

# Sustainability of Riga 21<sup>st</sup> Century Apartment Complexes

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**Abstract** – The research focuses on the sustainability of Riga 21<sup>st</sup> century apartment complexes, including the context of Riga, as well as sustainability assessment, results of the survey and SWOT analysis. Theoretical studies as well as empiric research methods were used. Research results show that there are some weaknesses, which do not allow achieving the best results, and should be improved in order to increase sustainability of residential environment and the city.

**Keywords** – 21<sup>st</sup> century, apartment complex, housing, Riga, sustainability.

## INTRODUCTION

Residential environment, which occupies 25 % of Riga area [1], plays a significant role in the context of city's development and its sustainability. Around 93 % of Riga citizens are living in apartments [2], which are located mostly in large-scale housing estates. However, since 2000 around twenty thousand new apartments have been built in Riga [3]. New built residential environment should accomplish principles of sustainability and increase quality of living conditions of inhabitants. This research focuses on 40 apartment complexes, which represents 47 % of all new built apartments in this time period.

## I. RESEARCH OBJECTS AND METHODS

40 of Riga 21<sup>st</sup> century apartment complexes were selected as research objects in order to identify the level of sustainability. These complexes consist of at least 2 buildings, with at least 80 apartments, each complex is designed as one ensemble and in the period of 2000–2016 at least the first phase of construction has been completed.

Theoretical as well as empiric methods were used in the research. Theoretical methods include the analysis of architectural and urban plans, legislation, sustainable strategies and other documented sources. Empiric methods include field studies, the analysis of statistical data, sociological survey and expert interviews.

## II. THE CONTEXT OF RIGA

### A. Demographics and Housing Demand

In the period of 2000–2016, population of Latvia declined by 17.3 %, population of Riga dropped by 16.5 %, however, population of Riga agglomeration raised up by 2.3 % [4]. The statistics show that despite the negative demographic situation in the

country, agglomeration of Riga is more durable to the changes of demographics.

Population of Riga in the beginning of 2016 accounted for around 640 thousand [4]. Due to continuous population shrink, it is expected that in 2030 population could be in the diapason of 500 to 580 thousand [5]. In the period of 2000–2016, not only shrinking of the population has been observed, but also aging of the society and declining of average household size, which leads to a raise of demographic load, has negative effect on the economy and poses a threat to a balanced process of generational change [6]–[9].

Despite the demographical trends, according to the Sustainable Development Strategy of Riga until 2030, in order to provide balanced socio-economic situation and sustainable urban development it is necessary to raise population of Riga to 700 thousand [10]. This aim can be achieved by using a suitable policy that would provide a raise in birth rates as well as attraction of new inhabitants, and reduce emigration.

Floor area per capita in Riga has increased from 21.4 m<sup>2</sup> in 2000 to 30.0 m<sup>2</sup> in 2016 [11]. This figure is reached mainly due to new construction and decrease of the population. However, it is planned that floor area per capita should increase to 35 m<sup>2</sup> per capita in apartment buildings [12].

### B. Characteristics of Housing Stock and Real Estate Market

During the last years, real estate market has been influenced by various aspects, such as economic downturn, which directly affected citizens' income, changes in the bank lending policy, political decisions regarding temporary residence permits, etc. In the period of 2000–2016, 20 269 new apartments have been built in Riga, and 52 % of them were built in the period of 2006–2008 [3]. After 2009, due to economic crisis the construction of new apartments sharply decreased. In comparison, 4 030 new apartments were built in 2007, while in 2016 only 507 [3].

The most demanded apartments in the new buildings are with 2 or 3 rooms, with area in a range of 70 m<sup>2</sup> to 75 m<sup>2</sup>, and cost around 85 thousand euro [13]. According to the statistics, in 3<sup>rd</sup> quarter of 2015, in the centre of Riga 402 new built apartment offers were registered, but 84 deals [14]. This shows that the number of offers is about four times bigger than of deals, and that creates surplus of new built apartments in the total housing stock.

