Problems of technological regulation of objects of negative impact on the environment in urban development.

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Abstract. The article discusses the problems of the development of technological regulation of objects that have a negative impact on the environment in urban planning in the Russian Federation. On the one hand, the measures taken in this area are aimed at improving the regulation system in the field of environmental protection in general and reducing the technogenic load on the Russian regions, and on the other, at increasing the efficiency and competitive ability of Russian enterprises. Keywords: technological regulation, best available technologies, BAT, information and technical reference books on the best available technologies BAT, technological indicators, technological standards, emissions and discharges of pollutants, water disposal, waste water treatment.

1 Introduction

The environment in the cities of the Russian Federation and adjacent territories, where 74% of the country's population lives, is subject to significant negative impacts, which are caused by industrial, energy and transport facilities, as well as capital construction projects. Cities with high and very high levels of air pollution are home to 17.1 million people, representing 17 percent of the country's urban population [1].

Moscow is one of the most dynamically developing megacities in the world in terms of urban planning. In 2019, 10.4 million square meters real estate were built. A significant part of capital construction projects being commissioned require measures to ensure environmental safety and environmental protection at all stages of the life cycle of construction products – during territorial planning, urban zoning, territory planning, architectural and construction design, construction, capital repairs, reconstruction of capital construction projects, operation of buildings and structures. On April 20, 2020, the Moscow clinical center for infectious diseases in the Voronovskoye district, a green zone of the city, was put into operation. It is one of the largest construction projects implemented in recent years in Moscow, with a capacity of more than 800-900 hospital beds. Almost a thousand medical specialists will provide assistance here. The object was built within record time of 1 month. On a plot of more than 40 hectares, there are 50 single-story buildings and 14 2-3-story buildings with a total area of 80,000 sq. m. [3, 4]

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Fig. 1. Moscow clinical center for infectious diseases in the Voronovskoe district [3].

More than 11,000 builders and 1,500 units of construction equipment were involved in its construction. When preparing the foundation of the hospital, engineering networks and roads, more than 90 thousand cubic meters of soil were moved. During its construction, more than 200 thousand cubic meters of sand and more than 1.5 thousand tons of rebar, about 14 thousand cubic meters of concrete, 6.5 thousand tons of metal structures and about 280 thousand square meters of sandwich panels were used. Only during the construction of premises, there were installed more than 5 thousand internal and external doors and more than 3 thousand different ventilation systems [3].

There were laid approximately 100 main and internal communications systems to provide gas, electricity, and heat. Engineering networks and equipment of the infectious diseases hospital will consume about 2.5 thousand cubic meters of gas per hour. There has been constructed the water intake unit with a capacity of 1250 cubic meters per day. The water source is artesian wells. Two drinking water storage tanks with a volume of 500 cubic meters each, a water treatment plant for water purification and a pumping station that will supply treated water to the water supply network are designed [3].

Fig. 2. Construction of the Moscow clinical center for infectious diseases [3].

They paid special attention to ensuring environmental and sanitary-epidemiological safety. There has been met all regulatory requirements for the placement of a clinical center. In accordance with the provisions of SanPiN 2.1.3.2630-10 "Sanitary and epidemiological requirements for organizations engaged in medical activities", medical organizations that provide medical care in stationary conditions, providing round-the-clock medical monitoring and treatment of infectious diseases are located at a distance of at least 100 meters from the territory of residential development. Hospitals of the specified profile with 1000 or more beds are located in a suburban or green zone. The established sanitary protection zone (SPZ) with a size of 250 m is 2.5 times larger than the required standards [5, 6]. At the entrances and exits from the territory of the infection center, there are two posts for sanitary treatment of transport. There you can simultaneously process three ambulances in each. The posts will operate around the clock and provide disinfection of 288 cars per day.

They created effective treatment facilities to prevent any waste that is contaminated or dangerous from entering the external environment. The wastewater disinfection system will allow for multi-stage cleaning. At the first stage, wastewater will be decontaminated in fiberglass tanks with a volume of 650 cubic meters using chemical reagents. At the next stage, there is planned an additional installation of a water disinfection system with ultraviolet radiation. The effluents at the outlet will meet the regulatory quality requirements for wastewater [3].

The hermetic ventilation system of premises is one of the main systems for ensuring biological safety. It prevents the release of contaminated air into the external environment and its spread between rooms. They plan to clean and decontaminate the air supplied and removed from infectious premises with devices that ensure the effectiveness of inactivation of microorganisms at the exit from the installation of at least 99 percent. For this purpose, there are provided channel installations for air inactivation [4].

