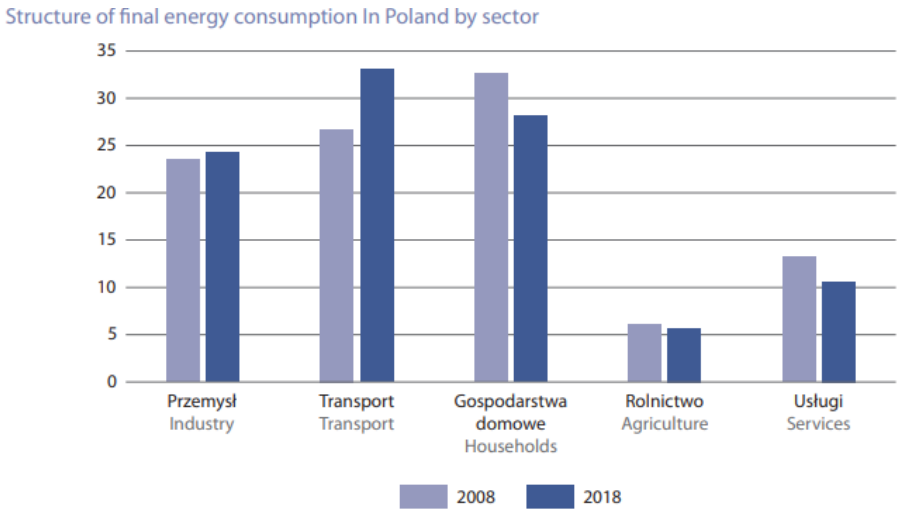
The national energy and climate plan takes into account the conclusions of inter-ministerial agreements and consultations public, as well as conclusions from regional consultations and recommendations of the European Commission C (2019) 4421 of June 18, 2019. The document was prepared on the basis of national development strategies approved at the government level (including the Strategy for sustainable transport development until 2030, State ecological policy 2030, Strategy for sustainable development of rural areas, agriculture and fisheries 2030) and taking into account the draft Energy Policy of Poland until 2040.

It sets the following 2030 climate and energy goals:

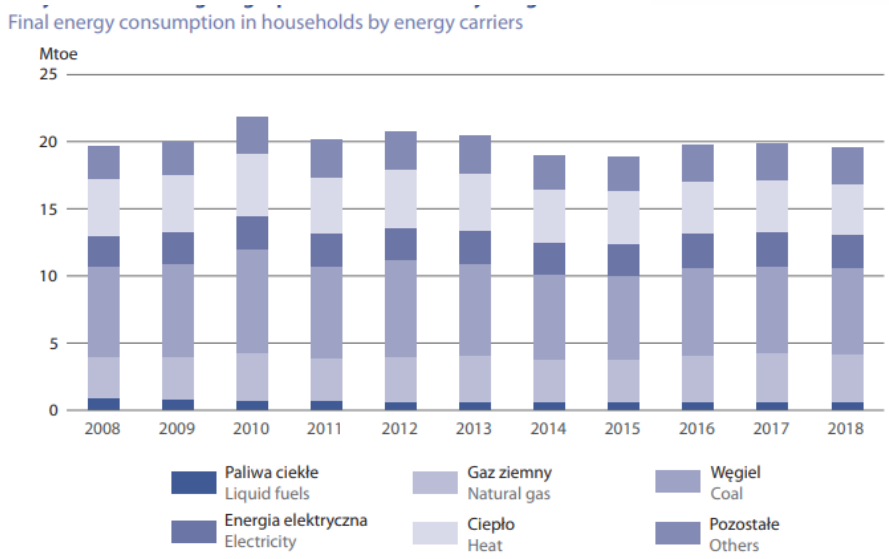
- 7% GHG reduction in non-ETS sectors compared to 2005 level,
- 21-23% share of RES in gross final energy consumption (the 23% target will be achievable in this situation granting Poland additional EU funds, including those allocated for a just transition), taking into account:
  - 14% share of renewable energy in transport,
  - the annual increase in the share of renewable energy in heating and cooling by 1.1% on an annual average.
- an increase in energy efficiency by 23% compared to 2007 forecasts,
- reduction of the share of coal in the production of electricity to 56-60%.

5.2 Residential buildings strategy

Polish households, as in other European countries, consume approx. 40% of all energy used in the country. The statistical data show that this share is systematically decreasing [3]. It is the result of introducing new regulations concerning energy standards of new and modernized buildings. The awareness of the inhabitants is also growing, and they use energy in their apartments more and more wisely.



The share of energy consumption in households in final energy consumption was 28,1% in 2018. Coal fuels were the most frequently used carrier, the share of which amounted to 32,7% in 2018 the carrier was heat, whose share amounted to 19.2% in 2018, after a decrease from 21,2% in 2008. In 2018 natural gas had a share of 18,2% in energy consumption in households, electricity – 12,9%, liquid fuels – 3,2%, and other carriers – 13,8% [3].



Structure of the energy consumption in households by the end-use (%)

	2002	2009	2012	2015	2016	2017	2018
Space heating	71,3	70,2	68,8	65,5	66,2	65,8	65,1
Water heating	15,0	14,4	14,8	16,2	16,0	16,3	16,6
Cooking	7,1	8,2	8,3	8,5	8,3	8,3	8,5
Lighting	2,3	1,8	1,5	1,5	1,4	1,4	1,3
Electrical appliances	4,3	5,4	6,6	8,3	8,1	8,2	8,5
total	100,0	100,0	100,0	100,0	100,0	100,0	100,0

The most important direction of energy use was space heating, the share of which was 65,1% in 2018 16.6% of energy was used for water heating, 9,8% for lighting and electrical appliances, 8,5% for cooking meals.

Since heating plays a significant role in households' energy consumption projected energy savings are strongly connected to the improvement of energy performance of buildings. In the period of 2021-2013 they should have reached 43,4 GWh.

Long-term renovation target of the country's housing stock defined in the National Housing Program states:

- the share of thermomodernized residential buildings in the total housing stock will reach 70% in 2030 year (compared to 58.8% in 2015),
- to reduction the number of people living in substandard conditions due to overcrowding, poor technical conditions or lack of technical installations to 3,300,000 people in 2030 (from 5 360 thousand in 2011).

A strategy for the renovation of the national stock of residential and non-residential buildings, both public and private, is under development. It should ensure improvement of energy efficiency and diminishing emissions by converting existing buildings into nearly zero-energy buildings on the level

of rational, low costs. The strategy will be submitted to the European Commission in accordance with the requirements of the amended Directive 2010/31 / EU - as a separate document, not constituting an annex to the National Energy and Climate Plan.

6 Energy standards of Polish housing sector

Polish regulations concerning building technical requirements and its energy efficiency are included in the Ordinance of the Ministry of Infrastructure "Technical conditions to be met by buildings and their location" [18]. The regulation establishes technical conditions, which are to be met by buildings and their associated devices, building location on a plot and development of the plots earmarked for buildings. The provisions of the Regulation shall be applied to design and construction, including also extension, superstructure, reconstruction and change of exploitation.

6.1 Energy indicators

The building and its heating, ventilation, air-conditioning, hot water systems, and in the case of public utility buildings, collective residence, production, farm and storage buildings - also built-in lighting, should be designed and constructed in a way ensuring that the following minimum requirements are met:

1) value of the indicator of the annual demand for non-renewable primary energy EP [kWh/(m^2•year)], calculated in accordance with the regulations issued on the basis of Art. 15 of the Act on the energy performance of buildings, is less than or equal to the maximum value presented in the table below.

Building type	EP value for heating, ventilation and hot water preparation EP_{H+W} [kWh/m^2*year]
Single family houses	70
Multifamily houses	64

2) the partitions and technical equipment of the building meet at least the thermal insulation requirements specified in Annex 2 to the Regulation, as in table below.

	Heat transfer coefficient U_{max} [W/(m^2K)]
external walls	0,2
Internal walls	1
roofs above the unheated attic	0,15
ceilings above an unheated basement	0,25
windows	0.90

6.2 Energy efficiency in heating systems

1. Heaters and other devices receiving heat from the heating system should be equipped with heat supply regulators.
2. In a building supplied from a heating network and in a building with its own (individual) heat source using fuel oil, gas fuel or electricity, heat supply regulators to radiators should operate automatically, depending on changes in internal temperature in the rooms where they are installed .
3. The devices should enable users to obtain a temperature lower than the design temperature in the rooms, but not lower than 16 ° C in the rooms with a design temperature of 20 ° C and higher.
4. Heating installations supplied from the district heating network should be controlled by a device for regulating the heat supply, operating automatically, in accordance with changes in external climatic conditions.

6.3 Energy efficiency in hot water system

1. The hot water installation should be designed and constructed in such a way that the amount of thermal energy needed to prepare this water is kept at a reasonably low level.
2. Equipment for hot water preparation installed in buildings should meet the requirements specified in a separate provision on energy efficiency.
3. Heat losses in the transfer of domestic hot water and in circulation pipes should be reasonably low. Thermal insulation of these pipes should meet the requirements set out in Annex 2 to the Ordinance
4. The hot water plumbing system should enable obtaining water at the points of use at a temperature not lower than 55 ° C and not higher than 60 ° C.
5. In a multi-family residential building devices for measuring the amount of heat or fuel used to prepare hot water should be used.
6. In a multi-family residential building, water meter sets should be used to measure the amount of cold and hot water supplied to individual apartments and rooms for common use of residents, in accordance with the requirements of Polish Standards.

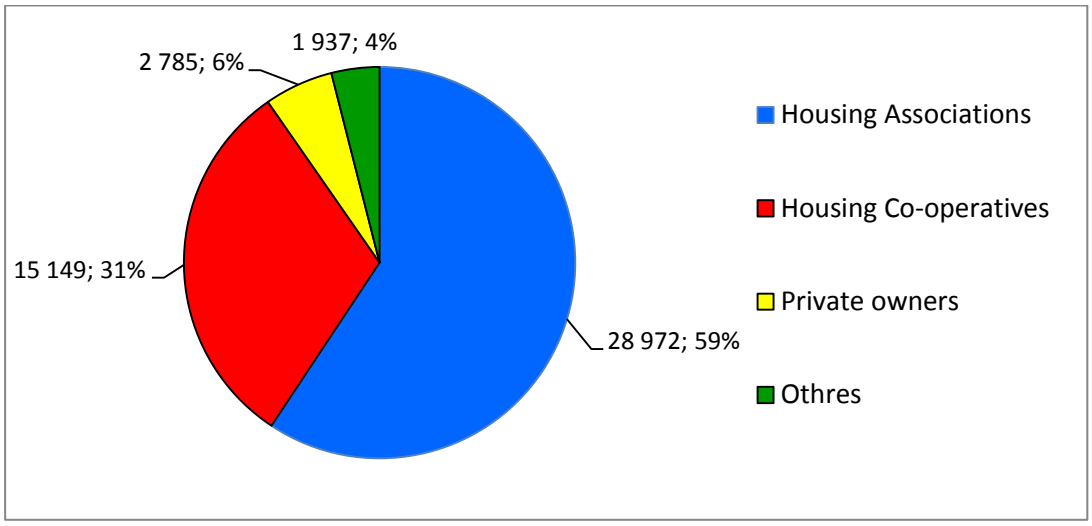
7 Thermomodernization Fund

The Thermomodernization and Renovations Fund is a financial support system for thermomodernization and refurbishment investments functioning since 1998.

