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## TECHNICAL CONDITION OF SOVIET-ERA APARTMENT BUILDINGS, RELATED PROBLEMS AND POSSIBLE SOLUTIONS IN LATVIA

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**Abstract.** More than half of Latvia's population lives in Soviet-built, serial apartment blocks that have reached or are rapidly reaching the end of their useful life. The State Audit Office has acknowledged in its report that there is not an effective approach to housing security in the country, and the funds needed to renovate the buildings exceed the owners' ability to pay. The main problems are the following: the actual technical condition of these buildings is unknown (technical studies are needed), there are no freely available management fee savings for residents to pay for fundamental studies and repairs or renovations, there is insufficient or difficult access to public support for improving energy efficiency and the overall technical condition of buildings. Apartment buildings are also one of the largest contributors to greenhouse gas emissions (36 %), a problem which is relevant in the context of the national climate targets for 2023. In order to establish the actual technical condition of the buildings and to develop the most affordable improvement solutions, it is necessary to carry out a technical investigation for each of the apartment buildings, identifying the problems specific to each series and individual to each building, taking into account the different conditions to which the buildings are exposed in their daily operation. Such an approach would allow for the development of standard solutions to the problems specific to each series, saving resources and ensuring a higher quality of renovation works. The question remains how to address the financial support needed for comprehensive technical studies and the development of standard solutions. Is the technical condition of apartment buildings only a problem for residents (apartment owners), property managers, municipalities or the government?

**Keywords:** *Apartment buildings, technical studies, standard solutions, construction process, technical condition of buildings, climate, property manager.*

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### INTRODUCTION

Currently, about 70 % of the Latvian housing stock consists of buildings constructed between 1946 and 1990 (Riga Energy Agency, 2008), the majority of which are serial apartment block buildings. Annex 1 of the Cabinet of Ministers (CM) Regulation No 907 "Regulations Regarding the Survey, Technical Servicing,

Current Repairs and Minimal Requirements for Energy Efficiency of the Residential House” defines the average lifetime of these buildings depending on the type of construction and the materials used (see Table 1), by which it can be identified that the lifetime of serial buildings in Latvia has expired or is rapidly coming to an end.

**Table 1.** Average Lifetime of the Residential Buildings  
(Cabinet of Ministers, 2010)

Solidity group		Foundation construction, material	Material of load-bearing walls - frameless constructions ; material of load-bearing frame constructions	Roof construction, material	Average lifetime of the residential house in years	Notes
IV	Mass production buildings	Monolithic concrete and reinforced concrete, including on a plate, premanufactured element or pile foundation	Stone (brick) or large panel	Reinforced concrete, premanufactured elements	70	Batches 1-316; 1-318; 119
V	Mass production buildings	Monolithic concrete and reinforced concrete, including on a plate, premanufactured element or pile foundation	Panel and large panel	Reinforced concrete, premanufactured elements	60	Batches 103; 104; 1-464; 1-467A; 1-602; 602P

The end of expected lifetime of buildings and the risks associated with it are often mentioned in the media and government reports, but no practical solutions have been developed to address the problems. The State Audit Office of the Republic of Latvia has acknowledged in its report that there is not an effective approach to housing security in the country, and the resources needed to improve buildings are beyond the ability of owners to pay (The State Audit Office, 2019).

The authors of the article identify the following most important problems related to serial apartment buildings in Latvia:

1. The actual technical condition of the buildings is unknown;
2. The amount of funds accumulated for future maintenance work is not

- sufficient to carry out fundamental studies, repairs, renovations or alterations;
3. Government financial support for improving energy efficiency and the overall technical condition of buildings is insufficient or difficult to access;
  4. Multi-apartment buildings are one of the largest GHG emitters in Europe (36 %) (European Commission, 2017), which is relevant in the context of Latvia's and Europe's national energy and climate policy targets to reduce emissions by 2030 (Ministry of Economics, 2020).