Although there are a lot of offers in the new built apartment buildings in Riga, a lot of people choose to live in the agglomeration, due to lower prices of real estate and better living conditions – high quality of air and water, nature, human scale of environment, etc. [15]. Current situation contributes to an in-

creasing number of people moving to the agglomeration of Riga, promotes private transport usage, as well as reduces population density in the city and negatively affects overall sustainability of the urban environment.

### C. Economics and Housing Affordability

Housing is one of the principal human rights, in order to provide adequate quality of life. Since 2008, when Latvia faced economic downturn and crisis, housing affordability has deteriorated. Despite several factors, which have improved the situation since economic crisis – a raise in household income, low interest rates and support programs, etc. – experts point out the fact that the time necessary for saving a down payment is still too long, and there is a shortage of suitable and affordable housing [16]. Thereby the possibilities of households to obtain housing are still restricted.

Six of the 40 selected Riga 21<sup>st</sup> century apartment complexes are social housing and have specific renting rules. Among 34 remaining complexes average price reaches 1582 euro per 1 square meter, and the price for 60 m<sup>2</sup> apartment in average is around 95 thousand euro [17], [18]. Mortgage payment in average is 320 to 350 euro monthly [19], [20]. Average household income in Riga in 2015 was 1 156 euro. Average wage in Riga in 2016 was 971 euro (gross) and 710 euro (net) [21].

Housing affordability of Riga 21<sup>st</sup> century apartment complexes was calculated with 2 methods. The first method was Median Multiple, where average apartment price is split by gross annual average household income. By calculation rating housing is considered as affordable if the result does not exceed 3.0 points [22]. The second method was Housing Affordability Index (HAI), with formula:  $HAI = [(1.5 \text{ of average monthly net wages}) / (\text{monthly mortgage payment} / 30\%)] \times 100$ . By calculation rating housing is considered as affordable if HAI index is over 100 [23].

Among 34 Riga 21<sup>st</sup> century apartment complexes, the result of Median Multiple calculations in average was 5.4 points, which falls into the rating category ‘severely unaffordable’. However, housing affordability index (HAI) in average has reached 107.6 points, which indicates that housing is affordable. Despite the fact that HAI is over 100.0 points, it is a low result. In comparison, in June 2016 average HAI in Riga was 166.5 points [23].

In order to ensure housing affordability for families with children, in 2015 there has been launched a support program AL-TUM, which allows to get guarantees for housing loan [24]. Another support, for example, social housing, can be received from the municipality. Despite the fact that since 2000 there have been built several new social apartment buildings, in 2015 there were still around 1500 persons in the queue waiting for a social apartment [25]. These statistics show that it is still necessary to raise a social housing stock, in order to provide housing to everyone.

## III. SUSTAINABILITY ASSESSMENT

Taking into account the theoretical literature [26]–[28], the author of the research has selected 53 indicators and has adapted them to the specificity of the research. Indicators are arranged

in 9 groups and cover local object as well as neighbourhood scale issues, thus providing a holistic approach. Issues regarding environment dimension of sustainability are covered by 3 following groups of indicators: land use and healthy conditions; resources and materials; transport and mobility. Issues regarding society are covered by next 3 groups of indicators – diversity and quality, safety, participation and communication. Issues regarding economy are covered by last 3 groups of indicators: costs, economic activity, availability of services. For indicator assessment a 5-point system was used, where 1 point corresponds to a very weak, while 5 points – to a very good result.

### A. Environment

The data of the research shows that although there are still undeveloped areas nearby the city centre, Riga 21<sup>st</sup> century apartment complexes in average are located 6.3 km far away from the city centre [17], [18], [29] that affects the compactness and density of the city. In the neighbourhoods, where new apartment complexes have been built, average density in 2014 was around 5.4 thousand people per km<sup>2</sup> [30], [31] and it is a low result. In comparison, according to the high density principle 15 thousand people per km<sup>2</sup> is considered as optimum density [32].