Beneficiaries are owners of multi-dwelling units, owners and administrators of all other housing facilities, and local government units with the exception of local government budgetary enterprises. Three different bonuses may be obtained: thermomodernization bonus; repairs bonus; and compensational bonus.

The Thermomodernization and Renovation Fund was launched in January 1999 and continues its activities to this day. The funding was provided to entitled investors engaged in thermo-modernization projects and should be considered as a partial repayment of the loan taken by the investor. The bonus amount is 16% of the investment value in the case of the thermo-modernization bonus and 15% of the investment value in the case of the renovation bonus

To the moment 2 697 mln zł (around 500 ml euro) was spent in the form of bonuses to the 48 843 investors. [5]

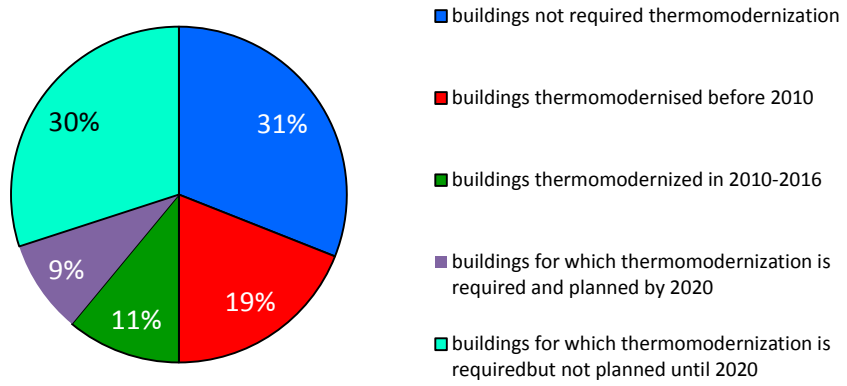


The structure of applications for bonuses by type of investor in the years 1999 - 2020 [5]

7.1 Thermomodernization of multi-family residential buildings

Surveys carried out in 2019 by the Central Statistical Office [4], in which participated respondents (building owners or managers) owning or managing 189 289 buildings show that:

- 60,7% of multi-apartment residential buildings do not require thermomodernization, in which 29.7% due to thermomodernization works carried out by 2016, and 31,0% due to the lack of thermomodernization needs (e.g. due to construction building in energy-saving technology),
- 39,3% of multi-apartment residential buildings require thermomodernization in order to bring the technical condition to the present energy standards, in which thermomodernization is planned for 9.4, and for 29,9% is not planned yet.



The scale of thermomodernization activities in multi-apartment residential buildings [4]

Extrapolating the above results to the entire stock of multi-apartment buildings in Poland (assuming that the obtained results of the study are also true for 64,6% of buildings untested), it can be assumed that approx. 200 thousand are still waiting for thermomodernization works. It should be emphasized that these needs may increase in the future (e.g. due to an increase of energy carriers prices).

Taking into account the fact that:

- currently, as part of the government program to support thermal modernization and renovation, it is carrying out investments worth around PLN 950 million per year3
- according to the results of the study [5], from the government program to support thermal modernization and renovation in 2010-2016, 37,0% of buildings covered were used in the case of thermal modernization research

it can be estimated that the implementation of thermal modernization works at the current pace will make the building stock multi-family housing units will be subject to thermal modernization and adaptation to the modern ones standards in terms of energy efficiency within approximately 20 years.

	before thermomodernization	after thermomodernization
DH	37,00	65,90
coal boiler	22,80	5,10
stove fired by coal	22,50	0,00
gas boiler	10,00	23,70
oil boiler	3,00	1,80
electric heating	1,90	0,30
biomass	0,10	0,90
heat pump	0,00	0,50
other	2,70	1,80

Changes In heat sources structure after thermomodernization [5]

The study shows that after thermomodernization the most popular heat source was the district heating and its share raised to 65,9% (an increase by 28,9 percentage points). This happens with a significant reduction in the use of coal-fired boilers (share of buildings with this heat source, after thermomodernization was only 5.1%, i.e. 17,8 percentage points less) and the complete abandonment of coal fired stoves [13].

7.2 Role of energy auditor and property managers in the process of thermomodernization

In the process of thermomodernization, the greatest responsibility for achieving the expected results lies with the auditors. A properly prepared energy audit allows for the selection of the most effective projects, and properly made calculations of energy demand before and after modernization will give the investor confidence that the money invested will bring the results expected by all residents, in the form of reducing bills and improving thermal comfort in their buildings and apartments.

Audits performed under the Thermomodernization and Renovation Fund are verified by independent experts, so the possibility of errors in this case is kept to a minimum. However, not always the investor decides to use the thermo-modernization bonus. There are other forms of co-financing for thermal modernization available on the market. It is true that in most of these support methods an energy audit is also required, but in general it is not subject to any verification. This sometimes leads to a situation where the achieved savings in energy consumption after the end of the investment are significantly different from those shown in the audit [7]

Therefore, a good practice in the operation of an administrator carrying out thermal modernization should be:

1. entrusting the preparation of an energy audit to a person with experience

2.Verifying the audit prepared by an independent expert (unless it is verified in the process of applying for funding)

Such a procedure is a guarantee of properly prepared thermo-modernization, and thus the achievement of the assumed results.

8 Climate policy

8.1 Long-term Renovation Strategy Supporting the Renovation of the National Building Stock

8.1.1 Guidelines for supporting the renovation of buildings in Poland

Adopting the perspective of transforming the building stock towards the climate improvement by 2050 means a series of changes in energy carriers used in Poland

- total resignation from the use of coal for heating purposes:
  - in all residential buildings by 2040 (in cities - until 2030),

- as soon as possible withdraw the coal used for heating in buildings undergoing renovation and replacement of heat sources,

• almost complete withdraw of natural gas used in residential buildings and non-residential until 2050:

- withdrawal the use of natural gas sources during the renovation of residential and non-residential buildings until 2030,
- withdrawal of gas sources in other buildings during the deep renovation by 2050

Building renovation support programs leading to improving energy efficiency and the transformation to a neutral economy climatically will include:

1. Financial support:
   1.1. thermomodernization bonus
   1.2. continuation of the Clean Air and Stop-Smog for single family houses
   1.3. Thermomodernization and Renovation Fund (FTiR)-
   - redirection of the fund to support deep thermal modernization of multifamily houses (the amount of the bonus depends on the final class of the building),
   - connecting the process of supporting thermal modernization of buildings with the installation of renewable energy sources in them,
   - support of the renovation of buildings which, for legal reasons (conservation protection), do not may be subject to standard thermal modernization •
   - transfer to the FTiR of some funds from European Funds, including funds from the National Reconstruction Plan, to increase the energy efficiency of multifamily buildings

   1.4. European Funds (National Reconstruction Plan)
   - increasing the energy efficiency of residential buildings (including energy audit),
   - continuation of existing and creation of new programs ensuring promotion, raising awareness and knowledge of residents, entrepreneurs, local authorities in the field of energy efficiency of buildings and use of renewable energy,
2. Intelligent technology
   2.1. Support for the development of intelligent technologies. Implementation of intelligent management systems energy at building and city level to optimize energy use
   2.2. Legal and financial framework. Introduction of legal regulations and financial instruments supporting the implementation and operation of intelligent technologies, in particular, the installation of smart meters and intelligent systems metering
   2.3. Research and development support
3. Skills and education
   3.1. Incorporation of the construction technician and renewable energy technician into the country forecasts of the demand for employees
   3.2. Rebuild the school system towards permanent learning, to strengthen competence of employees in the construction sector in the field of energy efficiency of the buildings, installation technique and heat sources.
   3.3. Development and monitoring of regional and national balances of professionals working on renovation of buildings,
4. Financing the renovation of the building stock

4.1. Promotion of the ESCO model

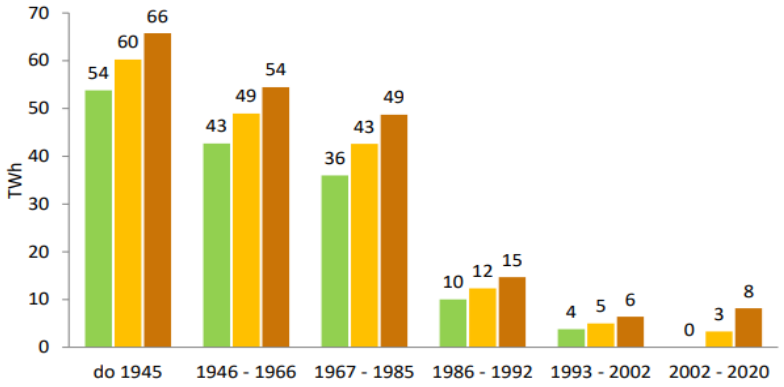
5. Supervision, consultancy and information
   5.1. information campaigns and incentive for building users, encouraging to the change of behaviours leading to the reduction of energy consumption in buildings
   5.2. continuing to develop energy consulting systems

8.1.2 Energy savings potential for residential buildings

The chart below shows the energy saving potential for residential buildings in which:

- cost-effective thermal modernization can be carried out,
- it is technically possible to carry out thermomodernization according to 2021 standard, (i.e. the standard specified in the Ordinance of the Minister of Infrastructure on technical conditions to be met by buildings and their location), [18]
- it is technically possible to carry out thermomodernization to the standard of nearly-zero energy building

Energy savings potential in TWh *[calculation done by KAPE]*

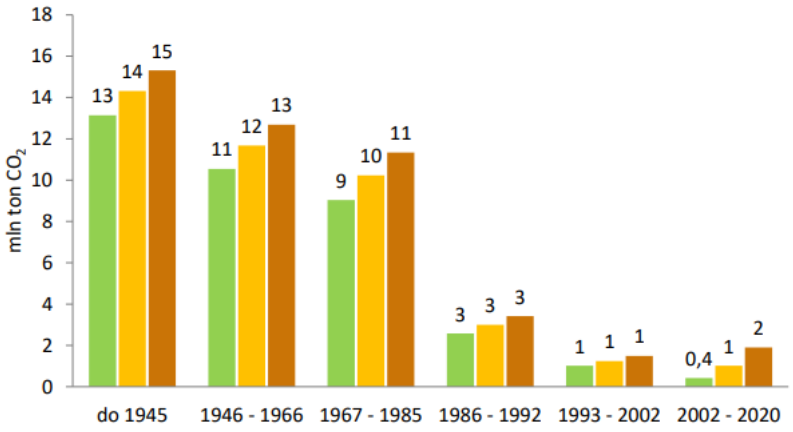


cost-effective thermomodernization

technically possible thermomodernization to the 2021 standard

technically possible thermomodernization to the nearly-zero energy standard

Emission reduction in mln ton CO_2 *[obliczenia KAPE]*



cost-effective thermomodernization	technically possible thermomodernization to the 2021 standard	technically possible thermomodernization to the nearly-zero energy standard

Economically efficient thermomodernization allows to achieve reduction of CO2 emissions around 37 million tons per year, which is approx. 25% of the total annual greenhouse gas emissions in Poland.

8.2 Other measures to stimulate energy efficiency of buildings

8.2.1 Creation of the Central Emission Register of Buildings (CEEB)

The Central Register of Emissivity of Buildings (CEEB) is an IT tool for inventory of low emission sources in buildings. In this system, the information on the sources of emissions in the municipal and housing sector will be collected. The system will allow to collect data on the energy condition of buildings and information on forms of public aid (subsidies, preferential loans) granted for heat systems modernization or replacement of old boilers in buildings.