In a situation where a significant proportion of the country's population lives in buildings that are subject to these problems, developing solutions must start by creating a common understanding of the subjects involved in the life cycle and management of apartment buildings – apartment owners and residents (neighbours), property managers, property valuers, banks, service providers, public authorities, insurers, municipalities and companies established by them. All these subjects are an essential and integral part of the life cycle of apartment buildings in various ways. The authors, therefore, stress that all these subjects should be involved in solving the problems mentioned above.

Limiting factors of the research: availability of literature and statistics. From a process management point of view, little or no research has been done on this topic. Technical studies have been carried out for a few buildings, but the overall processes and trends have not been analysed previously.

## **1. DETERMINING THE TECHNICAL CONDITION OF BUILDINGS: ANALYSIS OF THE EXISTING SITUATION**

Article 105 of the Constitution of the Republic of Latvia provides: "Everyone has the right to own property. Property shall not be used contrary to the interests of the public. Property rights may be restricted only in accordance with law. Expropriation of property for public purposes shall be allowed only in exceptional cases on the basis of a specific law and in return for fair compensation" (Constitutional Assembly, 1922). In the context of determining the technical condition of apartment buildings and preventing risks, it should be interpreted both as the right of apartment owners to decide how their property is managed and the fact that the property is related to the public interest, in this case – safety. According to the Latvian National Development Plan 2021–2027, the action line "housing" sets the following objective: "All households in Latvia have access to housing. By 2050, the existing housing stock meets high standards of energy efficiency, construction, safety and amenity" (Cross-Sectoral Coordination Centre, 2020). Given the expected lifetime of buildings as set out in Table 1, by 2050, all Soviet-built apartment buildings in Latvia will have far exceeded their useful life and will be unable to provide a safe living environment without significant improvements. It should be noted that the development plan among the tasks to achieve this specific objective does not include the determination of the existing technical condition of apartment buildings.

The urgency of the problem is also described in the audit report of the State Audit Office, which found that in 60 % of apartment buildings inspected during the audit, significant failures were found, including inadequate condition of roofing, increased moisture levels in the foundations of buildings, etc. (The State Audit Office, 2019). This finding also supports the authors' hypothesis that the technical condition of buildings is generally unknown.

### **1.1. Affordable Housing Guidelines 2023–2027**

Housing affordability is one of the basic human needs, which is also reflected in the OECD Better Life Index, where in the housing section, assessing both the quality of available housing and people's financial capacity for housing-related expenses and living space per household member, Latvia not only lags behind the index average, but shows the 5th lowest score of all countries, indicating that housing conditions are worse only in Colombia, Mexico, Slovakia and South Africa (OECD, n.d.).

The authors consider the Ministry of Economics Guidelines for Affordable Housing 2023–2027 as an important policy planning document for housing and apartment buildings. The set of measures included in the document should contribute to the improvement of the quality of life of the population and, consequently, to the increase of the housing assessment indicator – approaching the average indicator of OECD countries.

The main outcomes (deliverables) of the guidelines are divided into three groups:

- Supporting the solution of affordable housing problems;
- Improving the quality and amenity of housing;
- Encouraging investment in new housing stock.

In the context of Soviet-built apartment buildings, the results of Group 2 should be evaluated, the objectives of which include reducing the proportion of households with unsatisfactory housing conditions by 3 % over the period of the planning document, as well as improving environmental accessibility in 90 buildings.

Noting that 51 % of Latvia's apartment buildings are Soviet-built (serial), the Ministry of Economics states in a document that "Homeowners are responsible for preserving the quality of their homes by preventing premature deterioration" (Ministry of Economics, 2023). The authors stress that the concept of "preventing premature deterioration" is inappropriate in the context of these buildings, given the lifetime of the buildings shown in Table 1, as the key problem in a large proportion of apartment buildings is not premature deterioration, but the possibility of maintaining the quality of the building beyond its expected lifetime.

