

# High-rise housing as a factor of the increase in Investment attractiveness of the city

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**Abstract.** That is obviously for experts, irrespective of status or quality, high-rise housing is here to stay. No country is in a position to ignore or discard this conspicuous legacy of the post-war and mass housing period. Nevertheless, high-rise residential buildings are still less widespread, than offices. According to the author, there are certain problems and reasons for limitation of high-rise construction in the housing sector. The author summarizes successful experience of high-rise housing construction in the world and considers some social-and-economic prerequisites of its development in the modern city. These concrete examples, given in article, prove that the existing problems are being solved. The most effective option of construction is the combination of inhabited and commercial chambers in the high-rise building and also the creation of specific infrastructure. In that case housing high-rise estates will promote the increase in investment attractiveness and investment activity in the district and in the city as whole.

## 1 Introduction

That was construction of high-rise buildings for office purposes to begin at first. Thanks to that, the cities gained more modern and respectable look, and, above all - the number of the jobs (generally for "white collars"), located not only in the downtown but also out of historical areas increased. Further the turn of high-rise housing came.

Formal definitions of high-rise housing vary between countries. Many authors have focused on housing from the post-war period, which requires a lift to reach the upper floors. In general, this means high-rise is a block with a minimum of five storeys and a lift. Modern high-rise housing consist of tower (skyscraper) or point blocks reaching twenty or more storeys, or slab blocks providing hundreds of metres of separate dwellings connected by lengthy internal or external corridors. [1]

Among the architects and engineers who have made their contribution to the development of housing high-rise construction there were William Jannie, Bertrand Goldberg, Der Skatt, Dominique Perrault, Franck Lloyd Wright, Geoffrey Powell, Peter "Joe" Chamberlin, Christoph Bon, Skidmore,

Owings and Merrill, Maria Rosa Cervera, Javier Pioz. In the USSR and Russia the development of high-rise housing construction is connected with the names of architects D. Chechulin and A. Rostovsky, A.N. Dushkin, B.S. Mezentsev, L.M. Polyakov and A.B.

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Boretsky, M.V. Posokhin, A.A. Mndoyants, A. Dobrovolsky, O. Malinovsky, P. Petrusenko, M.N. Vokhonsky (designer), engineers L.M. Gohmann, E.V. Myatlyuk, V.A. Saprykin. Modern Russian architects A. Trofimov, E. Treshchilina, V. Shteller, O. Markova, Sergey Nepomnyashchy, Anton Nadochych and Vera Butko are also deserve mentioning.

Considering the emergence of residential skyscrapers, it is necessary to remember the term gentrification (from the English "gentry" – untitled nobility), meaning the social phenomenon which has arisen in Great Britain and the USA in the 1960th; and representing arrival to the place of poor households in the downtown of more prosperous ones. Externally gentrification was presented by reconstruction of certain buildings, quarters and the whole districts of the centres of the cities, which had the investigation substantial increase of quality in them the inhabited environment and housing prices. Evolution of this phenomenon has led to the creation of new buildings - higher and higher residential buildings.

Nowadays in the cities and megalopolises of the whole world there is a replacement of large productions out of limits of housing urban development. There is a danger of emergence of areas and the whole "ghost" towns. In order to avoid that the released territories can be effectively occupied with pointed building in the form of inhabited skyscrapers.

On the other hand, some office centres of the cities "become extinct" at the end of the working day. Construction of skyscrapers in which office and dwelling are combined, solves the problem and does the similar area more attractive. Inhabitants (households) come back to the area, founders of institutions of social service, public catering, etc. invest more actively.

The prospects of the increase in investment attractiveness of districts and whole cities at the expense of high-rise housing construction are considered in this article.

## 2 State-of-the-Art Review

As decades ago, at the beginning of high-rise construction, today the majority of high-rise buildings are office skyscrapers. The share of residential buildings is small – about 20%, and their height, as a rule, is much less than average skyscraper and does not exceed 140 metres, and the absolute majority of them is the share of residential buildings up to 100 metres high.

However the first European building, higher than 100 metres, was inhabited, but not administrative. It was one of seven "Stalin" high-rise buildings, created in Moscow by 1954. Those high-rise buildings have created "a ring of the high-rise dominants structuring building outside a historical part" of the city [2].

The highest inhabited building in the world is the skyscraper of Trump World Tower in New York, 262 metres high (72 storeys) is considered today. In Europe Moscow 61-storey "Triumf-Palas", which is 264 metres high (with the spikes) is in the lead. Towers of Marina City standing in Chicago (almost 250 metres high), multipurpose John Hancock Centre (343 metres high, including offices, hotel and inhabited levels at the top) are widely known. In China the "Vertical Bionic City Tower" project (a 300-storey 1228 metres high construction for 100 thousand inhabitants is being seriously discussed.