Distance to the nearest public transport stop in average is 355 m and has 5 routes [33]. 78 % of the respondents pointed out that they were satisfied with public transport. Despite this fact, only 17 % of them predominantly use public transport, but majority – 57 % mostly use private car, 17 % of respondents use different types of mobility, 6 % use bicycles and 3 % are moving on foot.

Actual specific heat consumption in 2015 in average reached 85 kWh/m<sup>2</sup> per year [34]. According to the statistics, 50 % of new built apartment building inhabitants pay less than 50 euro per month for heating in the winter season and 54 % consider that their residential building energy efficiency is high [35]. As requirements become more stringent and new technologies are developing, energy efficiency indicators are improving.

Despite the fact that waste sorting is one of the most important aspects of ensuring environmental sustainability, according to the survey data only 30 % of respondents sort waste, while 30 % partially sort waste and the rest 40 % do not sort waste at all. This situation indicates that there are still problems with the provision of waste sorting and involvement of people in environmental friendly actions.

### B. Society

Mostly the 21<sup>st</sup> century complexes offer 3 to 4 different types of apartments by number of rooms, and area of the apartments is in range from 33 to 160 m<sup>2</sup> [17], [18]. This diversity shows ability to meet the needs of different households and ensure an adequate housing for them.

According to the results of survey, majority of the respondents are satisfied with such factors as area of the apartment (79 %), facades and visual appearance of the complex (89 %), safety in surroundings (82 %), children playgrounds (82 %), etc. However, only 46 % are contented with active recreation area, which can be explained by low yard improvement and equipment level. During

TABLE I  
AVERAGE SUSTAINABILITY ASSESSMENT OF RIGA 21<sup>ST</sup> CENTURY APARTMENT COMPLEXES [AUTHOR OF THE ARTICLE]

Group of indicators	Ecological			Social			Economic		
	1.1	1.2	1.3	2.1	2.2	2.3	3.1	3.2	3.3
Land use, healthy conditions									
Resources and materials									
Traffic and mobility									
Diversity and quality									
Security									
Sociability, participation									
Costs									
Economic activity									
Availability of services									
Score	3.2	3.2	3.6	3.7	3.8	3.0	2.7	2.9	2.8
Total score: 28.9 points (of 45 maximum points)									

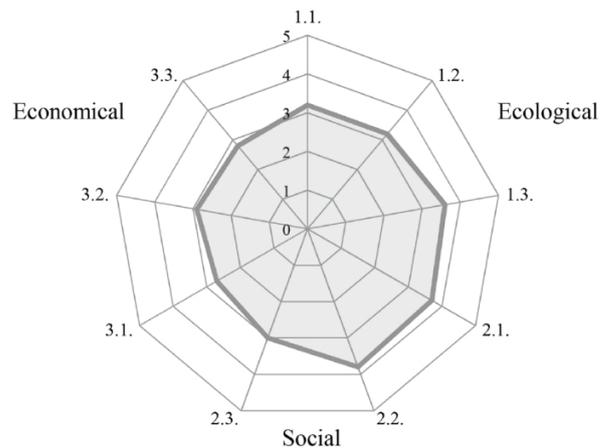


Fig. 1. Average sustainability value map [Figure: S. Freimane].

field studies, it was determined that around 40 % of objects in the common yard have only some simple children playground equipment and benches. Despite the fact that the results of the survey indicate overall satisfaction of residents with 21<sup>st</sup> century residential environment, too little focus on outdoor space and common area is present. That results in limited opportunity to create a community and social interactions.

Only 28 % of the respondents indicate that some cultural, sports, etc. events are being hold for the residents of the complex. Also interaction in social media is very low. Although media is playing a significant role in 21<sup>st</sup> century, only 15 % of the objects have a Facebook community page and 40 % have a project homepage. This data proves that there are unused opportunities to increase social sustainability through social media.