In general, the Ministry of Economics points out in the guidelines that both the number of buildings potentially to be renovated (both apartment buildings and private houses) and the potential renovation costs, which in the case of apartment buildings are indicated as EUR 11 000 000 000, are estimates, and calculations are made based on assumptions rather than data analysis, which confirms the authors' hypothesis about the lack of data and the fact that the technical condition of

buildings is unknown, thus making informed and data-based assumptions impossible, which further limits the development of effective solutions.

## 1.2. Need for Technical Investigation and Availability of Information

To achieve the objectives of housing security, energy efficiency and quality of life at the national level, it is necessary to start by assessing the technical condition of the existing housing stock. The Construction Standard on the Technical Inspection of Structures (LBN 405-21) identifies two ways of doing this:

- *technical survey* - the assessment of a structure or part thereof (including visual inspection of the structure or part of the structure), the identification and evaluation of the actual technical condition of its structures, the construction products incorporated therein, their connection points, which is the basis for a detailed study of the construction products, elements and their connection points incorporated in the structure or part thereof and for the preparation of a technical survey report;
- *technical investigation* - a detailed and in-depth technical examination of the construction, or part of a construction, of the built-in construction products, elements and their connection assemblies, by exposing the building structures, drilling or other destructive methods of investigation, in order to establish or specify the technical condition, defects and deficiencies of the construction or part of a construction, of the built-in construction products or elements, as well as their causes (Cabinet of Ministers, 2021).

In Latvia, measures to determine the technical condition of serial apartment buildings are already being partially implemented – the Ministry of Economics has carried out several procurements for technical investigation of Soviet-built serial apartment buildings from 2020 to develop standard solutions to the problems identified in the investigation. For example, based on the Contract EM 2022/15 of 30.05.2022, a report on the investigation of the mechanical strength and stability of the structures of apartment buildings (602 series) has been drawn up, within the framework of which the service provider has carried out technical investigation of 18 houses of the relevant series. The 602 series houses were mainly built in Riga – Purvciems, Plavnieki, Ziepniekkalns, Mezciems and Imanta districts (AS “Inspecta Latvia”, 2022). Although the exact number of houses of a given series is not publicly available in Riga or Latvia, it can be assumed from the number of 602 series houses observed in the urban environment that the 18 houses included in the study represent a small part of the entire housing stock of this series in Riga and Latvia. The authors of the article identify that the investigation was performed on a random selection of buildings. Buildings of the same or similar designs are subject to different conditions during construction and operation; therefore, without a technical investigation of each building it is not possible to carry out a qualitative analysis of the problems that can be solved using standard solutions.

Conditions affecting the operation of serial apartment buildings:

- Geography – proximity to the sea, freezing cycles, temperature regime;
- Geological conditions – changes during the lifetime of the house;
- Construction materials – quality, manufacturer;
- Insulation and renovation – quality of work, materials used;
- Construction contractor – quality of work, use of construction materials;
- Illegal alterations – information practically not available;
- Operational regimes, e.g., heating time, capacity and quantity, quality of management, regular repairs, energy losses.

Technical surveys are more general and only provide data on visually visible defects, which, although important, are considered to be incomplete information to make meaningful decisions about the future serviceability and safety of buildings, which is why the authors emphasize the need for technical investigation to be carried out. This would provide an in-depth insight into future actions with regard to policies and financial support programs for the renovation of buildings. Based on real data and technical information provided by professionals, citizens would be able to make relevant decisions about the repair or renovation of buildings.