Fig. 3. The construction of wastewater treatment plants [3].

The scale of the tasks to be solved in the operation of such a large capital construction project, and as shown above, the volume of use of natural resources and negative impact on the environment, will require new approaches to regulating issues of reducing negative impact, protecting the environment and ensuring environmental safety based on the principles of best available technologies (BAT) [23, 24].

2 Regulation in the field of environmental protection

In accordance with the Federal law of 10.01.2002 No 7-FZ (as amended on 27.12.2019) "On environmental protection" the operation of capital construction projects must be carried out in accordance with the requirements in the field of environmental protection, including measures to preserve and restore the natural environment, rational use of natural resources, ensure environmental safety, prevent negative impacts on the environment, land reclamation, as well as taking into account compliance with environmental quality standards [2].

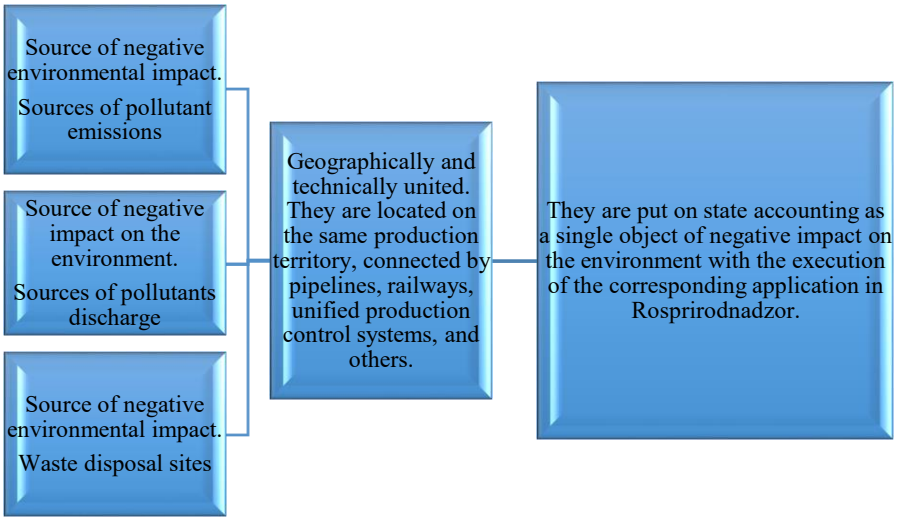

Fig. 4. Conditions for state registration of an object of negative impact with several sources of negative impact.

It is determined by provisions of Federal law No 219-FZ of 21.07.2014 that all objects where legal entities and individual entrepreneurs carry out economic and (or) other activities are divided into 4 categories according to the degree of negative impact on the environment. At the same time, an object that has a negative impact on the environment is "an object of capital construction and (or) another object, as well as their combination, united by a single purpose and (or) inextricably linked physically or technologically and located within one or more land plots"[2].

According to the "Rules of creation and maintaining the state register of objects that have a negative impact on the environment" approved by Decree of the Government of the Russian Federation from 23.06.2016 No. 572, the object of negative impact on the environment can include several sources of negative impact (including sources of emissions, discharges, waste disposal sites) and must meet the requirement of territorial connectivity (Fig. 4.) [7].

If a legal entity or individual entrepreneur carries out economic and (or) other activities on 2 or more production territories that are located at a significant distance from each other (including those located in different municipalities) and are not connected by pipelines, railways or otherwise (technically), it is necessary to put two or more production facilities on the state register with the corresponding submission of an application for each object (Fig. 5).