8.2.2 Heat, Electricity and Gas Fuel Supply Plans

The Energy Law imposes an obligation to prepare municipal Energy Supply Plans, which should include in cities development of heating and gas networks, which is directly related to thermomodernization and climate protection.

8.2.3 Low- emission Plans

Low-emission economy plans are strategic documents containing the actions that local authorities plan to take to reduce energy consumption, CO_2 emission, improve energy efficiency and use of renewable energy sources.

8.2.4 Nationwide support system for energy advisors

The project "A nationwide Polish system of advisory support for the public and housing sector and enterprises in the field of energy efficiency and renewable energy" is implemented by the National Fund for Environmental Protection and Water Management in cooperation with partners throughout the country.

8.3 Financial tools

8.3.1 National Fund for Environmental Protection and Water Management programme "Clean Air"

This program is one of the most important NFEPWM programs, including decommissioning high-emission solid fuel heating sources and thermomodernization of single-family housing.

The programme was launched in 2018 and will last until 2029. The most important goal is to reduce the emission of harmful substances to the atmosphere resulting from the heating of single-family houses. The program offers co-financing for the replacement of old and ineffective heat sources using solid fuel with modern heat sources that meet the highest standards (these are: heat substation, heat pump, gas boiler condensing boiler, condensing oil boiler, electric heating, solid fuel boiler (coal, biomass)), as well as carrying out the necessary thermomodernization works in the building.

One of the main reasons for the smog problem in Poland is the so-called low emission, i.e. release into the atmosphere harmful substances. The addressees of the program are owners or co-owners of a single-family residential building, or a separate apartment in a single-family building with a separate land and mortgage register, and people who have obtained permission to start the construction of a single-family residential building. The maximum level of subsidy for the project, which includes: heat source replacement, mechanical ventilation, thermal modernization, is PLN 32,000.

8.3.2 Program Clean air in schools

Clean Air in Schools program is a follow-up activity supporting the improvement of air quality in Poland. The main goal of the program will be improvement of air quality and reducing energy consumption, including improving energy efficiency in schools. Important an element of the program will be a handbook of good practice in thermomodernization of educational facilities.

8.3.3 National Fund for Environmental Protection and Water Management programme "Energy-efficient construction. Part 1) Decrease energy consumption in construction "

The energy modernization program covered hospitals, care and treatment facilities, historic buildings, sacred buildings, student houses or buildings intended for the needs of culture, religious worship, education, and others. The program offer financing of the thermomodernization measures such as building insulation, replacement of windows and doors, reconstruction of heating systems (including the replacement of the heat source), modernization of ventilation systems and air conditioning, replacement of lighting with energy-saving ones, use of management systems energy in buildings and the use of renewable energy sources.

8.3.4 Thermomodernization and Renovation Fund

The budget of the Thermomodernization and Renovation Fund (FTiR) is determined every year, and its functioning is continuous. FTiR is one of the oldest continuously functioning tools supporting energy efficiency in Europe (it has existed continuously since 1998).

Last data confirm the thesis that a lot of multi-family buildings have already undergone thermomodernization.

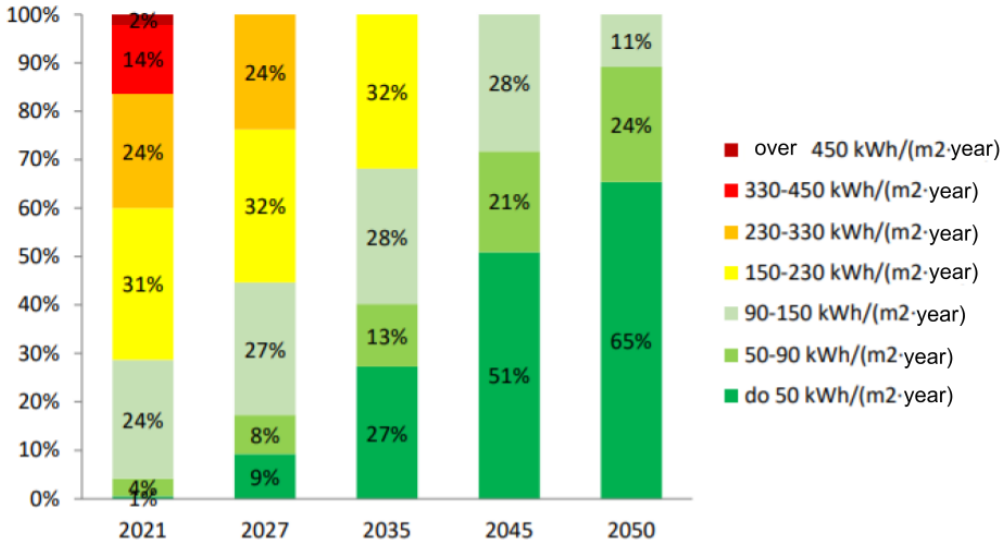
8.3.5 Supporting modernization in residential buildings

The beneficiaries may be housing cooperatives, housing associations with specified areas, entities that are suppliers of energy services within the meaning of Directive 2012/27 / EU. The support is intended to finance projects related to deep, comprehensive energy modernization of buildings, including thermal insulation of the facility and replacement of equipment in facilities with energy-efficient ones.

8.4 Three renovation scenarios - action plan until 2050 [1]

8.4.1 Scenario of fast and deep thermomodernization

The first scenario assumes extensive, deep thermomodernization of the building stock, which will start with the least efficient buildings with the lowest energy efficiency. This is the most ambitious and cost-effective plan. This scenario assumes that all buildings characterized by the EP index greater than 330 kWh/(m^2·year) will be modernized by 2027, and by 2035 buildings characterized by the EP index greater than 230 kWh / (m^2·year). In 2045 all buildings will have an EP index of no greater than 150 kWh / (m^2·year). According to the scenario, by 2050 65% of the buildings will have passive standard, and 24% energy-efficient standard. The remaining 11% of buildings, which, for technical reasons, cannot be modernized will reach efficiency 90-150 kWh / (m^2·year).

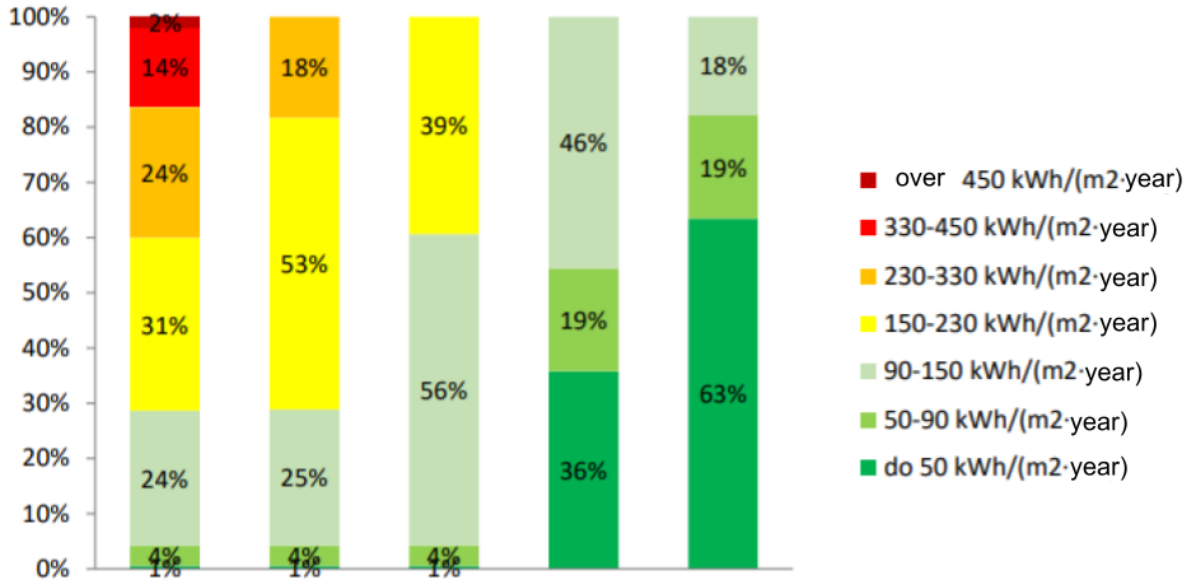


Thermomodernization stages according to the year and building standard

8.4.2 Scenario of stage thermomodernization

The second scenario assumes extensive renovation of the building, in which buildings in the worst condition will be modernized in stages until the best standard of building efficiency is achieved. Each stage of modernization covers only a part of the full scope of thermal modernization works, which can be spread over time to avoid accumulation of capital expenditures.

According to the stage modernization scenario, 63% of the buildings will reach by 2050 the passive standard, and 19% the energy-saving standard. Others 18% of buildings which, for technical or economic reasons, cannot be so deep modernized, they will get efficiency standard of 90 150 kWh/(m2 ·year). The final result of the scenario is slightly worse than the quick and deep scenario.

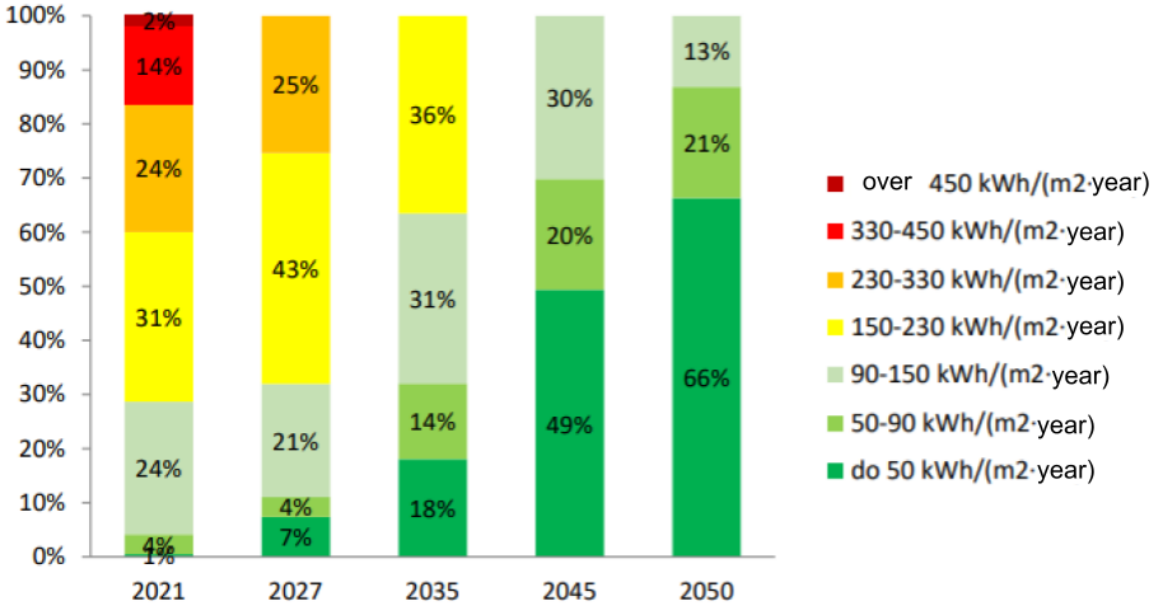


Thermomodernization stage according to the year and building standard

8.4.3 Recommended scenario

The recommended scenario assumes an approach that combines the advantages of the previous two scenarios. It includes the fast implementation of the first stage of thermomodernization of buildings in the worst energy condition and combined it with the popularization of deep thermomodernization in the coming years, and then popularization of a high standard renovation on the entire market.