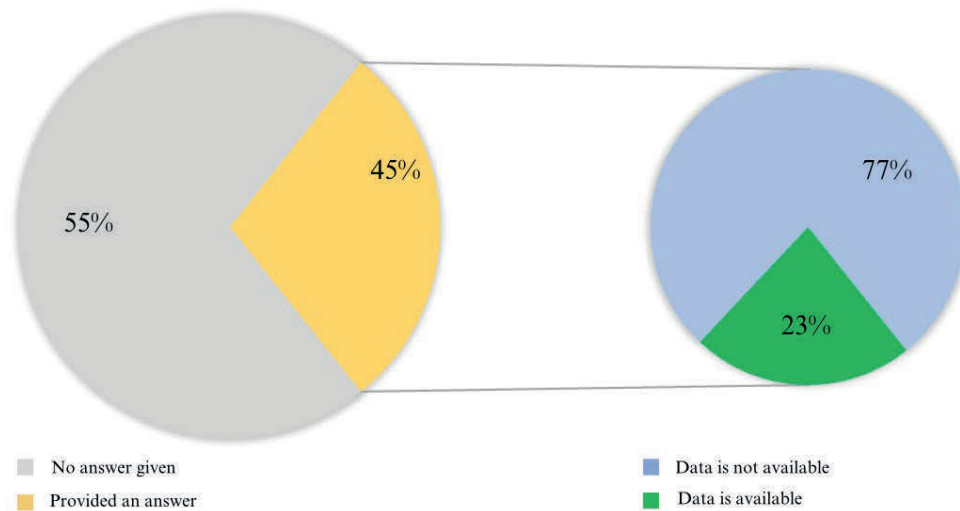
A technical investigation of each series building would not only identify the problems specific to each series, save the residents' financial resources needed to make improvements using high-quality standard solutions, but would also allow collecting information on these buildings, which is not currently available.

As part of the research, the authors conducted a survey in 40 Latvian municipalities, requesting the following data:

- The number of buildings of each series in the administrative territory of the municipality;
- The number of inhabitants living in Soviet-built serial apartment buildings;
- The number of buildings (by series) where renovation works have been carried out.

According to Paragraph 6 of Cabinet of Ministers Regulation No 907, “the administrator of the residential house shall ensure the technical servicing, visual inspection, technical investigation and elimination of the damages of the residential house, the facilities and the engineering networks located therein” (Cabinet of Ministers, 2010), but the regulation does not stipulate how compliance with it is monitored or the quality of the service provided by the manager. In the survey, the authors asked municipalities to indicate which authority or body controls (if any) the enforcement of the regulation.

The majority (55 %) of the municipalities contacted for the survey did not respond to the request for information, and among the 22 municipalities that did respond to the request, only 23 % or 5 (see Fig. 1) had data on the number of apartment buildings by series and the frequency of inspections of their technical condition.



**Fig. 1.** Availability of information on Soviet-built apartment buildings in the Latvian municipalities (based on the survey data).

The majority of the municipalities that responded to the request for information (77 %) indicated that information on apartment buildings and their technical condition was not collected in the municipality and was not available also in the related municipal capital companies that were engaged in the management of buildings. Also, the quality of management services was not monitored by the municipalities in accordance with Regulation No 907, mentioning that the assessment of the quality of management services was the responsibility of the apartment owners.

In five of the surveyed municipalities (Aizkraukle, Talsi, Varakļāni, Daugavpils and Ventspils) there were data on the number of Soviet-built apartment buildings in the territory of the municipality by series. According to the information collected, most of the buildings are inspected at least once a year, as required by Regulation No 907.

The municipality of Jēkabpils stated in the survey that data on the housing stock were not available at the moment, but at the beginning of 2023 a user programme would be introduced with the aim to collect information on apartment buildings, their type / series, number of apartments, technical condition of groups of rooms and other information within Jēkabpils municipality.

The authors note that the lack of information shows that data on the Soviet-built housing stock in Latvia are practically non-existent, which makes it difficult to calculate the amount of funding needed for renovations, as well as to develop an effective housing policy.

