Renovation of urban areas as a factor of settlements sustainable development

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Abstract. The article under consideration determines the role of biosphere compatibility in the context of persisting antagonism between destructive human activity and the environment. It also shows the relevance of chemical and pharmaceutical industry enterprises merger to build a flexible self-developing model of long-term territorial development of the city of Tyumen. A number of aspects contributing to the provision of sustainable urban development is outlined.

1 Introduction

The general plan provides the transformation of Tyumen into a multifunctional center with a biosphere-compatible environment by 2040. Therefore, further development of the city should be based on a new development paradigm [1], which ensures the sustainability of society and settlements as a whole. However, it is being neglected that the perspective of humanity is associated with only joint development of nature and society [1]. Otherwise, the creation of an artificial environment occurs contrary to nature [2].

The complexity of this process is determined by its global nature and by the need to implement environmental policy in the territorial development of the city until 2030. The goals of this policy, among other points, include:

• prevention and minimization of the negative impact of economic and other activities on humans and the environment;
• preservation and restoration of the natural environment, improvement of disturbed natural eco-systems;
• elimination of accumulated environmental damage associated with past economic activities.

Achievement of these goals can be carried out through the implementation of regional and territorial environmental policy, which presupposes the public use of industrial zones after their reclamation and re-profiling as one of the main reserves of territorial development [3].

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2 Main part

In the main directions of territorial development of Tyumen, it was presupposed to continue the process of removing industrial enterprises from the city center and the coastal zone of the Tura River. On its banks there is located the Coastal Industrial Center, which includes a chemical and pharmaceutical plant. The site for the plant was chosen in difficult war-time conditions. The production of drugs of pharmacopoeial purity was mastered in primitive conditions.

The plant had been developing, and the nature of its impact on the environment had also changed. Today, the maximum permissible discharge volumes of substances into Tura with the effluents from the chemical pharmaceutical plant have not been coordinated with the city's sanitary service, thereby violating the requirements of Sanitary Laws 2.1.5.980-00, requirements for sewage GOST R 52249-2009.

The further fate of the plant was determined by the main directions of the city territorial development: the removal of the enterprise from the coastal zone of Tura was planned. Therefore, according to the urban planning zoning scheme, it was assumed that the territory of the chemical and pharmaceutical plant would be used in the future as a public, business and recreational (terrestrial development reserve) one. This assumption dictated the inevitability of enterprise removal from the coastal zone, and reclamation works to follow. However, according to the amendments made to the resolution of the Government of the Tyumen region No. 687-p "On approval of the state program of the Tyumen region "Development of industry, investment and foreign economic activity" until 2020", measures should be taken to modernize the production of OJSC "Tyumen chemical and pharmaceutical plant" on the existing site. This will require changes to the functional zoning of the general plan. As a result, the storehouse and public utilities zone will be recreated, and a chemically hazardous facility - a chemical-pharmaceutical plant - will be reconstructed. Thus, with an increase in its capacity, the volume of harmful runoffs will also increase. This approach does not allow implementation of urban environment biosphere compatibility principles. At the same time, it is impossible to determine the necessary infrastructural factors that characterize the sustainable development of the city and the entire region. On the one hand, there is a decrease in the level of health and an increase in the incidence rate of the population in the zone of industrial enterprises influence. On the other hand, there can be witnessed an impoverishment of the species, outbreaks of mass reproduction of pests, a decrease in the overall biocenoses productivity, an increase in environmental mutagenicity, etc. [4]. It is necessary to change the approaches to the production structures development radically. The preservation of industrial facilities near residential buildings does not comply with the principles of environmental policy. At the same time, the stability of the natural framework and the effectiveness of its beneficial effect on the urban environment decrease. This does not fit into the concept of transforming the city into a biosphere-compatible and person developing. Biosphere compatibility is one of the most important criteria for the sustainable development of civilization. However, given the current ecological situation in the city, the city itself is a source of degradation of the biosphere and man.

It is impossible to eliminate human contact with chemical substances in the impact area of the chemical-pharmaceutical plant (at least 60,000 different chemical substances circulate in the environment). Analytical studies carried out in the world have revealed significant concentrations of various drugs and their metabolites in soil, water, sewage systems, effluents which underwent treatment facilities, surface water bodies, ground and drinking water. Irrational use of medicines, low-quality, falsified materials also contribute to the formation of the most harmful pharmaceutical waste [5].

The Tyumen chemical-pharmaceutical plant modernization project will be implemented in three stages:
• carrying out works on reconstruction of the finished product warehouse in accordance with GMP standards (but today almost all domestic production does not comply with GMP requirements [5]);
• construction of a new building with a production capacity of 300 million tablets per year, 40 million capsules, 8 million sachets;
• construction of the second new building for the production of soft and liquid dosage forms by 2020.

After the modernization, it will be a new plant at the existing production site. At the same time, the development of the Russian chemical-pharmaceutical industry is still being constrained by the environmental complexity and the danger of biotechnological industries. What adds to the problem is the lack of:
• effective ways to deodorize smelling substances in air emissions;
• technical solutions to radically reduce the amount of polluted wastewater discharged into water bodies;
• technical solutions for complete utilization and neutralization of multicomponent large-tonnage waste;
• approved sanitary and hygienic standards for a large amount of substances contained in waste.

It is impossible to solve this problem by expanding and modernizing the production of medicines: the antagonism between destructive human activity and the environment will only grow.

3 Conclusions and suggestions

1. Projects for large-scale modernization of existing industrial enterprises are significant for the Tyumen region. However, the regional environmental policy is not consistent with the principles of settlements sustainable development and does not contribute to the transformation of cities into biosphere-compatible and people developing [6].

2. Traditional methods of creating new drugs are becoming more costly and ineffective. In some cases, emissions from drug production exceed the toxic threshold concentration [7]. A nanotechnological and genetically engineered revolution is needed to replace traditional drugs. It is necessary to form the innovative potential of the pharmaceutical industry, to develop the production of innovative medicines [8]. The territorial planning scheme of the Tyumen region sets the task of creating conditions for the development and effective use of the scientific potential of the region with the further implementation of scientific achievements in the economy and social sphere of the region.

3. To minimize the impact on the environment, it is necessary to introduce a waste-free technology for the production of drugs as well as the integrated use of plant materials.

4. In Russia, due to a defect in the law "On Technical Regulation", practically no enterprise operates within GMP standards. GMP rules regulate production organization and the requirements for technology and equipment. But what the drug should be and how to control it is the subject of the Pharmacopoeia. Advanced GMP rules with a backward pharmacopoeia will lead to nothing [5]. Increasing the production chain transparency for manufacturing drugs is one of the ways to reduce environmental pollution [9].

5. The development and composition of urban planning documentation existing today and prescribed in the legislation cannot serve as the basis to determine the parameters for the biosphere-compatible urban environment development. It is vital to develop a scientific basis for a new methodology of urban planning, which will be based on the formation of a biosphere-compatible living environment, and to consolidate this methodology at the legislative level. Progress is impossible without urban activity, which should be considered as a symbiosis with the biosphere.
6. Formation of a backbone network of industrial development clusters with the support of law and science is a necessary component of eco-city planning activities to transform cities into biosphere-compatible ones. It is clustering that contributes to the development of industry by giving an innovative impulse and increasing the competitiveness of national economic entities.

7. Reasonable functional zoning, optimal transport scheme, principles of biosphere compatibility are the basis for the development of cities as flexible self-developing models of territorial development. The experience of working out and implementing programs for the development of individual regions of Russia based on biosphere-compatible technologies shows that this is the way that has no alternatives.

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