This scenario assumes that by 2027 all buildings with an EP index greater than 330 kWh / (m2 year) will be modernized, and by 2035 all buildings with an EP index greater than 230 kWh / (m2 year) will be modernized. What is more, in 2045 all buildings will have an EP index of no more than 150 kWh / (m2 · year).



Thermomodernization stages according to the year and building standard

9 Technical aspects of the thermomodernization

9.1 Technologies for insulating the building envelope

Currently, the most popular insulation materials in Poland are mineral wool and polystyrene. The use of these materials in the case of the desire to modernize existing buildings to high, passive and zero-energy standards creates many problems, mainly due to the thickness of these materials on the external walls, which exceeds 20 cm.

Technological problems arise with this thicknesses of insulating materials (sometimes even more than 20 cm). In the case of the seamless method, cracks may occur in the plaster, while in the case of the light dry method, there is a possibility of related complications with a construction grate.

Secondly, the over twenty-centimetre thickness of the insulation changes the architectural expression of the building. This sometimes reduces the balcony area by around 30%.

Third, if there is a need to insulate from the inside, the high thickness of the insulation reduces, the usable area of the room in which the modernization works are carried out.

In the case of pitched roofs, a significant (over 30 cm) layer of wool insulation makes necessary to reinforce the existing structure, which increases the cost investment.

Therefore, new technologies should be introduced as soon as possible. Among them are:

- Vacuum insulations
- Intelligent insulations
- Aerogels
- Smart windows
- Modern heating, ventilation and air conditioning systems

10 The role of managers in the implementation of tasks related to the modernization of buildings

The reason for determining the role of property managers in improving the energy efficiency of multi-family residential buildings in accordance with the requirements of the European Green Deal is a social study of their needs in the field of raising qualifications.

10.1 Research on the needs of real estate managers in Poland in the area of improving skills in improving energy efficiency and climate in buildings and their surroundings

This study was conducted in February-March 2021 as part of the CLI-MA project. The survey model and questionnaire were developed by specialists from the Riga Technical University, who conducted the same survey among property managers in Latvia.

The sample of the survey was made available by supporting partners from Germany, ie the German Association of Real Estate Respondents (VDIV e.V.), which conducted a similar survey among German property managers[1].

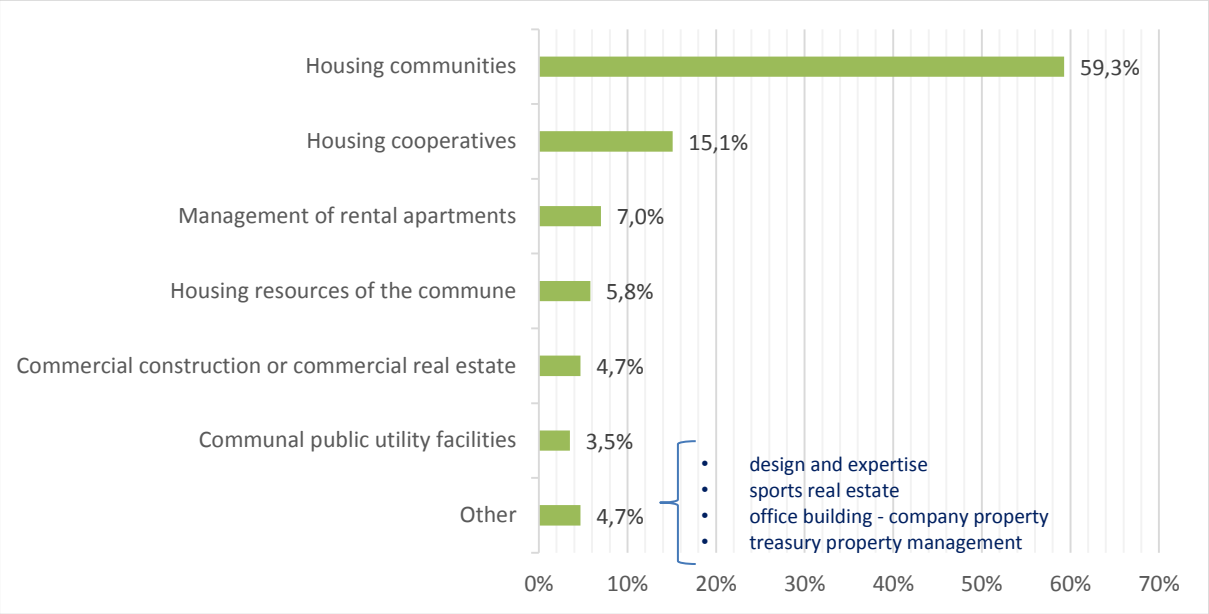
10.1.12.1 Characteristics of the respondents

Polish respondents to the survey were invited through the Administrator24.info portal and entities associating property managers: Polish Association of Real Estate Managers (PSZN), Polish Federation of Real Estate Professions Associations (PFSZN), Podlaskie Association of Real Estate Respondents, Warmian-Masurian Association of Real Estate Respondents. 86 real estate managers took part in an anonymous online survey, 65% of whom have been involved in property management for over 10 years. The state property administrator's license (valid until 2013) was obtained by 48% of respondents, while the industry license or property manager's certificate was obtained by 42% of them.

59% of the surveyed people deal with management in housing communities on a daily basis. The rest of the participants are real estate managers of a different type who also provide other services for property owners.

[1] https://cli-ma.eu/en/training-materials

Diagram 1. Structure of the respondents' activity areas



10.1.2 Summary of the study results

This section presents what respondents are saying about the requirements faced by property managers when introducing the principles of the European Green Deal for property management.

Involvement in projects related to increasing the energy efficiency of buildings

- In the surveyed group, 80% of property managers believe that they have participated in the implementation of activities increasing the energy efficiency of buildings at least once (26% of managers declare that they do it regularly, 45% that they have implemented such an action several times, 9% declare that they did it only once).
- 89% of property managers declare that in the future they will implement measures to increase the energy efficiency of the buildings they manage.

Competences

- There is widespread agreement that the knowledge of various aspects of real estate management: technical, legal, financial, organizational, social, information exchange is necessary for effective operation in the area of implementing solutions dedicated to energy efficiency of buildings.

- Necessary knowledge from various areas, according to managers, in order to effectively implement solutions dedicated to the energy efficiency of buildings, is:
    - Technical knowledge: energy-saving materials, building physics, energy-saving building structures, energy-saving engineering technologies in construction
    - Financial and economic knowledge: economic evaluation of projects, financial support instruments, investing
    - Legal knowledge: building management regulations, contracts for the supply of services, contracts for construction and renovation works
- Solving legal problems in the field of improving the energy efficiency of buildings and the selection of optimal technical solutions for energy efficiency are the areas of competence that require strengthening to the greatest extent.
- According to the managers, skills in various areas necessary to effectively implement solutions dedicated to the energy efficiency of buildings are:
    - Management and organizational: in order from the most important to the less important - planning activities to improve energy efficiency and the use of renewable energy sources, project management, risk management
    - Communication: the most important are two - consultation and conducting discussions and meetings

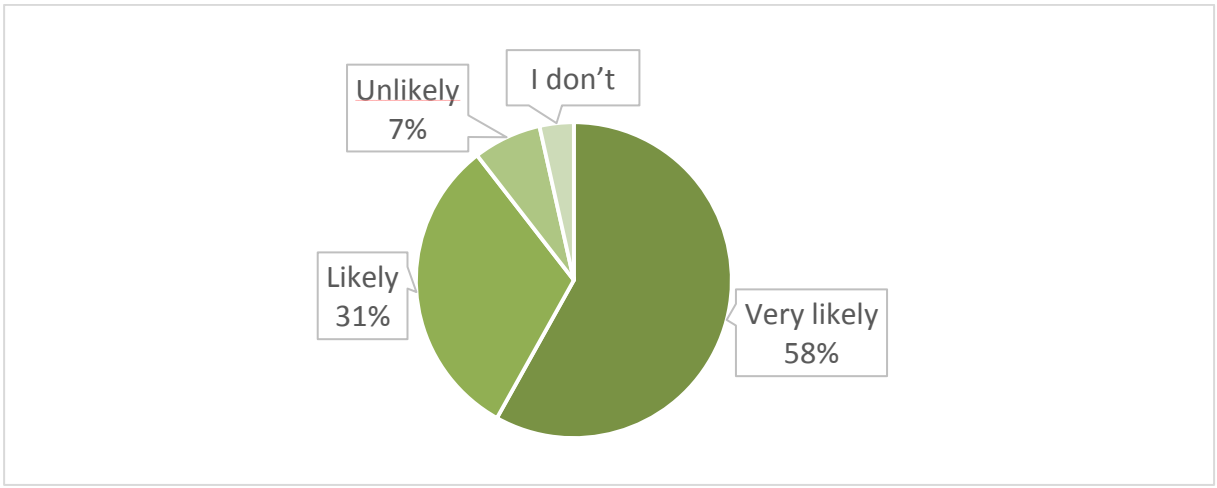
Barriers related to the implementation of solutions dedicated to the energy efficiency of buildings

- Awareness of the necessity of such actions - only 60% of managers are of the opinion that such actions should be obligatory
- Insufficient financial support for the modernization of multi-family buildings and unclear state policy regarding the efficient use of fuels and energy in the economy - the two most important barriers to the implementation of the European Green Deal
- Uncertainty about the beliefs of building residents about the economic benefits resulting from improving the energy efficiency of the buildings in which they live, with high awareness of the managers at the same time

10.1.3 Detailed presentation of the research results

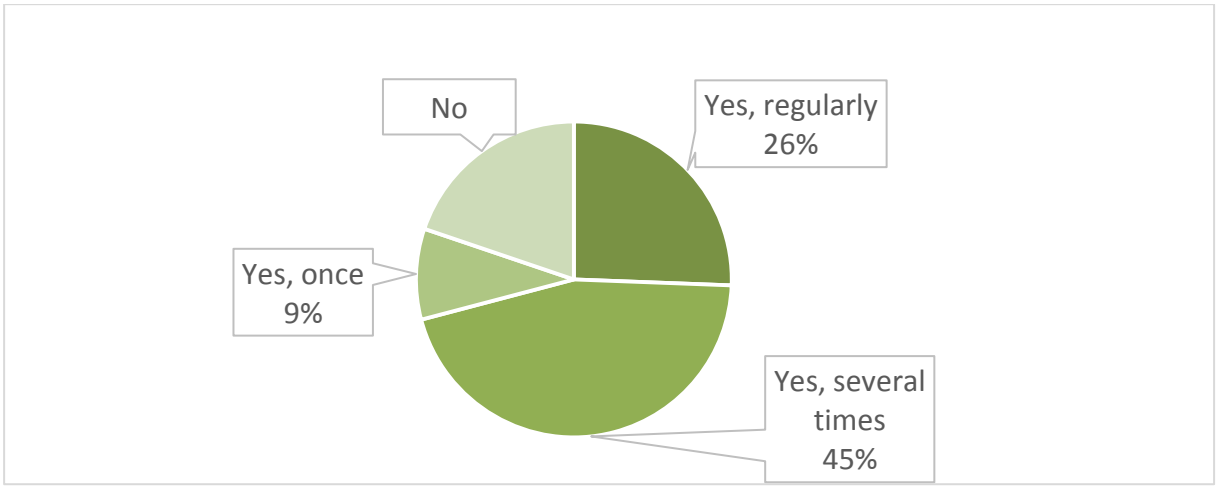
Presentation is in the form of asked questions and received answers with comments

Q.1. To what extent do you think you will be implementing measures to increase the energy efficiency of buildings in the future?