## 2. POSSIBLE SOLUTIONS TO ADDRESS THE RISKS

In order to address the identified problems and risks related to the technical condition of apartment buildings and access to safe housing, the authors propose a set of actions that are binding not only on residents and apartment owners, but on all subjects involved in the operation of apartment buildings. Primarily by promoting a common understanding among these subjects of the concept of common ownership and the responsibility that each of these subjects should assume to promote a safe living environment and improve the quality of the Latvian housing stock, without excluding cases where, following an assessment of the technical condition, it would be justified to make a decision to demolish the building.

### 2.1. Financing Options for Apartment Buildings

According to data collected by the European Statistical Office, Latvia ranks among the top 10 countries in Europe for most housing-related problems, such as leaking roofs (19 % of households in 2019), insufficient ability to maintain an optimal indoor temperature (8 % of households), overcrowding (42.2 % of households) (Eurostat, 2021). The first two problems are indicative of the need to improve the technical condition of buildings, but overcrowding can have an impact on the deterioration and quality of housing in the long term. To improve the situation, several co-financing programs for apartment buildings with different objectives are being implemented in Latvia with the support of the European Union:

- ALTUM “European Union Recovery and Resilience Mechanism Plan 1.2 Reform and Investment Axis “Energy Efficiency Improvement” Investment 1.2.1.1.i. “Improvement of energy efficiency of apartment buildings and transition to renewable energy technologies” (Cabinet of Ministers, 2022) suitable for apartment owners wishing to improve the energy efficiency of their apartment building;
- ALTUM support programme for construction works in apartment buildings and landscaping suitable for improving energy efficiency;
- Project call for proposals “Reduction of greenhouse gas emissions in households –
- support for the use of renewable energy sources” financed by the Emission Trading Instrument of the Ministry of Climate and Energy for apartment house owners who know what equipment they want to install in their house;
- Measure 2.2.3.6 of the European Union Cohesion Policy Programme 2021–2027, Specific Support Objective 2.2.3.6 “Implementation of measures to reduce air pollution by improving household heating systems”, suitable for owners of apartment buildings who wish to replace their existing heating systems (Ministry of Economics, 2023).

According to the Ministry of Economics, since the co-financing support programs started in 2009 until 2020, 1700 apartment buildings have been insulated with governmental support in Latvia, and in total about 23 000 buildings need to be renovated (improving the technical condition and energy efficiency of buildings)



(Cabinet of Ministers, 2020). The largest co-financing program currently available is the ALTUM program for improving energy efficiency and switching to renewable energy technologies, but until the end of the program there will be enough funding for about 300 more apartment buildings (ALTUM, 2023) which means that a new development policy and co-financing instrument for further building renovation measures needs to be developed.

In general, all the support program available to citizens are suitable for solving already identified technical problems or for general improvement measures in apartment buildings, with the main focus on energy efficiency, but the authors of the article emphasize the need to first carry out a fundamental identification of the existing technical condition of the buildings in order to develop at the national level a financing instrument suitable for solving the main problems (identifiable in a technical investigation) with standard solutions for a series of typical problems. Since, according to the above-mentioned audit report of the National Audit Office, citizens' savings for building management and repairs are low and, in some cases, non-existent, the possibility of co-financing technical investigation should also be explored as a first step. The cost of the technical investigation depends on the area of the building, its location, accessibility and other aspects. A price survey carried out by the authors in the framework of the research on the cost of technical surveys and technical investigations shows that the cost of a technical investigation for a single building varies depending on the series from around € 9000 (series 316, 318, 464, 103) to € 14 000 (series 119, 467, 104). Cost reductions are possible when ordering technical investigation for more than one building, accordingly for 2 to 10 buildings, a price reduction of 5 % per building, 10 % for 11 to 50 buildings, 15 % for 51 to 100 buildings and 20 % for more than 101 buildings. In comparison, the cost of a technical survey for a different series of buildings ranges from € 3500 (series 316, 318, 103) to € 6000 (series 119, 467, 104 and 602) (Zarina & Uzulens, 2023). The potential reduction in costs with a larger number of survey sites points to the need for these data to be collected centrally, at the national or municipal levels, for the entire Soviet-built housing stock, not only to capture and aggregate data to develop standard solutions and sound housing policy guidelines, but also to reduce survey costs by up to 20 % per building.