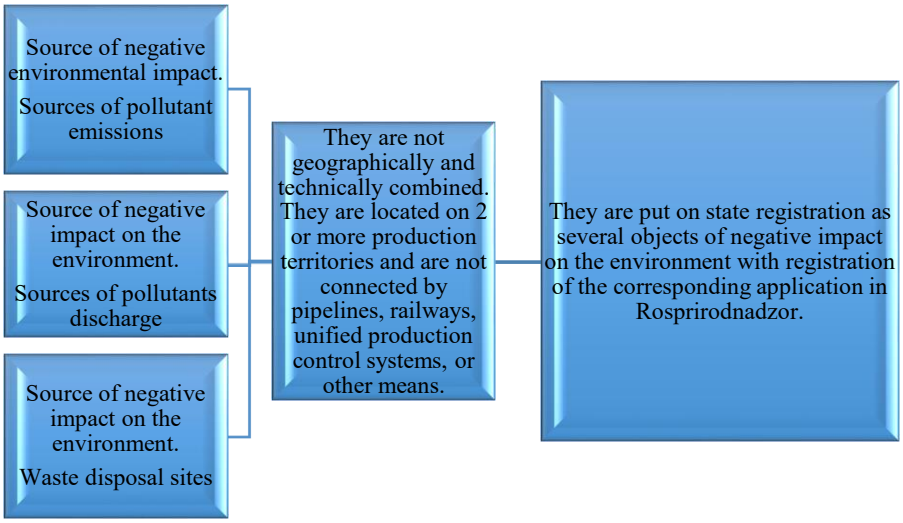

Fig. 5. Conditions for state registration of an object of negative impact with several sources of negative impact that are geographically and technically unrelated.

It should be noted that individual units of equipment that are on the balance sheet of an enterprise or organization cannot be considered as independent objects of negative impact on the environment. As well as, they do not consider land plots as objects of negative impact [7].

Objects that have a significant negative impact on the environment and are related to the areas of application of the best available technologies are classified as category 1 objects by law. For example, the implementation of economic and (or) other activities for the production of coke; for the extraction of crude oil and natural gas, including natural gas processing; for the production of petroleum products; for the extraction and processing of iron ores. In addition, the list of areas of application of the best available technologies, approved by the decree of the Government of the Russian Federation dated December 24, 2014, includes No. 2674-R includes economic and other activities that have a significant negative impact on the environment, such as mining and processing of iron ores, production of pig iron, steel and ferroalloys, production of products for further processing of ferrous metals; mining and processing of non-ferrous metals, production of non-ferrous metals; oil and natural gas production; production of coke and petroleum products, processing of natural gas, etc. As well as technological processes, equipment, technical methods and methods used in the implementation of economic and other activities, such as reducing emissions of pollutants, discharges of pollutants during storage and warehousing of goods(cargo); systems for processing (handling) waste water and waste gases in the chemical industry; industrial cooling systems; treatment of waste water and emissions of pollutants in the production of products (goods), works and services to enterprises, and others [8].

The criteria for classifying objects that have a negative impact on the environment to the appropriate category are established by the Federal law "On environmental protection" and Government Resolution No. 1029 of September 28, 2015, "On approval of criteria for classifying objects that have a negative impact on the environment as objects of categories I, II, III and IV" [2,9].

Table 1. Indicators used in establishing criteria for classifying objects that have a negative impact on the environment to the appropriate category.

Indicators	Regulatory and legal acts	Content of indicators
The level of environmental impact of a type of economic or other activity (industry, part of an industry, production).	1. Decree of the Government of the Russian Federation No. 2674-R of December 24, 2014 "List of areas of application of BAT". 2. Federal law "On environmental protection" (as amended by Federal law No. 404-FZ of 29.12.2015 and No. 219-FZ of 21.07.2014), article 16	The list of types of economic activities that have a significant negative impact on the environment is established.
The level of toxicity, carcinogenic and mutagenic properties of pollutants contained in emissions, discharges of pollutants, as well as hazard classes of production and consumption waste.	SP 2.1.7.1386-03 "Sanitary rules for determining the hazard class of toxic production and consumption waste".	There are four hazard classes of production and consumption waste.
Classification of industrial and production facilities	1. Federal law No. 116-FZ of 21.07.1997 (ed. from 07.03.2017) "On industrial safety of hazardous production facilities". 2. San PiN 2.2.1/2.1.1.1200-03 "Sanitary protection zones and sanitary classification of enterprises, structures and other objects".	There are four hazard classes of hazardous production facilities, depending on the level of potential hazard of accidents on them.
Features of implementation of activities in the field of nuclear energy use.	Federal law "On the use of atomic energy" of 21.11.1995 N 170-FZ.	Regulation of relations arising from the use of nuclear energy.

They take into account the following provisions in accordance with the requirements of the Federal law "On environmental protection":

environmental impact levels of economic and (or) other activities (industry, part of the industry, production);

classification of industrial facilities and productions. This should be guided by the provisions of Federal law No. 116-FZ of 21.07.1997 (as amended on 07.03.2017) "On industrial safety of hazardous production facilities", where hazardous production facilities are divided into four hazard classes depending on the level of potential danger of accidents on them:

hazard class I - hazardous production facilities of extremely high hazard;

hazard class II-high-hazard hazardous production facilities;

hazard class III-medium-hazard hazardous production facilities;

hazard class IV - hazardous production facilities of low hazard, as well as the requirements of the sanitary classification of industrial facilities, in accordance with the provisions of the SanPiN 2.2.1/2.1.1.1200-03 " Sanitary protection zones and sanitary classification of enterprises, structures and other objects. New edition» [5];

features of implementation of activities in the field of nuclear energy use (table 1) [2,9].

