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**PROSPECTIVE TRENDS OF MULTIFLAT
HOUSING IN 2021–2035**

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Received: 13.09.2020 / Revised: 18.11.2020 / Accepted: 25.11.2020

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<https://doi.org/10.23939/as2020.02.280>

Abstract. The article presents an analytical review of promising trends in apartment housing for the next 15 years. In particular, the following trends have been identified: increasing the role of energy efficiency, reducing housing stories, increasing dwelling diversity, increasing the role of environmental and ethical factors in diversifying housing management, modernization, cooperative building retrieval, appearance housing policy.

Key words: energy efficiency, modernization, probability, diversity, trend, housing.

Problem statement

Nowadays, there is an active building process in some regions, less active in others, in some – stagnation. Such cities as Kyiv, Lviv, Odesa, Dnipro, Kharkiv have a lot of building sites, and they determine the general trends of multi-apartment housing. The situation is slowly changing, and the housing estate market is becoming a consumer market. Part of single-family houses is constantly and slowly growing. A product of high-quality will correspond to consumers requirements and provide successful competition in the housing estate market.

Existing and future trends are necessary to take into account for the creation of a competitive product. Quality of housing built in Ukraine over the past 25 years is significantly worse than in European countries, that is why it is necessary to analyze European experience for determining these trends. European experience can be cliched, but not completely because it is quite difficult and inappropriate.

Trends are a temporary thing, so it is necessary to identify the most important, which will be relevant for the next 10–20 years. They should contribute to improving the quality of housing and living comfort. A significant part of the trends can be named analyzing the European experience, considering the time lag in technology. The trends analyzed will fit most segments of apartment housing. Few of them are already presented in some segments, but usually, there are more exceptions to the rules rather than the rules. Regardless of the nature of the assumption, forecasting trends are significant because they enhance theoretical and design-analytical work. The design-search process is largely determined by this, too.

The identified trends may be caused by various external factors – economic, social, technological, environmental, political, etc. or a combination of these factors. They affect various aspects of architectural and

design activities – artistic, aesthetic spatial planning, technical and economic, etc. Trends can also reinforce or reduce each other or be independent.

Analysis of recent research and publications

The topicality of the article is proved by a lot of articles and publications. The following publications are devoted to the study of this topic: “Current trends in the development of the primary residential real estate market in Kyiv” (R. Herasymchuk, 2014), “Current trends in the design of multi-apartment commercial housing in Ukraine” (J. Yuryk, 2010), “General directions of evolution of spatial planning structure of apartments in Ukraine” (V. Ursaty, 2009), “Storeys impact of residents health”, (Hnes I., 2009), etc.

The main emphasis of published works is directed on spatial planning regulation without specification of time frames. There are profound scientists' works, where each of the researched trends are analyzed in detail, but there is a lack of a brief analytical review of this topic in the form of an article. The article represents the author's vision in the form of observations, assumptions, hypotheses, which differs from other studies. It is essential to note that an extensive context is analyzed, including various aspects of housing policy.

Objective of the article

The article aims to identify future trends in apartment housing for the next 15–20 years, find out the factors that determine these trends, predict the impact of these trends on housing policy.

Results and discussion

Flat or houses selling becomes a more difficult business today because competition intensifies and demand for housing slowly increases. It is necessary to take into account the trends and tastes of apartment buyers to ensure competitive advantages. The article presents 10 perspective trends during the next 15 years, which is the longest time frame of pragmatic forecasting.

1. Energy efficiency. The energy efficiency of new housing is significantly better compared to the housing that was built between the 1960s and 1990s. However, if we compare the houses with modern European or American ones, heat losses per square meter are 2–4 times higher. The cost of reducing each next unit of heat is bigger than earlier and requires more investment.