So, there is a contradiction. Numerous calculations throughout all the history of high-rise construction showed that even despite the high cost and a limited reserve of the city land (the main incentives of high-rise construction), the economic feasibility of high-rise residential buildings as mass-product comes to the end at the height of 25-30 floors. This figure also limits the vast majority of high-rise residential buildings all around the world.

This article points out the reasons of limitation of high-rise construction in the housing sector and analyzes some social-and-economic prerequisites of his development in the modern large city. The influence of high-rise housing construction on the investment activity in the city is considered.

### 3 Results

The majority of residential skyscrapers in the world do not exceed 75 storeys.

Any further increase in number of storeys demands special measures for realization and control of constructive and fire safety, special decisions for water, heat and power supply, special complicated and expensive ventilation systems, sewerage systems and even rubbish disposal systems. Besides, construction of inhabited skyscrapers means dense population, considerable loads of social infrastructure, transport and engineering networks.

And still every day there appear more and more residential buildings, exceeding 100 metres and they are becoming higher. The matter is that construction of such residential buildings was always based first of all not on economic reasons. Except utilitarian economic purposes the high-rise ring is designed to resolve also city-planning and even political affairs.

So, for example, in case of "seven Moscow sisters" (so called "Stalin" towers), three of which are inhabited skyscrapers, they help to resolve not the housing problem: these buildings became populated "exclusively family-by-family by the citizens from nomenclature, scientific and technical, creative elite of the Soviet society" [2]. They have been designed to provide the new scale of the city, corresponding to the rank of the capital of the world power. Similarly, the construction of Marina City in Chicago has started the successful attempt to return the middle class, who was "running" to suburbs to the central regions of the city in 1964. Other projects serve to the city regulation purposes too. Such projects include rather considerable ones, such as areas La Défense in Paris and Docklands in London, the multipurpose Barbican complexes in London, Pershing Square in Los Angeles and dozens of others projects, including great number of high-rise and superhigh-rise residential buildings. Generally all these projects have been designed to take away a certain part of business life of the city out of borders of the historic center, resolving the issue of its transport congestion and the problem of creation "the architectural education adequate to requirements of time and at the same time not breaking historical appearance of the city" [3].

Though the era of superurbanization remained in the 1970th, construction of separate multipurpose public-and-housing estates [4, 5], such as, Trump Tower for 6 thousand apartments in New York, instead the former railway depot, is conducted and today.

Large-scale projects are implemented in Southeast Asia and Australia. In the Asian region formation of similar high-rise complexes is often carried out within the programmes for reconstruction of blighted areas and also for provision of housing for the numerous population of limited territories. That is also possible to mention the "New Ring of Moscow" programme adopted in 1998. Within its framework sixty zones was allocated in the median-and-peripheral territory of the city in 2005. That is planned to build about two hundred high-rise (30–70 storey) structures, which considerable part will be made up by the residential buildings. One can also note a local housing estate "Edelweiss", administrative-and-business buildings in the "City" zone, the 35-storey "Continental" complex, other residential buildings). The scheme of location of high-rise buildings provides several types of high-rise accents, such as: "coastal", "urbanistic", "planning accent", "entrance to the city" and so on.

What is the base for the hope, that existence of high-rise residential buildings will promote the increase in investment activity in the city?

First of all, the structure of "skyscraper" is important. In modern multilevel buildings, the top storeys are allocated to housing, below hotel rooms or offices are usually placed. Near earth level, in elevated and underground storeys of a skyscraper, shopping and entertainment centres, parkings, stations of the subway, etc. are located. One of the most widespread receptions of the architectural organization of the lower zone of similar complexes is the creation of the stilobat platform, often occupying all the ground area of the building; the total area of the chambers, which are in it can reach tens and even hundreds of thousands of meters. On such platform both one, and whole groups the of chambers of different height can