The order of the Russian Federation government of December 24, 2014 N 2674-p "List of areas of application of BAT" defines types of economic and (or) other activities that have

a significant negative impact on the environment:

mining and processing of iron ores, production of cast iron, steel and ferroalloys, production of products for further processing of ferrous metals;

mining and processing of non-ferrous metal ores, production of non-ferrous metals;

oil and natural gas production;

production of coke and petroleum products, processing of natural gas;

mining and processing of coal and anthracite;

production of electric and thermal energy through fuel combustion;

waste disposal, including thermal methods;

disposal of production and consumption waste;

the production of cellulose, wood pulp, paper, cardboard;

production of basic organic chemicals;

production of fine organic synthesis products;

polymer production;

production of basic inorganic chemicals-ammonia;

production of inorganic acids, mineral fertilizers;

production of solid and other inorganic chemicals-oxides, hydroxides, salts;

production of special inorganic chemicals;

production of other basic inorganic chemicals;

treatment of surfaces, objects or products using organic solvents;

coating metals and plastics using electrolytic or chemical processes;

production of glass and ceramic products;

production of cement, lime, and magnesium oxide;

production of textile products (washing, bleaching, mercerization);

dyeing of textile fibers, bleaching, dyeing of textile products;

tanning, dyeing, tanning of hides and skins;

pig and poultry breeding;

slaughtering animals in meat processing plants, meat slaughterhouses;

production of food, beverages, milk and dairy products;

wastewater treatment using centralized water disposal systems in settlements and urban districts (table 1) [8].

In accordance with article 16 of the Federal law "On environmental protection" (as amended by Federal law No. 404-FZ of 29.12.2015 and No. 219-FZ of 21.07.2014), the fee for negative environmental impact is charged for the following types of environmental impact:

emissions of pollutants into the atmosphere by stationary sources (emissions of pollutants);

discharges of pollutants into water bodies (discharges of pollutants);

storage and disposal of production and consumption waste (waste disposal).

The payment basis for calculating the fee for negative environmental impact based on the results of the reporting period is the volume or mass of emissions of pollutants, discharges of pollutants, or the volume or mass of waste placed in the reporting period of production and consumption.

The list of pollutants that are subject to state regulation in the field of environmental protection is approved by order of the Government of the Russian Federation No. 1316-R of 08.07.2015.

They assigned the appropriate category to an object that has a negative impact on the environment when it is registered on the state register of objects that have a negative impact on the environment. The object category can be changed when updating accounting information about an object that has a negative impact on the environment.

Federal law and a government decree classified the objects that have a moderate negative impact on the environment as objects of category II. Category III objects are objects that have a slight negative impact on the environment. And objects that have minimal negative impact on the environment, these are objects of category IV.

As examples of the government's decision to classify objects that have a negative impact on the environment in category I of objects, the following criteria can be cited:

implementation of economic and (or) other activities for the production of the following non-metallic mineral products:

glass and glass products, including glass fiber (with a design capacity of 20 tons per day or more);

refractory ceramic products and construction ceramic materials (with a design capacity of 1 million pieces per year or more);

for the production of the following food products:

meat and meat products (with a design capacity of 50 tons of finished products per day or more);

vegetable and animal oils and fats (with a design capacity of 75 tons of finished products per day or more);

products from potatoes, fruits and vegetables (with a design capacity of 300 tons of finished products per day (quarterly average) and more);

dairy products (with a design capacity of 200 tons of processed milk per day (average annual rate) or more).

Assignment to an object of the corresponding category is carried out when it is put on the state register of objects that have a negative impact on the environment and are entered into the state register at the federal or regional level. This is documented by a certificate of registration with the state, which is issued by the relevant territorial authority of Rosprirodnadzor (for federal facilities) or by the authorized body of a constituent entity of the Russian Federation (for regional facilities).

If an object does not meet the criteria for classifying objects that have a negative impact on the environment as objects of categories I, II, III and IV, approved by the decree of the Government of the Russian Federation No. 1029 of 28.09.2015, such an object is not subject to state registration [9].

For each category of objects various measures of state regulation are applied. In particular, in accordance with federal law, the procedure for determining the payment base for calculating fees for negative environmental impacts and the procedure for calculating fees for negative environmental impacts, the established amount of fees for negative impacts depends on the category of enterprise.