To reduce energy consumption for heating during the year per square meter from 100 kW*h to 50 kW*h we spent practically the same cost as to reduce from 50 kW*h to 30 kW*h. Reduction of energy consumption in the first and second cases differs 2.5 times (O. Denys, 2009). Developers and designers offer the most cost-efficiency solutions: effective thermal insulation of external walls using more efficient boilers or other heat devices, etc. Because of this actual consumption significantly may be beyond the standards. These factors can reduce the standards of consumption:

- significantly higher air temperatures than standard during the heating season;
- heat measure for every apartment;
- energy savings due to the increase of its price.

Indoor indoor temperature during the day can range from 14–16 °C without people and 17–20 °C when they are, and the average value will be 17 °C, which is less than the standard temperature of 18–20 °C (S. Zhukovskiy, 2000). Better external thermal insulation will reduce the duration of the heated period for 1–2 weeks, as well as global warming (rp5, 2015), (green-city.su, 2019). Real energy consumption can be 10–20% lower due to indirect energy-saving measures only. The potential even cheap energy-saving measures are not fully used:

- LED bulbs are not a new standard, but they are 7–10 times more efficient than incandescent bulbs and 2–3 times more fluorescent one;
- the thickness of thermal insulation is rarely more than standard, a lot of cold bridges;
- heating systems with efficient heat distribution are almost absent, first of all, wall or floor surfaces heating systems.

People's changing of consciousness often determines more energy efficient use than fine or standards. We can predict that over the next 5–10–20 years, depending on economic agenda and energy prices, energy efficiency indicators for housing buyers will be much more significant than today.

2. Reducing housing storeys. There is a trend to gradually reduce the number of storeys of new housing. However, the situation is not the same in Ukraine. In Kyiv, for example, the number of storeys are decreasing while in Lviv it is gradually increasing. The author considers that these cities are still in different periods. Kyiv has already passed its peak of storeys, Lviv – is slowly reaching it. Many studies confirm the increase of operation costs with increasing building height and harm to human health, too (I. Hnes, 2009). Therefore, the trend height of decreasing is predicted, and will occur for the following reasons:

- demand decreasing for housing in most towns & cities of Ukraine due to population decline except a few big cities and capital;
- demand reduction due to the accelerated immigration 2021–2030;
- less money flow of abroad employers into the real estate market (single-family housing part), especially due to virus threats;
- development of a participative and cooperative private detached and townhouses building as an alternative to multi-apartment housing.

3. Increasing the diversity of the real estate market. Diversification process in the sphere of apartment housing slowly developed today. In time, the process can accelerate. Majority of new apartment housing in the 2000s was an improved version of the Soviet housing, except for business class or luxury housing. More modern apartment dwelling of economy-class appeared in 2009–2010 already. Comfort-class housing emerged in 2011–2013 (R. Herasymchuk, 2014). This housing differs from average residential buildings of the previous period primarily by thoughtful design, quality of materials, context-oriented planning, architectural expressiveness.

Flat areas in such housing can be even smaller than the average, often corresponding to economy-class. At the same time, such residential complexes often morphologically include different typologies: townhouses, sectional, blocked in two levels, gallery, atrium and hybrids of these.

Townhouses will be developed also, nevertheless, the share of the type is not more than 1 % today. This type of housing is the most attractive for medium-sized cities with a population of 50–200 thousand because it offers much better opportunities for living compared to apartment buildings. The advantages of this type are own plot of land, entrance from the ground, individual heating and water supply, own roof and cellar. At the same time, the density of townhouses is 3–5 times higher than single-family houses and allow for public transport in the vicinity of 4–6-storey buildings.

4. The growth of ecological factors. Housing buyers before buying a home think about the environmental friendliness of the materials from which it was built. Harmful for health building materials are used in housing construction very often. There are questions about their quantity and method of using. Practically no building is built without heat-insulating fibrous materials, foams and other artificial non-environmental substances. Many houses can be called truly ecological, but these are mostly single-family homes, but very few are multi-flats buildings.

More ecological buildings likely appear in the next 10–15–20 years. The buildings based on a wooden frame will have walls of straw or reed blocks. Wood and other natural materials will be popular as concrete and brick today. This type of housing is not only more environmentally friendly but also cheaper. Modern synthetic insulation will be gradually replaced by organic based on cellulose, flax, seaweed, coconut fibre and others. It will come true not earlier than in 2030–2035 because the economic situation will not change very quickly.