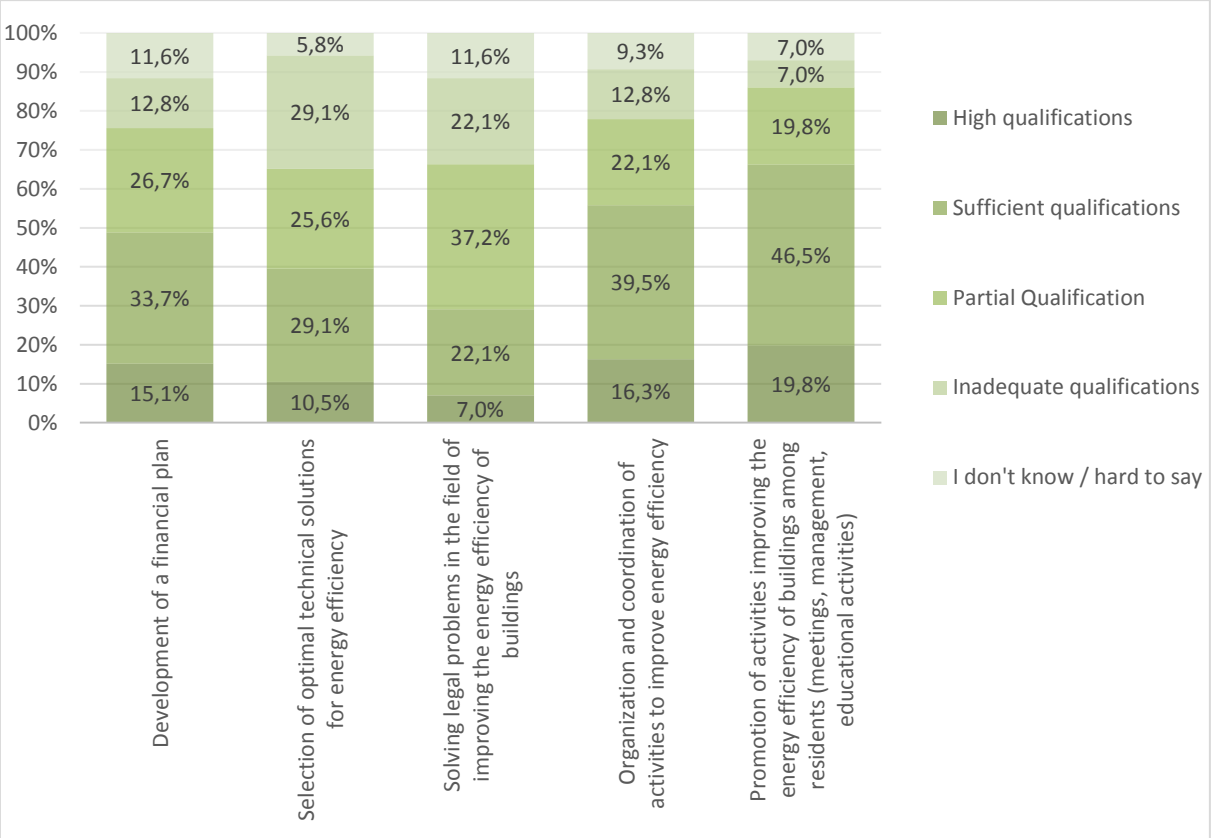
89% of respondents declare that in the future they will implement measures to increase the energy efficiency of the buildings they manage.

Q.2. Have you participated in the implementation of activities increasing the energy efficiency of buildings?



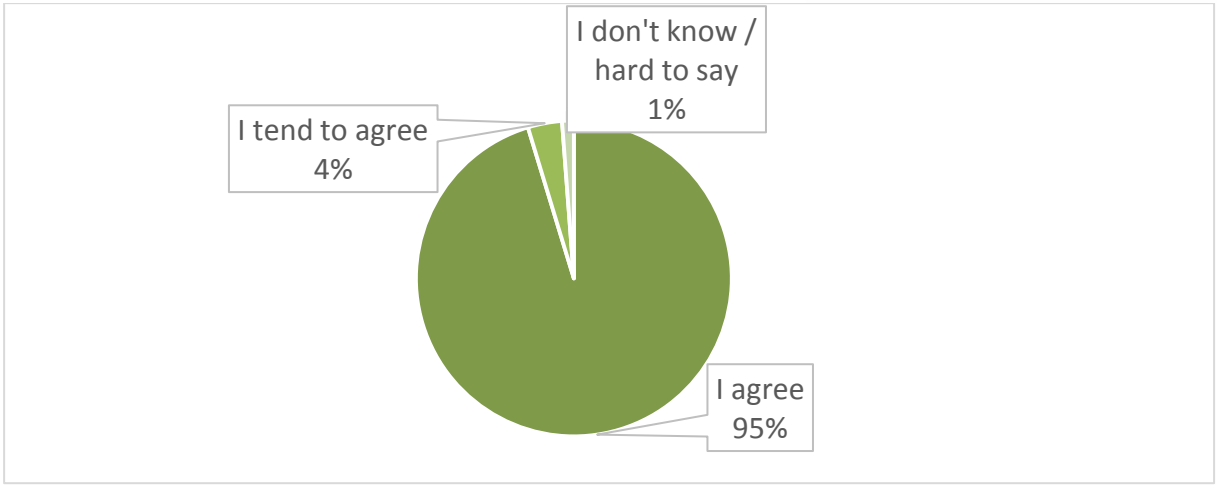
Among the respondents, 80% declare that they have participated in the implementation of activities increasing the energy efficiency of buildings at least once - in the entire surveyed sample, 26% of managers declare that they do it regularly, 45% that they have implemented such an action several times, and 9% only once.

Q.3. Please assess your competence / qualifications to implement the following measures to improve the energy efficiency of buildings:



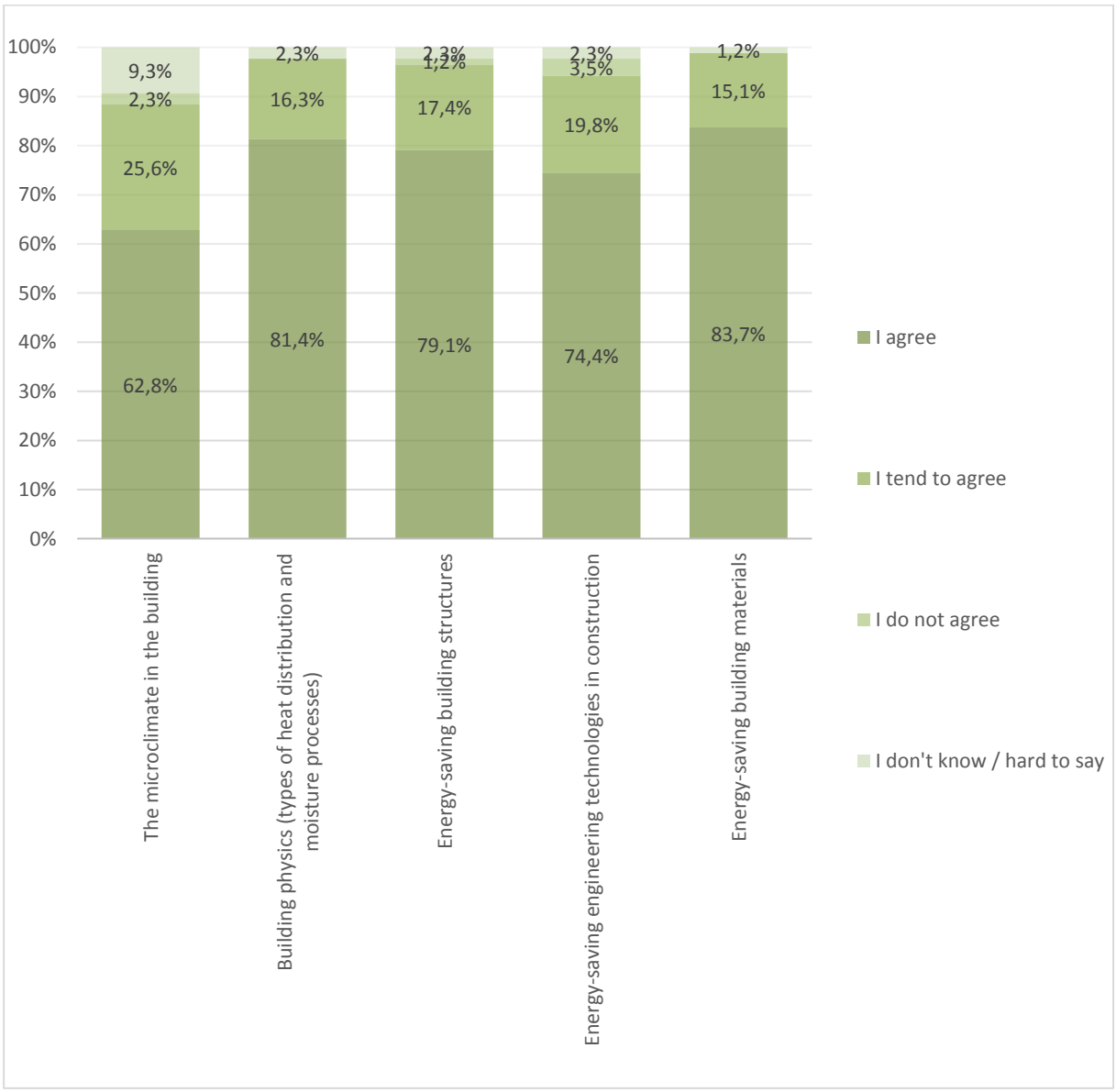
Among the analyzed areas, managers have the most deficits in solving legal problems in the field of improving the energy efficiency of buildings and in selecting optimal technical solutions for energy efficiency. Managers have the highest qualifications in the area of promoting activities improving energy efficiency of buildings among residents.

Q.4. Please indicate to what extent you agree with the statement that in order to effectively implement measures that improve the energy efficiency of buildings, knowledge of various aspects of property management is required: technical, legal, financial, organizational, social, information exchange.