When carrying out urban development activities, another instrument of state regulation to prevent and reduce its negative impact on the environment is the regulation in the field of environmental protection, which is carried out in order to maintain a favorable environment and ensure environmental safety. It consists in the establishment of environmental quality standards, standards of permissible environmental impact during the implementation of economic and other activities (Fig. 3).

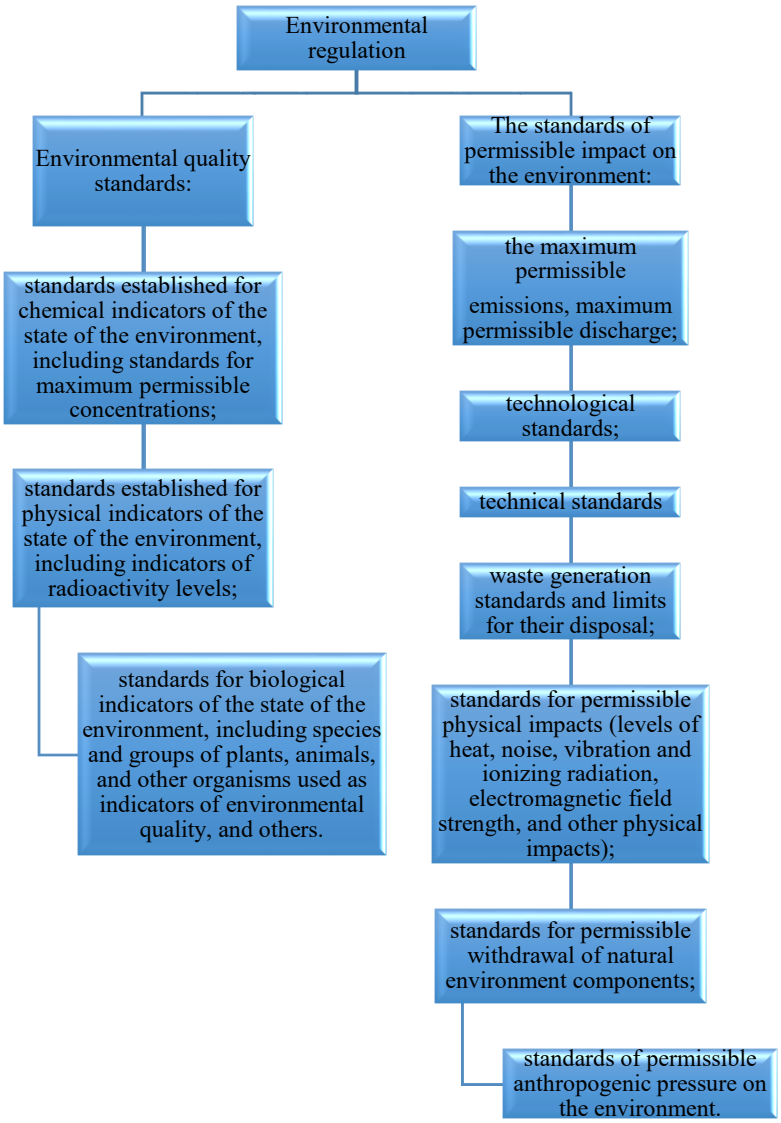

Fig. 6. Regulation in the field of environmental protection.

Environmental quality standards are the standards that there are established in accordance with physical, chemical, biological and other indicators for assessing the state of the environment and upon compliance with which a favorable environment is ensured (Fig.3.).

The standards of permissible environmental impact are the standards that are established in accordance with the indicators of the impact of economic and other activities on the environment and at which the environmental quality standards are observed.

Compliance with permissible environmental impact standards, with the exception of technological standards and technical standards, must ensure compliance with environmental quality standards (Fig. 3.).

At the same time, in accordance with article 1 of the Federal law "On environmental protection", technical standards are standards that are established for engines of mobile sources of environmental pollution in accordance with the levels of permissible impact on the environment.

In addition, by the provisions of the Federal Law “On Environmental Protection” the existing permits for emissions, discharges of pollutants, waste disposal were replaced by a comprehensive permit, declaration or reporting, depending on the category of enterprise and organization. Technological regulation based on BAT was introduced, the list of regulated substances is reduced. Depending on the category for enterprises and organizations, various requirements have been established for the obligation of enterprises to develop and approve programs of industrial environmental control and increase the environmental performance of production facilities [2].

3 Technological regulation of objects that have a negative impact on the environment in urban development

In accordance with the Federal Law “On Environmental Protection”, technological standards are the standards for emissions, discharges of pollutants, standards for permissible physical impact. They are established using technological indicators.