Following the technical investigation and conclusions on the renovation potential of buildings, it is necessary to develop a financial support programme for the development of standard solutions to remedy the identified defects in order to avoid a situation where financial investments are made to improve certain energy performance indicators but significant technical defects are not remedied, which may endanger the safety of the residents and the operation of the building when approaching the end of its expected lifetime.

In order to develop the most efficient and appropriate form of financing for the current situation (technical condition of buildings), it is also possible to analyse the experience of neighbouring countries, where apartment building renovation programs have so far been implemented much more widely – in Latvia, an average of 140 apartment buildings are renovated per year, while in Lithuania and Estonia these figures are at least twice as high (Vārna, 2023).

In Lithuania, Estonia and Germany, a loan with a grant element has been chosen as an efficient and cost-effective way of providing financial support for the renovation of apartment buildings.

In Lithuania, since 2013, the legislation provides for the possibility that not only apartment owners or their authorized persons, but also municipalities (their institutions) may implement energy efficiency promotion projects (by concluding a contract with a commercial bank). The municipalities assess the buildings with the lowest energy performance in the region and allocate them to two lists respectively in order to prioritize the works to be carried out. In total, the financing programme offers three types of support (grants) financed by the State and the European Union Funds in addition to low-interest loans: for project preparation and management (up to 100 %), up to 40 % of the project costs for the achieved energy efficiency level, and a grant for persons with low-income, financing 100 % of the project costs from public funds (European commission, 2020).

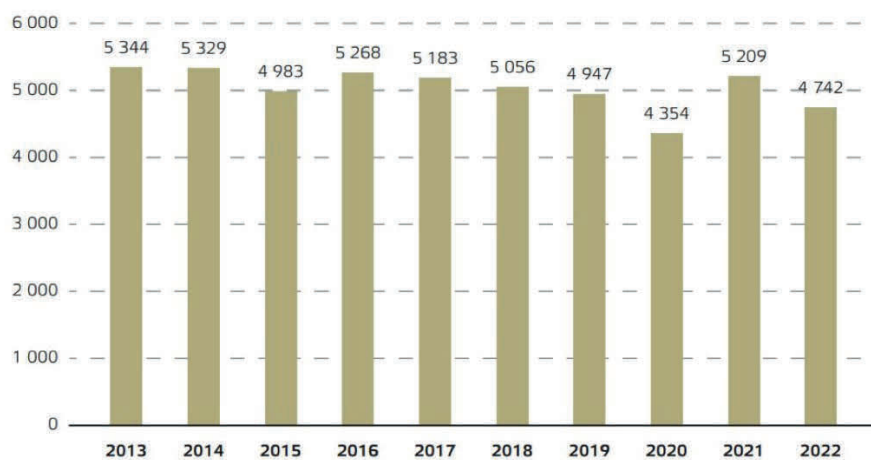
In Estonia, programs to promote energy efficiency in housing are implemented through the Estonian Credit and Export Guarantee Fund (KredEx), a state-owned company that combines three elements – loans, guarantees and grants. On the basis of a cooperation agreement, commercial banks offer a low interest rate on the loan and, in addition to the loan, state guarantees are provided in cases identified by the commercial banks as more risky (the amount of the guarantee does not exceed 75 % of the loan value with a fee of 1.2–1.7 % per year of the balance of the guaranteed amount). Grants are applied to projects in the range of 15–35 % of the renovation costs, depending on the energy efficiency improvement indicators to be achieved by the project (Kuusk & Kalamees, 2016).