50 % of the objects have video surveillance and 30 % in addition to video surveillance have also security on site. 15 % of the objects have fences with closed access. Although it is important to ensure safety in a residential environment, exaggerated security measures can lead to isolation and closed communities. This, in turn, increases tension in the society and promotes segregation. That could be changed by promoting principles of crime prevention through environmental design instead of creating fences.

C. Economy

Housing affordability was calculated among 34 of Riga 21<sup>st</sup> century apartment complexes, because the rest 6 selected research objects are social housing. The average results of Median Multiple calculations was 5.4 points (severely unaffordable), but housing affordability index (HAI) in average reached 107.6 points (affordable).

According to the statistics, in average 40 % of neighbourhood residents are satisfied with economic activity in their neighbourhood [36]. However, in 2014 in average only 27 % of all activities took place in the neighbourhood of the residence [37]. That means that the rest 73 % of activities were happening in the centre or other neighborhoods and required movement of the residents, which increased dependence on transport. During the field studies, it was determined that 35 % of the objects include additional

functions, such as shops, kindergartens etc., thereby providing multifunctionality and mixed land use.

The most available service is shop with average distance of 646 m from the residential environment. The most inaccessible service is State Social Insurance Agency, which in average is located more than 3.4 km far away from the apartment complexes. Distance to a kindergarten in average is 742 m, to a school – 982 m, to nature and greenery area – 1117 m, to a library – 1234 m, to a clinic – 1230 m, to a small sports area – 1456 [17], [18], [26].

D. Average Results

Total score in average is 28.9 points from 45 maximum possible points, and it is corresponding to a mediocre performance. The highest level was achieved in the indicator group 2.2 – security (score 3.8 points), while the lowest level was identified in the indicator group 3.1 – costs (score 2.7 points) (Table I), (Fig. 1).

IV. RESULTS OF THE SURVEY

72 persons, who live in one of the 21<sup>st</sup> century apartment complexes, participated in the survey. Surveys were conducted using face to face interviews and give a short insight about present situation in Riga 21<sup>st</sup> century apartment complexes. For a more detailed insight the research must be continued. 60 % of the survey participants were women and 40 % were men. The majority of the participants, i.e. 62 % were in the age group of 25–39.76 % of respondents had higher education. 60 % of respondents were workers, but 29 % were entrepreneurs. 46 % of respondents have an apartment of 3 rooms, 38 % have an apartment with an area in the range of 70–90 m<sup>2</sup>, 65 % are owners, 56 % feel belonging to their residential environment. In 35 % cases apartments are inhabited by 4 persons. 53 % of respondents had moved to the new apartment from standardized apartments of large scale housing estates. 72 % of the respondents stated that there are no events for the residents of the complex. Respondents were asked to rate their satisfaction with several housing quality aspects. The results show that largest satisfaction was with lighting (99 %), but the biggest dissatisfaction was with car parking (22 %). Although

most of respondents are satisfied with many quality aspects, 47 % of them stated that they possibly will move out.

## V. SWOT ANALYSIS

### A. Strengths

The identified strengths are:

- the first steps towards sustainable development have been taken, including preparation of sustainable development strategies and other necessary documents;
- Riga 21<sup>st</sup> Century apartment complexes have been developed in different neighbourhoods of Riga, thus promoting the increase of housing supply in different parts of the city;
- a relatively large number of free territories, where realization of new residential development is possible, thus providing residents with housing within the city limits, is accessible in the city;
- support programs for obtaining mortgage loans for families with children as well as municipal support for housing issues have been developed;
- neighbourhood initiatives have been developed, promoting socialization of the population and the formation of communities;
- the city is rich in forests, greenery and waters that can be used for recreation functions, thus improving the quality of the residential environment and its connection with nature.