Technological standards are developed and established at enterprises and organizations of the 1st category that have a significant negative impact on the environment based on the volume of emissions of pollutants, the volume of consumption of energy, raw materials and other resources per unit of production. However, the technological standards are also established for objects of centralized water disposal systems of settlements or urban districts classified as category II objects, if they are issued a comprehensive environmental permit for technologically regulated substances in accordance with the procedure established by the Federal law "On environmental protection" and the decree of the Government of the Russian Federation of October 26, 2019. No. 1379 "Rules for classifying water bodies for the purpose of establishing technological indicators of BAT in the field of wastewater treatment using centralized water disposal systems of settlements and urban districts". At the same time, the main marker pollutants are regulated for the applied technological process. Rules for the development of technological standards are established by the order of the Ministry of natural resources and ecology of Russia dated 14.02.2019 No. 89 "Rules for the development of technological standards"(Fig. 7) [10, 11].

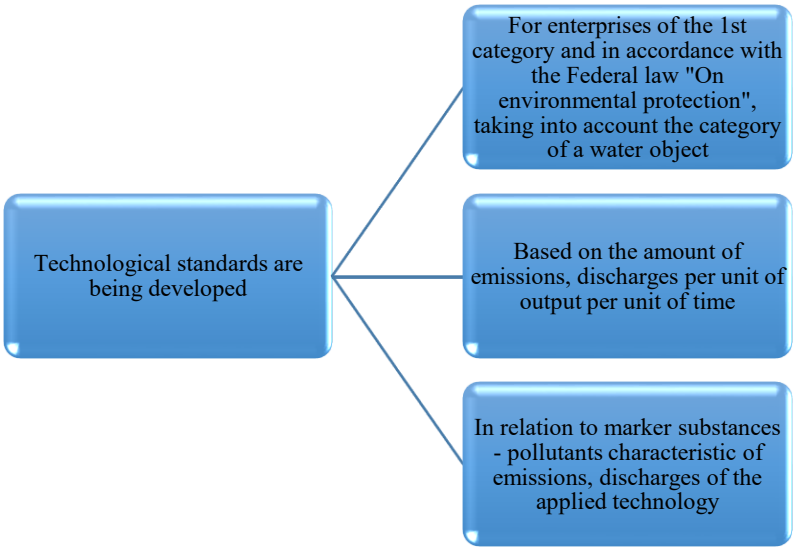

Fig. 7. Conditions for the development of technological standards.

Technological standards are set based on technological indicators. In turn, technological indicators are indicators of the concentration of pollutants, the volume and (or) mass of emissions, discharges of pollutants, waste production and consumption, water consumption and use of energy resources per unit of time or unit of production (goods), work performed, services rendered [11].

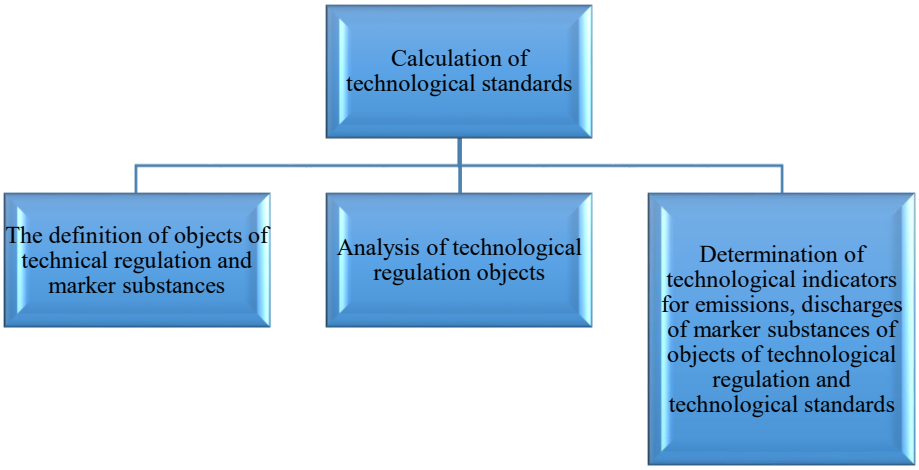

Fig. 8. The procedure for calculating technological standards.

Technological indicators of the best available technologies are established by regulatory documents in the field of environmental protection no later than six months after the publication or updating of information and technical reference books on the best available technologies. The technological indicators are specified in the main information and technical reference books (Table 2). For example, ITS 10-2015 “Wastewater treatment using centralized wastewater systems in settlements, urban districts”, ITS 8-2015 “Wastewater treatment in the production of products (goods), work and services at large enterprises” and others [12,16].