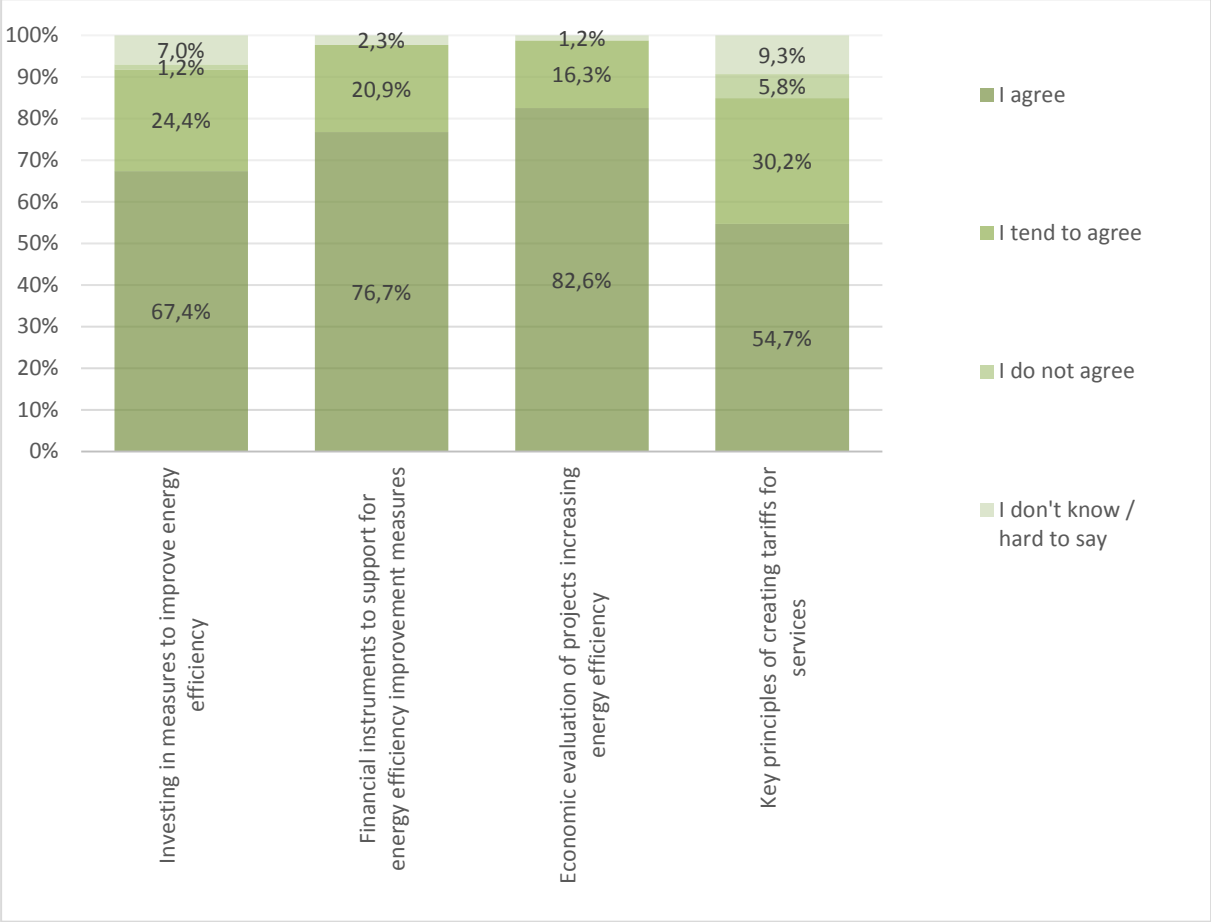
Almost all respondents (95%) agree with the opinion that in order to effectively implement measures that improve the energy efficiency of buildings, knowledge of various aspects of property management is required: technical, legal, financial, organizational, social, and information exchange.

Q.5. Please indicate to what extent you agree with the statement that the following technical knowledge and skills are required to successfully implement energy efficiency measures in buildings.



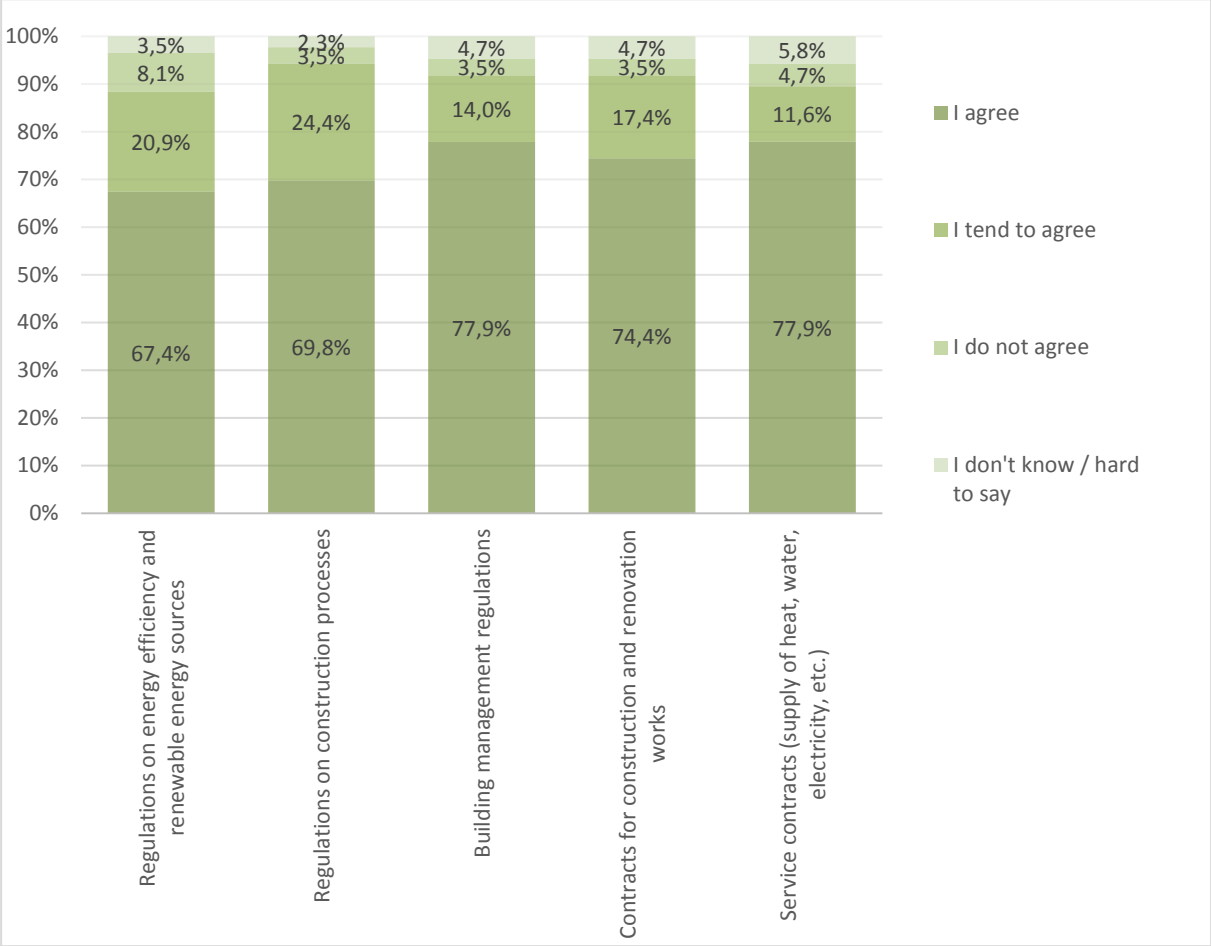
The respondents agree on the following areas of knowledge and skills that they are necessary for the effective implementation of measures to increase the energy efficiency of buildings: energy-efficient materials, building physics, energy-efficient building structures, energy-efficient engineering technologies in construction. According to the managers, knowledge about the microclimate in the building is not so necessary to conduct effective activities in the area of improving the energy efficiency of buildings.

Q.6. Please indicate to what extent you agree with the statement that in order to effectively improve the energy efficiency of buildings, the following financial and economic knowledge from the following scopes is required.



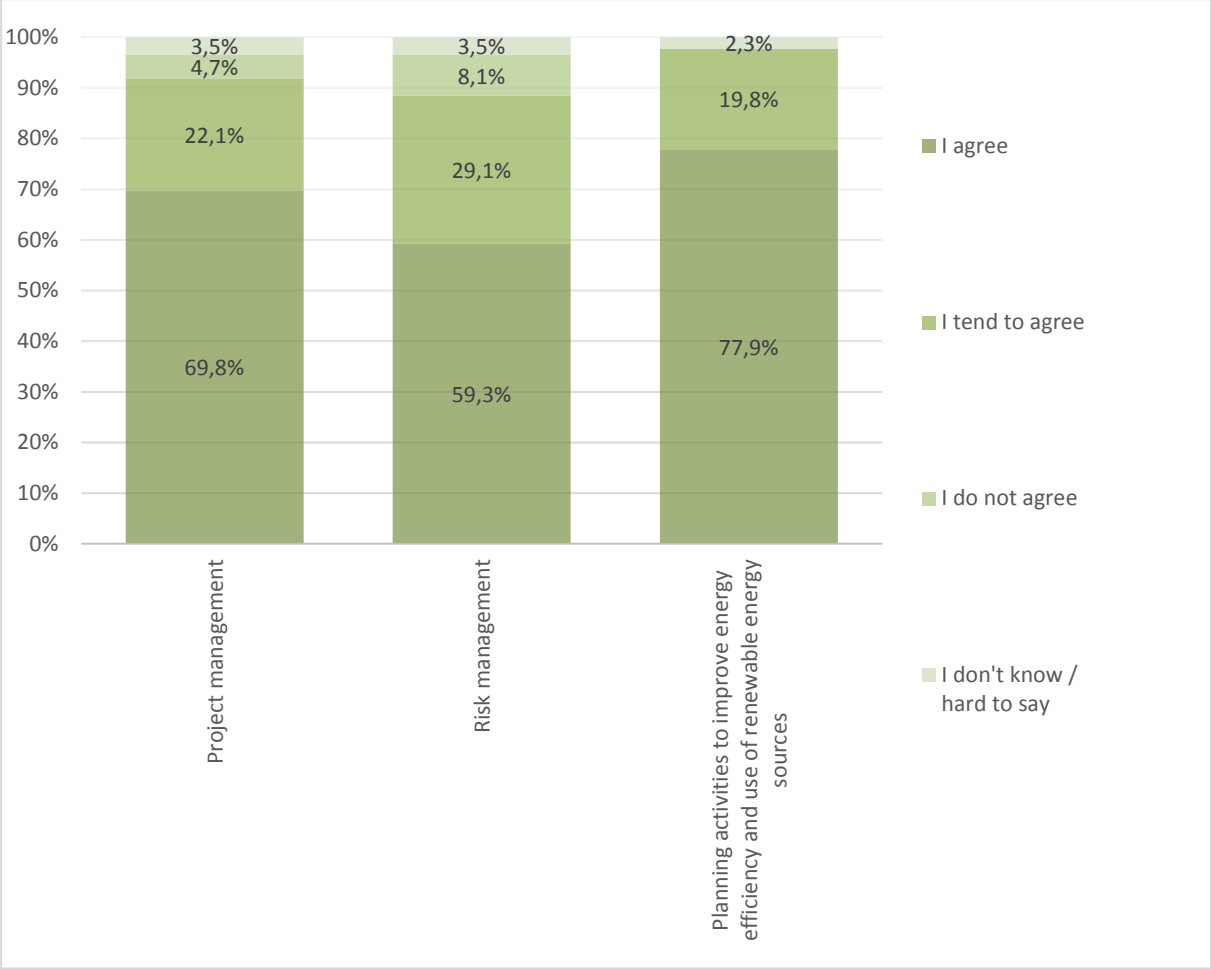
Most of the respondents agree that in order to carry out effective activities in the field of improving the energy efficiency of buildings, they need to have, first of all, knowledge of the economic evaluation of projects and knowledge about financial support instruments, and then knowledge about investing. To a lesser extent (slightly over 50% are convinced) respondents need knowledge about the key principles of creating tariffs for services.

Q.7. Please indicate whether you agree with the statement below that in order to effectively implement measures to improve the energy efficiency of buildings, the following legal knowledge is required related to:



The three most important areas of legal knowledge that are necessary to effectively implement measures to improve the energy efficiency of buildings are: building management regulations, contracts for the supply of services and contracts for construction and renovation works. Regulations on energy efficiency and renewable energy sources as well as regulations on construction processes are important for almost 3/5 of the surveyed managers.