### B. Weaknesses

The identified weaknesses are:

- weak regulatory framework that reduces the quality of implementation of sustainable development, as well as uncertainty and frequent changes in tax and other political issues that directly or indirectly affect the housing;
- ineffective cooperation, communication and participation among stakeholders, as well as weak circulation of information regarding planning processes among population and professionals;
- weak interest of citizens in sustainable solutions as well as low purchasing power, which reduces the ability of developers to offer sustainable solutions;
- poorly developed rental market, as well as lack of competitiveness of Riga housing stock with agglomeration offerings;
- the development of new residential environment is often missing balance and relation to the existing environment, natural territories, as well as appropriate infrastructure, thus significantly reducing the quality of new apartment complexes;
- separation of socio-economic groups is observed in the living environment of Riga, thus increasing tensions in society, promoting segregation and the formation of 'closed gate' communities;

- in average Riga 21<sup>st</sup> century the sustainability of apartment complexes is mediocre, thus not using the full potential of creation a sustainable residential environment.

### C. Opportunities

The identified opportunities are:

- obtaining investments for development of neighbourhoods and revitalization of brownfields, in order to create affordable and high-quality housing supply within the city limits;
- linking tax policy with sustainable development and construction, thus ensuring the interest of stakeholders in the use of sustainable solutions;
- development of an effective housing policy that would ensure clear progress towards sustainable development of the residential environment;
- promotion of birth and remigration, with the aim of increasing the population of Riga to the optimum level, thus ensuring a viable city functioning;
- development of effective communication and involvement of citizens;
- increasing of sustainability in the residential environment in various aspects, for example, by improving waste sorting, air quality, reducing noise levels, linking with natural areas and others.

### D. Threats

The identified threats are:

- demographic trends create a threat of future city shrinking;
- insufficient investment attraction reduces Riga's ability to improve the quality of the living environment, in the context of which agglomeration development undermines Riga's competitiveness;
- without an effective housing policy, there is a threat of stagnation in further development of the housing stock;
- socio-economic situation, as well as insufficient integration, threatens to further segregation.

## CONCLUSION

Residential environment and housing play an important role in the sustainable development of the city. The analysis of Riga context shows that the population in the city has been shrinking and Riga faces aging tendencies as well as the need of large families, which ensure a balanced process of generation change. In this situation it is needed to promote policies that would allow maintaining the optimal population and density in the city, as well as reduce citizens' desire to move to the agglomeration. It is also necessary to ensure an adequate supply of housing considering the age structure, the composition of households and other related issues.

In the period of 2004–2008, the most rapid development of new construction has been identified, because of the economic growth. After 2008, the level of new construction rapidly dropped

down, and since then has not increased back to pre-crisis level. Demographic changes, economic crisis and expansion of agglomeration, has formed a new challenge, such as an increase in the number of empty housing.

The results of housing affordability calculations are low. Average Median Multiple score of Riga 21<sup>st</sup> century apartment building has reached 5.4 points (severely unaffordable), but the housing affordability index (HAI) has reached 107.6 (starting from 100.0 points – affordable).

In the current situation, there is a very weak demand for sustainable solutions in the apartment building sector as they increase initial cost of housing and buyers mostly are not able to pay for that. Life-cycle costs are not primary in the decision, and that also reduces the interest of developers in offering sustainable solutions.

The average overall sustainability score of Riga 21<sup>st</sup> century apartment complexes is 28.9 points with a mediocre rating. On the one hand, regulations, strategy of development, new materials and technologies, etc. stimulate progress towards sustainability. On the other hand, there is insufficient provision of bicycle infrastructure, relatively high noise levels in the residential environment, low level of waste sorting, etc. That proves that the full potential of sustainable development has not been used.

The data of the survey shows that overall satisfaction of residential environment of Riga 21<sup>st</sup> century apartment complexes is rather high, however 47 % of respondents stated that they possibly will move out. The largest satisfaction was with lighting (99 %), but the biggest dissatisfaction was with car parking (22 %).

Through SWOT analysis, there have been identified aspects, which need to be in focus, in order to increase the sustainability of residential environment. These aspects are as follows: improvement of regulations; creation of effective corporation, communication and participation; realization of pilot projects in priority areas; balancing the development between new built environment and urban heritage; development and increasing availability of sustainable technologies and solutions.

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