5. Accelerating the growth of the share of “bad” and emergency housing. Average housing square per capita will increase no more than 0.15–0.25 m²/year. An average need will be 28–30 m²/person, and comfort level will be 35–40 m²/person, which corresponds to the average European indicators (k. Day, 2000). The level can be achieved in 70–100 years, according to new square meters per year. Existed housing destruction speed is practically the same. A big part of housing is obsolete, emergency or unfit for habitation. In a future decade, the

speed of destruction of abandoned, obsolete and emergency residential buildings will be faster than new buildings according to the majority of economic forecasts.

6 Aesthetic and architectural factors importance growing. This trend is more difficult to predict than all the above. Buyers of housing, especially in the comfort class segment have some requirement of the architectural aesthetic of the building, which they want to buy. A requirement for building appearance is quite difficult to accurately formulate, but most of them will include the following criteria:

- scale to the surrounding buildings and people, the harmony of form and spatial structure;
- adequacy with the location, corresponding to the natural or anthropogenic landscape;
- the presence of greenery on the facade – pots with bushes or flowers, vertical green elements
- using not too bright and dim colours, presence of details;
- individual character and silhouette of the building;
- use of high-quality and durable materials that can grow old with beauty;
- absence of large mirror or deaf surfaces of wood, stone, plaster, etc.

These criteria are close to organic architecture spirit, some of them we can find in Kristofer Day's famous work "The place where the soul lives" (Day K., 2000). The criteria can also relate to the style, shape of the roof, windows or balconies, etc.

7. Housing management forms diversification. Today, more than 92 % of housing is owned by citizens. A big part of the housing has bad or even unsatisfactory conditions. Due to this, housing management methods become social determinants. 5 forms of housing management are predicted.

External management. Some of the people with low-income who cannot maintain their housing in good condition will use some financial support from the state or private initiative. Their rights for living, owning or rent will be restricted for exchange for financial support. This form will be popular for small houses with 5–10 apartments or larger with a relatively homogeneous population.

Club housing and condominiums. The target segment of the category is wealthy people that want to have housing that corresponds criteria's of comfort and status. It differs from the other types by developed infrastructure services and high payments. Besides, residents also receive certain benefits of using such infrastructure. Owners of flats in the housing can select candidates for living or owning here.

Association of co-owners of apartment buildings. This form will be the most popular, among inactive and passive citizens, who will transfer management of housing from communal to private entities. This type of management will be popular in a residential building from 20 to 200 and more flats.

Housing cooperatives. This form can be renewed as an active housing management type. This form of housing management will unite enterprising citizens. Residents will decide when and what needs to be repaired, hire security or cleaners, clean the area from snow and other questions. Share management of the adjacent territory of basements or other communal spaces can bring profit and differ it from other forms of management.

Reserve housing. This type can be formed only after the building boom. This housing can use and own communal, public or private corporations but not a private person. This is the type of housing as a temporary place for living for citizens in difficult psychological, social and legal situations.

8. Housing modernization. High prices for utilities and reduced subsidies will stimulate the housing modernization and the process may begin after 2020. Separate modernization programs can start in the next 3–5 years. However, as a sustainable process, housing modernization will start in 2020/2030s. Funds for modernization will have several sources – cost of residents (30–50 %) city cost, grant or patronage funds, support or credit. This process first of all will affect condominiums and communal housing. The duration in time can be at least 10–15 years, but probably even 20–30 years, until 2050. The dwelling modernization process will be paid only by residents without any additional help.

9. Cooperative building retrieval. Today, there are only two forms of a building – own ones and buildings firms. Housing cooperatives have been known since the first half of the 19th century and are very developed in Germany and other European countries (zn.ua, 2012). Nonprofit multi-flats housing is practically

absent today in Ukraine. First of all, the ecological builders cooperative can arise and develop. Such cooperatives can be headed by builders, architects or people of other professions who have practical building experience. The movement can also play the role of consulting, coordination, and information service.