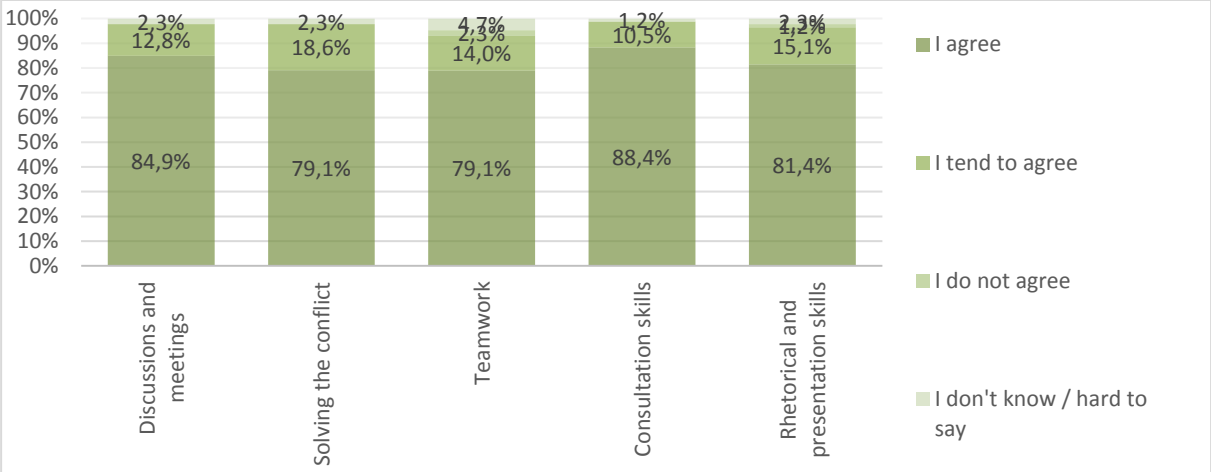
Q.8. Please indicate whether you agree with the statement that in order to successfully implement measures to improve the energy efficiency of buildings, the following organizational and management skills are required:



According to managers, planning activities to improve energy efficiency and the use of renewable energy sources is the most important skill contributing to the effective implementation of measures to improve the energy efficiency of buildings.

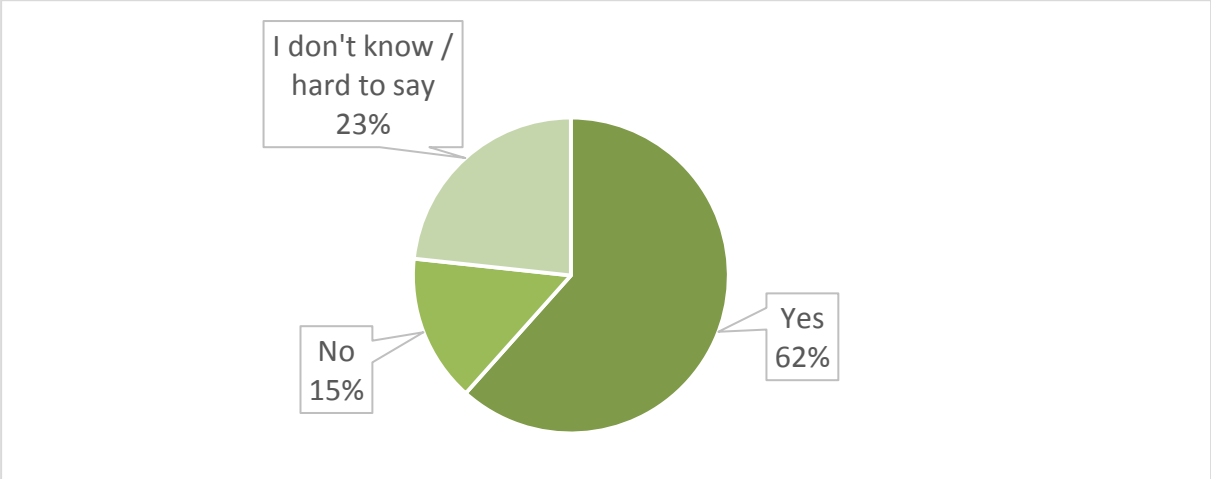
In the second place is skill of project management and in the last place it is risk management.

Q.9. Please indicate whether you agree with the statement that the following communication skills are required when implementing measures to improve energy efficiency in working with building residents:



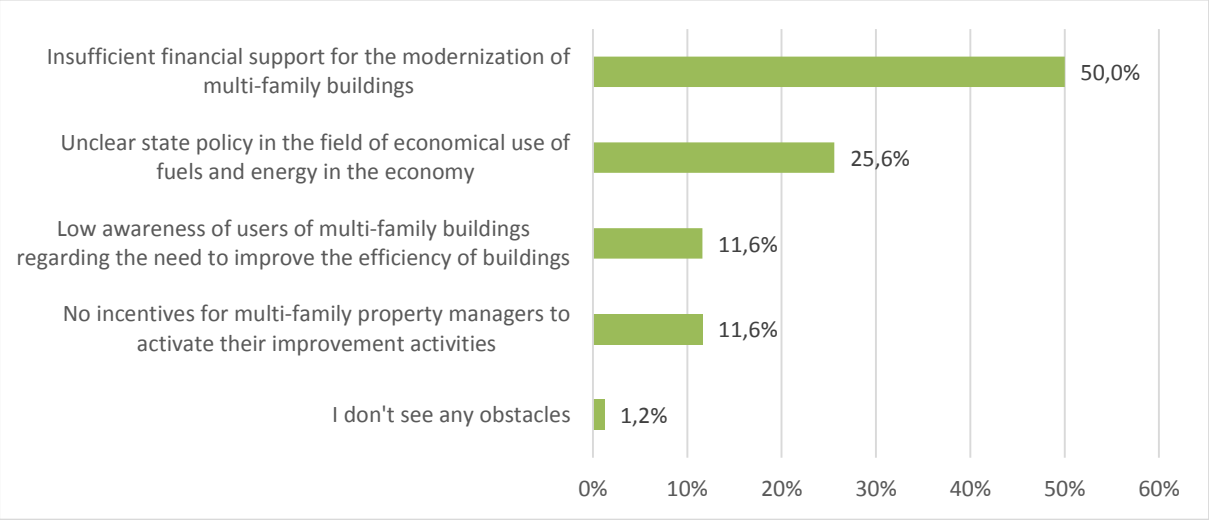
Generally speaking, the vast majority of managers agree that all indicated communication skills are important in working with building residents. Of these, two seem to be the most important: consulting skills and conducting discussions and meetings.

Q.14. Please indicate whether, in your opinion, energy modernization of multi-family buildings should be obligatory?



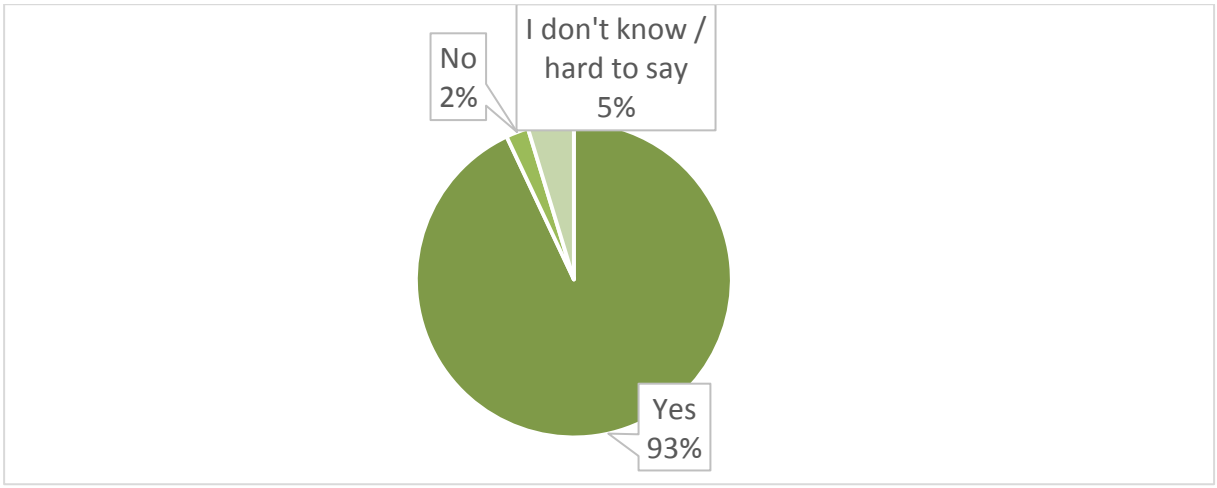
Over 60% of the surveyed managers are of the opinion that energy modernization of multi-family buildings should be obligatory.

Q.15. Thanks to the implementation of the European Green Deal strategy, Europe is to become a climate neutral continent by 2050, inter alia by ensuring greater energy efficiency of buildings. What are the main obstacles in the implementation of the European Green Deal, which will be adopted as a strategy by all EU Member States, including Poland?



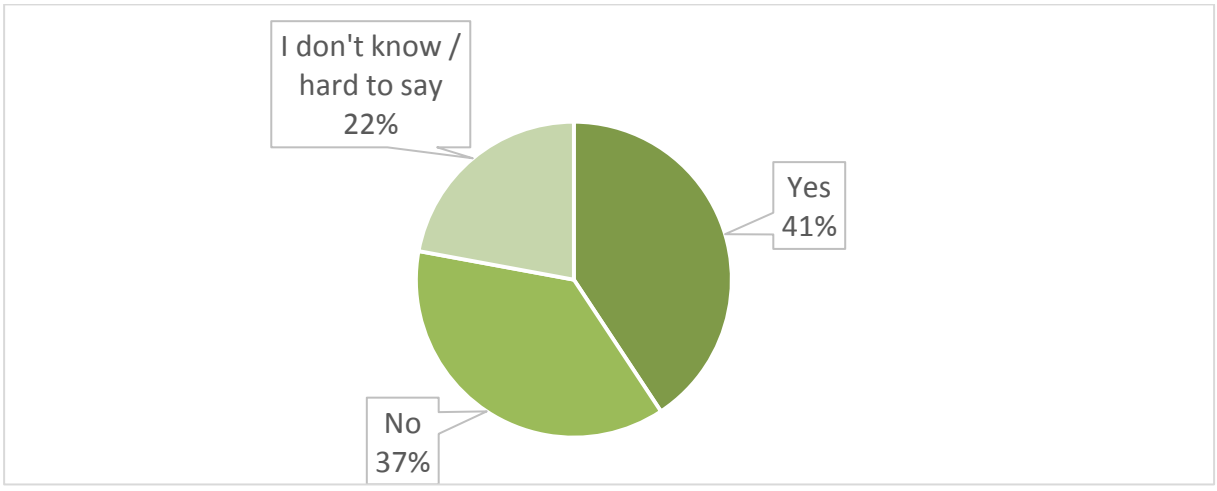
The main obstacles to the implementation of the European Green Deal are, according to the property managers, insufficient financial support for the modernization of multi-family buildings (50%) and the unclear state policy regarding the efficient use of fuel and energy in the economy (26%).

Q.16. Are you aware of the economic benefits of improving the energy efficiency of multi-family buildings?



Almost all property managers are aware of the economic benefits that result from improving the energy efficiency of multi-family buildings.