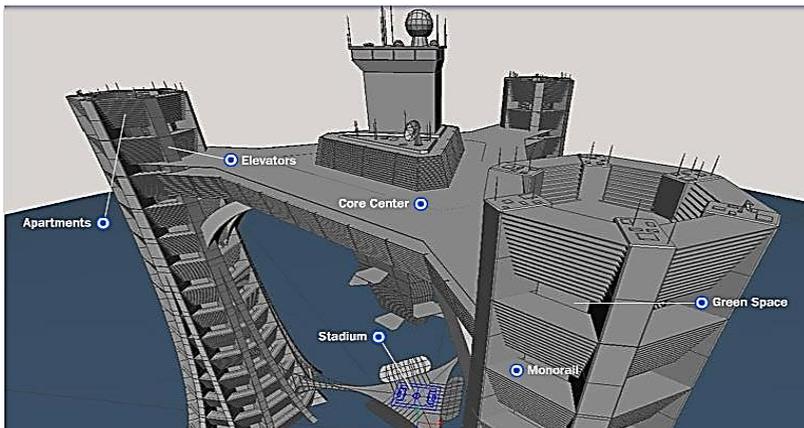
accommodate. Marina City is the axiom of such organization of a complex. The first 19 storeys of the building of Marina City are occupied by the parking having design, unique for the middle of the 60th, twirled on a spiral, which is calculated on 896 parking places. On the 20th storey the laundry, the gym, warehouse, rooms for conferences, theatre, the gym, the swimming pool, an ice skating rink, several shops and restaurants are located. Storeys from 21 to 60 are given for apartments. Under one part of the platform, hanging over the river, the mooring for yachts is located [6] .



**Fig. 1.** Marina City (photo by Rich McNeess)

Multilevel platforms of the Marina City building radically solve many functional problems, such as division of pedestrian and traffic flows, pedestrian transit and inhabited recreations, public and inhabited levels, maximal use of the urban area.

Today there are even projects of the cities-skyscrapers. In such a city inhabited and working tiers alternate with parks, technical and economic tiers. The author of two such projects is the Japanese is the well-known corporation "Takenaka". The larger one is the kilometer height of Sky City, which has to become a housing for thirty six thousand people and a workplace for one hundred thousand people. Everything is provided in such skyscraper for full-fledged life without any need to leave it: schools, parks, shops, restaurants, theaters, hospitals, offices; issues of communications and transport are resolved (figure 2). Actually such construction will become the centre of business and investment activity.



**Fig. 2.** Sky City project, Japan (from Web Site for Architecture & Design-Related Info)

In Russia the architect Sergey Nepomnyashchy, who offered several concepts, including the 75-storey city "Birth of Venus" and the "Pancake city", spread on a landscape in the form of a huge washer, is engaged in the projects of the cities-buildings.

It is necessary to mention significance, visibility of the high-rise building. In combination with its uniqueness the visibility of the building automatically transfers it to the category of sights of a space and social landscape of the city, makes it the subject of discussion. "The skyscraper is always a status construction" [7] not only for the owner and the inhabitant, but also for all the district and the whole city, quite often thanks to the building, becoming the subject of tourism .

In Moscow the Ukraine hotel is not only one of the best hotels of Russia, but also one of the most beautiful sights of Moscow. Leningradskaya hotel is another sight, and even when the building began to collapse, and the state had no money for reconstruction, the hotel managed to be sold rather favourably at the auction. The Sadko-Hotel network, which was engaged in reconstruction of the building, became the new owner, then the hotel opened under the new name "Hilton Moscow Leningradskaya". One more sight is the house on Kotelnicheskaya Embankment, which has its unique history, and is associated with the famous residents and surrounded with the numerous legends attracts tourists into its vicinity.

Tourism in turn becomes one more incentive of possible investments into the city economy.

## 4 Discussion

The matters of location and construction of high-rise buildings and complexes in capitals and other cities, remain a subject of the closest attention of city-planners, architects, designers, engineers, ecologists, sociologists, demographers, doctors, historians, art critics and also representatives of the general city public.

For example, the US scientists completed an interesting research and found out that the chambers, which settle down not above the environmental trees (according to the American measures that means storeys from 1 to 7, according to the Russian - measures that means storeys from 1 to 10) can be recognized as the best for the inhabitants' health. According to the data of the American researchers, the people, living above the 7th storeys are subject to risk of various diseases more than those, who live below. Among "skyscrapers" persons nervous breakdowns, under immunity and cardiovascular diseases are noticed very often [7].

But despite many negative sides of life at great height, it is possible to find the particular qualities, characteristic for the high-rise dwelling, making it demanded by the consumer. Those qualities are on border between objective properties of inhabited skyscrapers as object of the social-and-economic relations and images of collective consciousness, they are "non-material", but they are rather accurately recorded in mass culture. The status and prestige of such housing, interesting design and the view from the window, existence of characteristic infrastructure and subculture in a skyscraper are among those qualities.

According to the conclusions of sociologists, the inhabitant of a skyscraper is a particular type of the citizen. That is "a rich, young, highly educated, single or married man, whose family has no more than two children" [7]. The representative behavior model, active lifestyle are inherent in it, it is rather of individualist, than a family set of values, a wide range of the formal and informal contacts, high business activity, intensive consumption of products of city culture. Such an inhabitant creates padding demand for goods and services in the area and the city in general, and in turn actively participates in their creation [8, 9, 10, 11]. Such a citizen is attracted to the city by the existence of modern status inhabited skyscrapers [12, 13, 14].