10 Housing policy appearance as an important tool for socio-economic development. Housing policy in Ukraine is present as a declaration, but there are almost no hypothec, residential credits, or dwelling buildings by state cost. There is no clear vision of the housing policy role in the state-building process and social progress among government and other leaders. Only building codes are corrected with a significant time delay at the state level.

At least 3–5 million families or 10 million citizens need better housing conditions in Ukraine. The building of new housing and reconstruction can become one of the country's economic locomotive. Unlike other branches, first of all, the construction industry needs organizational transformations. This is because the vast majority of building materials and components are manufacturing in Ukraine. Construction technologies for housing buildings in most cases are not too complicated. The development of the construction industry gives a multiplier effect about 2–3–5 times. A clear and understandable housing policy quality will be an effective tool for socio-economic development in the future in 10–15 years. The basis of which will be the creation of conditions for the better quality of new housing.

Conclusions

1. The development of apartment housing in the process of its evolution is studied. The author determinates ten perspective trends: increasing energy efficiency, storeys reducing, increasing diversity, environmental and ethical factors increasing in choosing housing, diversifying housing management, housing modernization, cooperative building restoration (retrieval), the housing policy emergence as an important tool for socio-economic development.

2. These trends may occur earlier or later than the specified period, depending mainly on the economic agenda. The forecast of trends based on analysis of Ukrainian and European housing development over the past 25 years.

3. Taking into account these trends will help to improve the consumer quality of housing,

4. There is a need for more precision analysis of apartment housing for more accurate prediction of the apartment's development trends for the next 15 years.

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ПЕРСПЕКТИВНІ ТЕНДЕНЦІЇ РОЗВИТКУ БАГАТОКВАРТИРНОГО ЖИТЛА 2021–2035

Анотація. У статті представлено аналітичний огляд перспективних тенденцій багатоквартирного житла на наступні 15 років. Ці тенденції прогнозуються на основі аналізу міжнародного досвіду, зокрема країн Європи. Прогноз загалом ґрунтується на поточній економічній ситуації та демографічних тенденціях в Україні. Найбільш ймовірним трендом є зростання ролі енергоефективності в оцінці споживчих характеристик житла. Існує великий вітчизняний та зарубіжний досвід застосування засобів енергозбереження.

Зменшення поверховості також є доволі прогнозованою, оскільки 3–5 поверхова забудова може мати щільність співставну з 8–9 поверховою забудовою. Малоповерхова забудова має багато якісних переваг. Передбачається збільшення різноманітності квартир що відповідатиме у різних життєвих укладах покупців. Ця тенденція зараз перебуває на початковому етапі. Екологічність матеріалів стає вагомим чинником при виборі житла, оскільки це безпосередньо впливає на якість життя. Якість проживання поступово ставатиме найголовнішим критерієм при купівлі нерухомості, а не кількість метрів квадратних як в минулому.

Однією з негативних на найбільш ймовірно прогнозованих тенденцій є зростання частки аварійного та малопродатного житла для проживання. Цей проноз ґрунтується на зношеності інфраструктури, негативним демографічним та економічним трендам. Передбачається також зростання важливості художньо-естетичного чинника. Однак ймовірність такого розвитку ситуації є меншою, ніж вищезазначених трендах. Урізноманітнення форм управління житлом може стати однією з форм ефективнішого та якіснішого використання житлового фонду.

Модернізація житлового фонду є одним з найважливіших та прогнозованих трендів на наступні 15–30 років. Ця тенденція триватиме навіть до 2050 року. Відновлення кооперативного будівництва також є однією з менш прогнозованих, оскільки процес кооперації вимагає активного залучення. Поява житлової політики, як вагомого інструменту соціально-економічного розвитку може стати вагомим інструментом розвитку житлового будівництва.

Ключові слова: енергоефективність, модернізація, ймовірність, різноманітність, тенденція, житло.