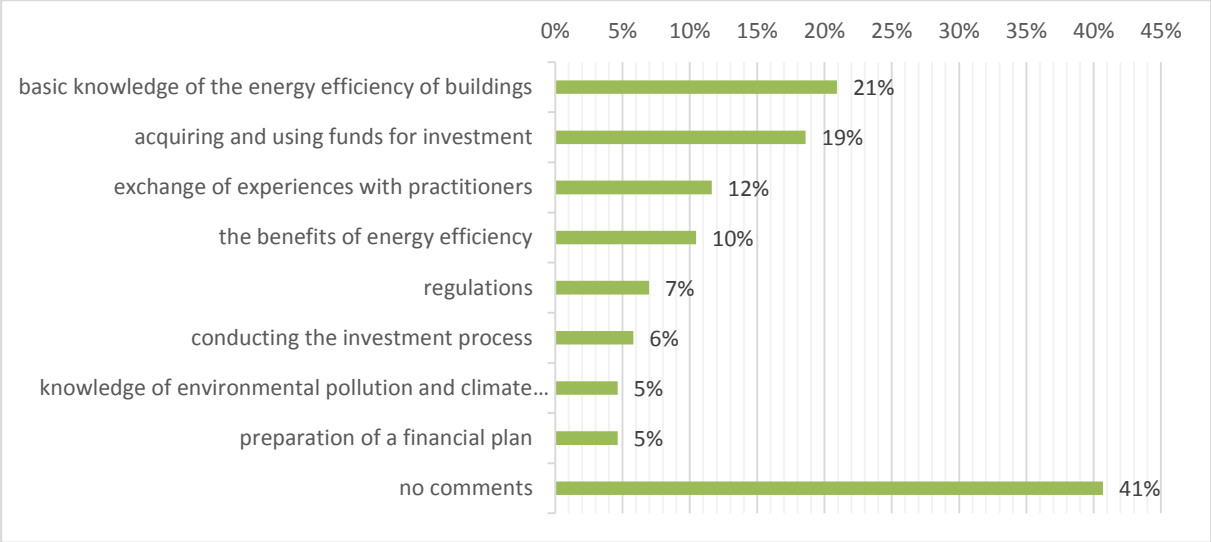
Q.17. In your opinion, are the residents of multi-family houses aware of the economic benefits resulting from improving the energy efficiency of multi-family buildings?



The respondents are not so sure of the awareness of the economic benefits of improving the energy efficiency of multi-family buildings among residents of this type of houses - only 41% of managers express a positive opinion on this subject.

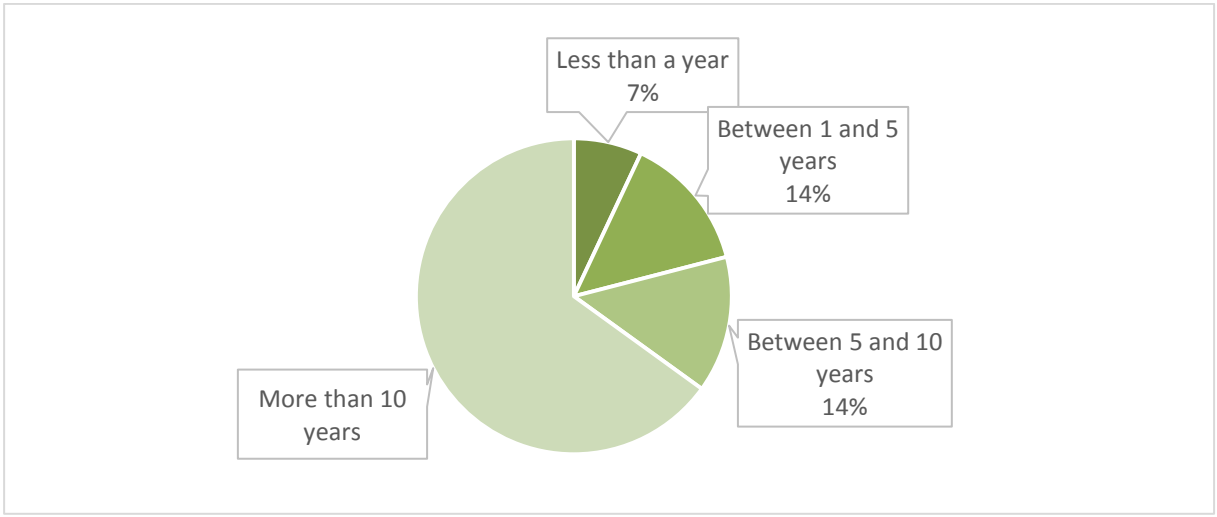
Q.18. Could you please share your suggestions and recommendations regarding the competences that are necessary to take actions to improve the energy efficiency of buildings and reduce their

impact on climate change? What competences and skills, according to you, require broadening the knowledge and improving the skills of property managers in this area?

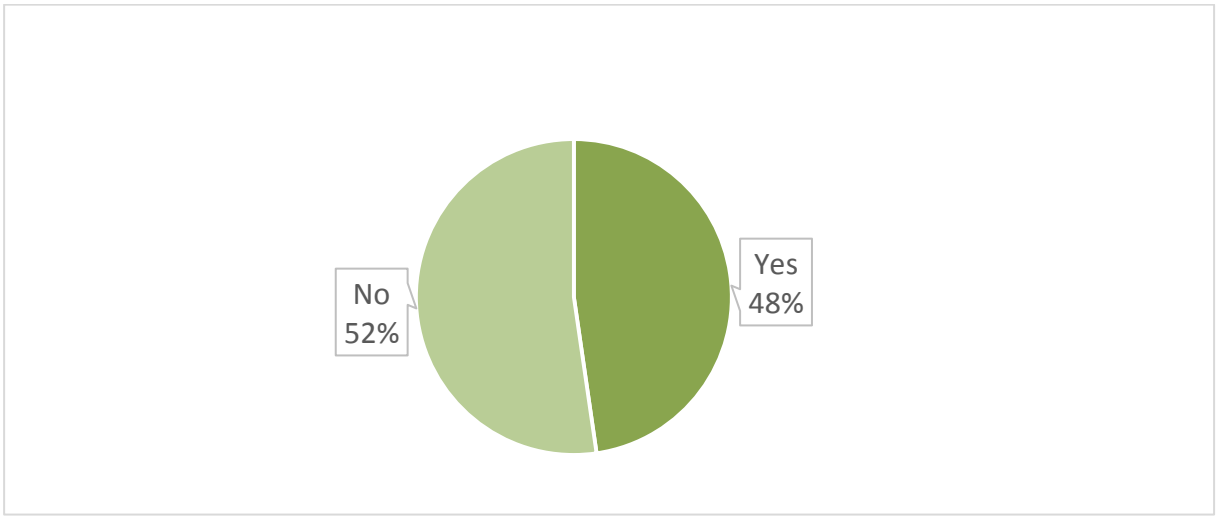


The most frequently indicated by property managers additional areas for extension are basic knowledge in the field of energy efficiency of buildings (21% of indications) and knowledge on obtaining and using funds for investments related to improving the energy efficiency of buildings (19% of indications). An important area seems to be the need to exchange experiences between managers - indicated only by 12%, but it is an area with potential.

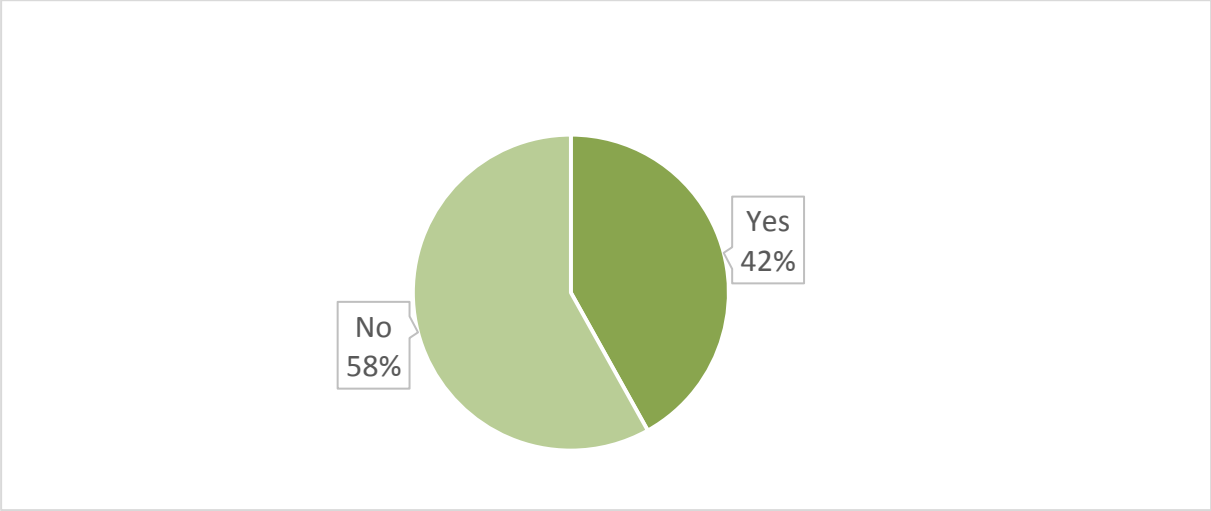
Q.10. How long have you been managing real estate?



Q.11. Have you obtained a state property administrator's license by 31.12.2013?



Q.12. Have you obtained an industry license or a property manager's certificate after December 31, 2013?



[1] Długoterminowa Strategia Renowacji - Warszawa, luty 2021
[2] Efektywność energetyczna w Polsce w roku 2013 – przegląd , Instytut Ekonomii Środowiska 2014
[3] Efektywność wykorzystania energii w Polsce w latach 2008-2018 ; GUS 2020
[4] Opracowanie metodologii i przeprowadzenie badania skali działań termomodernizacyjnych budynków mieszkalnych wielomieszkaniowych w celu poprawy ich energochłonności oraz ocena potrzeb i planowanych działań w tym kierunku, praca badawcza GUS 2017
[5] Dane liczbowe Funduszu Termomodernizacji i Remontów do roku 2020, BGK 2021
[6] Budownictwo w Polsce w roku 2018; GUS 2019
[7] Efekty termomodernizacji wielorodzinnych budyniów mieszkalnych będących w zasobach spółdzielni mieszkaniowych, realizowanej z udziałem środków publicznych; NIK 2019
[8] Krajowy plan na rzecz energii i klimatu na lata 2021-2030, Ministerstwo Aktywów Państwowych 2019
[9] Ustawa o gospodarce nieruchomościami Dz. U. 1997 Nr 115 poz. 741 z późn. zmianami
[10] Rozporządzenie Ministerstwa Spraw Wewnętrznych i Administracji w sprawie warunków technicznych użytkowana budynków mieszkalnych, Dz.U. nr 74 pos. 836 1999 z późn. zmianami
[11] Strategia modernizacji budynków – Mapa drogowa 2050 – Konsorcjum
[12] Stan mieszkalnictwa w Polsce; Ministerstwo Rozwoju 2020
[13] Gospodarka mieszkaniowa i infrastruktura komunalna w 2019 r.; GUS 2019
[14] Centralna Ewidencja Charakterystyki Energetycznej Budynków
[15] Narodowy Spis Powszechny – GUS 2011
[16] Prawo budowlane ; Dz. U. 1994 Nr 89 z poen, zmianami
[17] Ustawa o efektywności energetycznej – nowelizacja 25.03.2021
[18] Warunki techniczne jakim powinny odpowiadać budynki i ich usytuowanie – nowelizacja 12.04.2002