Besides medicine and psychology it is necessary to mention the following problems, arising during projection and construction of high-rise residential buildings in Moscow and demanding obligatory consideration and decision:

- justified city-planning and functional and typological need of construction;
- marginal (justified) number of storeys (height);
- the right choice of design system, the scheme and design decisions taking into account prevention of loss of the stability of the basement and the whole construction, leading to the destruction and the collapse of structures;
- inadmissibility of the deviation from the approved design solutions and change of number of storeys of buildings during construction;
- optimum containment of inhabited and non-residential, public areas (we remember the example of Marina City);
- necessary functional interaction of residential and uninhabited buildings and constructions with the transport and serving city infrastructure;
- the required containment of underground, ground and elevated parkings of the individual transport and their rational placement;
- efficient minimization of threat of external and internal danger of destruction of the building due to creation of express service of safe operation;
- the required fire and evacuation safety of the people, who are in high-rise buildings (here the towers of the World Trade Center in New York remain very effective example, though they were not residential buildings);
- rational effectiveness of the modern engineering decisions on life support and equipment of the building, to energy saving and comfort of an upkeep, etc.

The urgent matter during construction of high-rise buildings is providing them with energy. For the solution of this complexity it is necessary to consider the possibility of the use of the alternate sources of heat and energy supply which along with centralized supply will be put into maintenance. Roofs and spikes of high-rise buildings are very suitable for placement of solar batteries and wind energy installations [15, 16].

The following problem is that in view of extreme load of city highways with motor transport which number is steadily growing, close attention should be paid to transport infrastructure of the territories of high-rise complexes. But on the other hand construction of inhabited skyscrapers will create padding prerequisites for the accelerated development of transport infrastructure which in turn – is a factor of investment attractiveness and investment activity in the city. A probable solution of a transport problem are also multilevel platforms which allow to divide pedestrian and traffic flows [17].

Quite often critics of skyscrapers accuse them of violation of ecology, creation of the unnatural and unhealthy environment for life, isolation of inhabitants from the earth and nature. As the answer to this criticism there exist two Italian skyscrapers the Vertical wood (Milan, Italy) in which name the main idea of original skyscrapers is put. According to authors of the Vertical wood to return to sources and at the same time such projects will help to save residents of the megalopolis from inevitable environmental disaster.

The answer to the requirements of ecological construction is the highest building of Austria, the pollution-free skyscraper DC Tower 1, which is also known under the name Donau City Tower. This building was constructed on the bank of Danube-river in the 2013 and it at once was included in various lists of the most impressive constructions of the present. The matter is that the 250-metres building with is one of the few skyscrapers of the planet constructed according to all the standards of "green" architecture. In the building water-conservation shower, energy efficient elevators and also many other interesting counters inseparably linked with environmental issues are installed. "Life support" of the tower happens due to pollution-free energy. This creature of the French architect Dominic Perrault serves as the proof of the possibility of the solution of problems of environmental

friendliness, energy efficiency and rational use of resources in the high-rise residential building.

Solution of problems, disturbing the opponents of high-rise residential building is considered in the city investment programme "New Ring of Moscow". The high-rise complexes built within the specified programme demonstrate in new approach to providing a high level of safety and comfort of accommodation. At construction of these complexes in adjacent territories the modern infrastructure is supposed: kindergartens, schools, movie theaters, shops, medical institutions and beauty shops, fitness centers, nurseries and sports grounds [18]. The territory around a complex of high-rise objects according to normative requirements has to be arranged well that surely includes also gardening. The modern city landscapes will make more comfortable social and psychological and ecological space which will attract residents and businessmen investors.

The Moscow real estate market always was and remains very attractive to investors [19, 20]. And the developed programme will help to develop and improve more actively the mechanism of interaction of authorities of the capital and various investment structures.

## 5 Conclusion

Great experience of high-rise construction, including housing, is accumulated in the world. The difficult and fruitful way is passed by many gifted architects.

Construction of high-rise residential buildings means certain engineering and architectural difficulties. Special responsibility lays down on administrative, executive and supervisory authorities of any city, as well as on their divisions in the field of architecture and construction, on specialized research and design institutes on creation of residential buildings and complexes, design of unique high-rise constructions. But already there exist buildings, giving the answer to these difficulties. The matter is in placing such buildings in appropriate districts of the city, without breaking architectural and esthetical integrity of areas with historical building. On the other hand, the modern European cities (and Moscow is not an exception) aspire to combine residential and office real estate. High-rise residential buildings provide necessary functional and visual and figurative concentration of inhabited function for full-fledged round-the-clock life cycle of highly urbanized fragments of the urban environment. That attracts investors and buyers of the real estate to the city.

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