This approach can be compared with that outlined in Directive 2010/75 / EU of the European Parliament and the Council of November 24, 2010 on Industrial Emissions (Integrated Prevention and Control).

According to the Directive, BAT reference documents, drawn up for defined activities and describing applied techniques, present emissions and consumption levels, set the "emission levels associated with the best available techniques (BAT AELs)". BAT AELs means the range of emission levels obtained under normal operating conditions using a best available technique or a combination of best available techniques, as described in BAT conclusions, expressed as an average over a given period of time, under specified reference conditions [18,20,21].

For example, Best Available Techniques (BAT) Reference Document for Waste Treatment (2018) lays down information to asses BAT applicability for mechanical treatment of waste and the emissions levels associated with BAT (BAT AELs), including in order to reduce emissions to air of dust, and of particulate-bound metals, PCDD/F and dioxin-like PCBs (Table 2) [19].

Table 2. BAT-associated emission level (BAT-AEL) for channeled dust emissions to air from the mechanical treatment of waste [19].

Parameter	Unit	BAT-AEL (Average over the sampling period)
Dust	mg/Nm3 2–5 (1)	2–5 (1)
(1) When a fabric filter is not applicable, the upper end of the range is 10 mg/Nm		

The technical standards stipulated by the Federal law "On environmental protection" are established for engines of mobile sources of environmental pollution in accordance with the levels of permissible impact on the environment. They are established by technical regulations adopted in accordance with the legislation of the Russian Federation on technical regulation.

In accordance with the rules for the development of technological standards, approved by order of the Ministry of Natural Resources and Ecology of Russia dated 14.02.2019 No. 89 “Rules for the development of technological standards”, the procedure for developing technological standards in terms of emissions and discharges of pollutants is determined.

Table 3. Technological indicators BAT 11b "Aerobic stabilization of dehydrated sediments (composting)" (ITS 10-2015) [13].

Technological indicator	Unit	Range of values 3)
Efficiency of reducing organic matter sediment as a result of treatment using the BAT 11b 1 technology 1)	%	More than 22
1) excluding the use of additives (substances added to the sediment) during composting 3) the indicated values are given as average annual		

Technological regulations are developed for the object, that have negative impact on environment, and also for its parts (objects of technological regulation), where there are implemented or planned to implement technological processes, used equipment, used technical means and methods in the production of goods, performance of works, rendering of services in respect of which in the information technical reference books on best available techniques describes identical technological processes, equipment, technical methods, as well as technological indicators of the best available technologies, including for emissions, discharges (BAT technological indicators) (table 4.) [10].

Table 4. General procedure for developing technological standards.

Who develops technological standards	Development goal	For which objects of technological regulation	For which pollutants	Calculation of technological standards	The result of the development of technological standards
Legal entity, individual entrepreneur, carrying out or planning to carry out economic and (or) other activities at facilities of category I, as well as at facilities of category II in accordance with the Federal Law "On Environmental Protection"	Preparation of an application for a comprehensive environmental permit (CEP) or an application for a review of CEP.	Planned for commissioning and operating objects of negative impact.	For which technological parameters of BAT are established for emissions, discharges (marker substances).	-determination of objects of technological regulation and marker substances; - analysis of technological regulation objects; - determination of technological indicators for emissions, discharges of marker substances of objects of technological regulation and technological standards; - appendixes	Calculations of technological standards that are included in the application for obtaining CEP or application for revision of CEP.

The calculation of technological standards begins with the definition of objects of technological regulation and marker substances and is carried out by analyzing the available technical, design and operational documentation (Fig. 5) (table 5.6) [10].

The next step in the calculation of technological standards is the analysis of technological regulation objects for existing and planned objects that have negative impact on the environment. They carry it out using technical and project documentation (table 7.) [10].

Table 5. The procedure for determining the object of technological regulation.

Content of analysis of technical and operational documentation	For operating enterprises	For planned enterprises
• Technical documentation regulating carrying out of technological operations; • design and engineering documentation; • technological regulations;; • manual (instruction) for operation, technological scheme; • technical conditions; • other operational documentation for the production of products, performance of works, and provision of services for existing facilities.	Yes	
• Design documentation for the construction, reconstruction of the capital construction facility for the facilities planned for commissioning and comparison with the relevant BAT information and technical reference book (Table 6.)		Yes
The result of determining the objects of technological rationing and marker substances are: • list of identified objects of technological regulation; • lists of marker substances for which technological standards will be calculated for each object of technological regulation and the object of negative impact (table 6).		