In Germany, energy efficiency lending is provided through the German Development Bank, which offers citizens low interest rates and the possibility to erase a part of the loan principal after the project is completed, depending on the energy efficiency targets achieved. The most important difference in the German methodology is the involvement of an energy consultant already at the beginning of the project implementation phase, who certifies the results achieved in the project, which eliminates risks for commercial banks and facilitates calculations for citizens or project managers (Ministry of Economics, 2015).

The experience of neighbouring countries shows that it is important to focus on a combination of loans, grants and guarantees that is appropriate to the current national situation when designing a financing model, thus also enabling renovation of apartment buildings that do not have significant savings in management fees or for economically disadvantaged groups. Equally important is to inform the population about the available forms of support in a clear and easily accessible way.

## **2.2. Real Estate Appraisal**

Transactions with Soviet-built serial apartments occupy a significant share of the real estate transaction market in Riga and Latvia. The highest transaction activity is observed in Riga (see Fig. 2) and the number of transactions over the last 10 years ranges from 4354 to 5344 transactions per year. Thus, serial apartment buildings are still in demand among buyers.



**Fig. 2.** Number of transactions for apartments in Soviet-built serial buildings in Riga residential districts (Arco Real Estate, 2022).

Apartments in these houses are often more affordable than similar units in pre-war houses or new projects, so demand for them is not significantly reduced. The average price per square metre for apartments in Soviet-built houses in Riga in 2022 was EUR 916, while in other Latvian cities (Jelgava, Liepāja, Rēzekne, Jēkabpils, Daugavpils, Krāslava, Valmiera, Madona, Ogre) the price per square metre ranged from EUR 115 to EUR 889 (Arco Real Estate, 2022).

Prior to the purchase of the property, in the case of a bank-financed purchase, an appraisal is carried out on the property, in which an independent real estate appraiser makes an objective determination of the value of the apartment using established and accepted methods in property valuation. Appraisals include information about the apartment, appraisals of comparable transactions and other useful information, but the information that must be included in the valuation does not include the technical condition of the apartment building. As noted above, most buildings do not have such data, but it could have a significant impact on both the choice of buyers and the market price, as well as on the motivation of apartment owners to carry out a technical inspection of the building to obtain such data. The authors of the article suggest the inclusion of information on the technical condition of apartment buildings in real estate appraisals (as a mandatory requirement at the national level) as one of the solutions to the problems mentioned in the article.

## CONCLUSIONS

By assessing the current situation with the availability of information on the technical condition of Soviet-built apartment buildings in Latvia, the regulatory framework, government support programs for financing and the number of transactions with such apartments in Riga and Latvia, the authors have identified the main problems and their possible solutions.

For the development of an effective housing policy and the promotion of the safety/quality of the Latvian housing stock, it is necessary to carry out technical

investigation of each series building in order to objectively identify the problems specific to each series, which can be eliminated by developing standard solutions for the whole series and examining individual problems of each building, which require individual solutions.

At the national and municipal level, it is necessary to develop a financial support program that allows the residents of apartment buildings to attract funding for both technical investigation and the elimination of identified defects, provided that the data obtained objectively assess the future safe service life of each building. It is recommended to demolish buildings whose renovation is not economically justified and the amount of investment required is not rationally justified against the resulting extension of the expected lifetime of the building.

It is necessary to make it mandatory to include information on the technical condition of the apartment building in the real estate appraisal, which will contribute to the motivation of apartment owners to carry out a technical investigation and to the awareness of potential buyers about the investments necessary for the safe and long-term operation of the building.

Overall, the identification of the technical condition of Soviet-built apartment buildings and the effective remediation of identified problems at the national level will help achieve the housing and climate objectives of the National Development Plan by promoting energy efficiency and reducing greenhouse gas emissions. The authors will continue the study by focusing on the importance of identifying and remedying problems in the technical condition of Soviet-built apartment buildings before implementing complex energy efficiency improvement measures.

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