Table 6. The list of marker substances in accordance with ITS 10-2015 “Wastewater treatment using centralized sewage systems of settlements, urban districts” [13].

For atmospheric air	For water bodies
Hydrogen sulphide	Petroleum products - for surface wastewater discharges

Table 7. The content of the analysis of objects of technological regulation.

Analysis of technological regulation objects	
Operating objects	**Designed objects**
• The analysis is performed using: • technical documentation; • inventory data on emissions of pollutants into the air and their sources; • inventory data on discharges of pollutants into the environment and their sources; • results of industrial environmental control for several years, but no more than 5 years.	They perform analysis using data from project documentation for construction and reconstruction of capital construction projects.
• As a result of the analysis of technological rationing objects, the following are described for each technological rationing object: • data on raw materials used and materials consumed in the production process, • characteristics of manufactured products, by-products and intermediates, • characteristics of waste gases and gas-air flows, • list and parameters of stationary sources of marker substances emissions, availability of gas treatment plants and their efficiency, • characteristics of wastewater,	

- list and parameters of stationary wastewater sources (hereinafter - wastewater releases) containing discharges of marker substances,
- availability of facilities and devices for wastewater treatment and their characteristics.

In accordance with the Rules of development of technological standards, approved by the Ministry of natural resources and ecology of Russia from 14.02.2019 No. 89, "Rules of development of technological regulations" determination of technological indicators for emissions, discharges of marker substances for each object of technological regulation is carried out in order to assess the compliance of technological indicators of emissions, discharges of the object of technological regulation with the technological indicators of BAT.

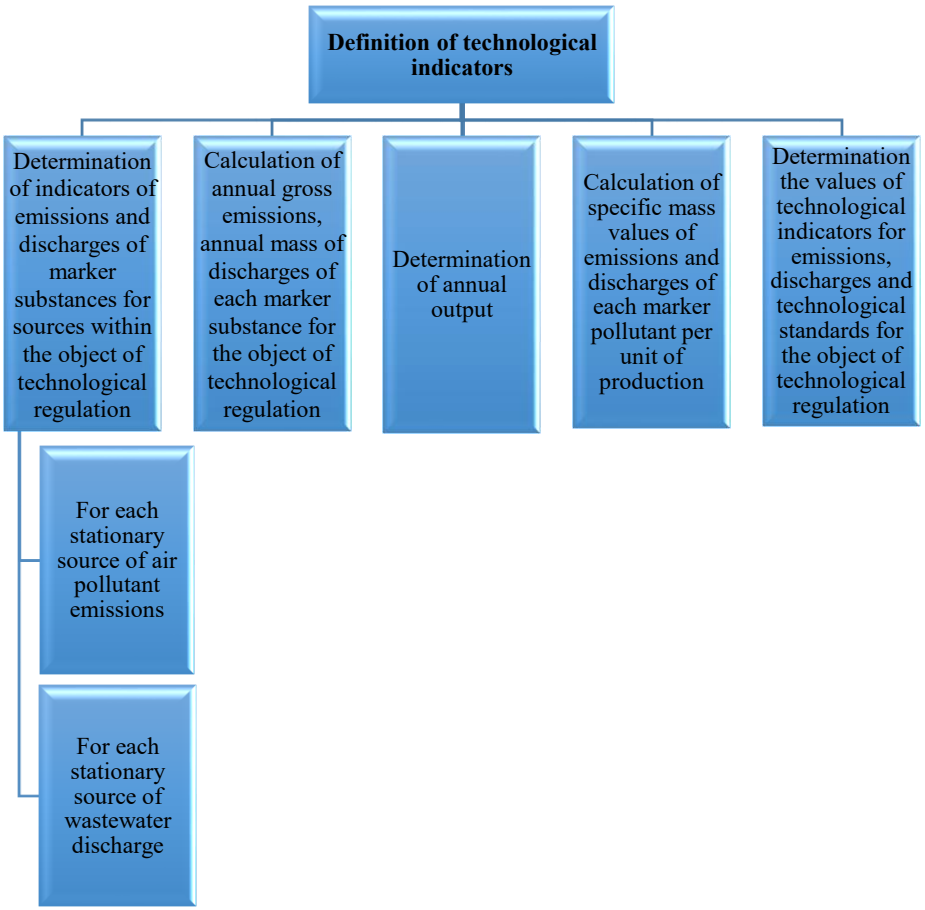

Fig. 6. The procedure of determination of technological indicators.

The indicators of marker substances emissions for each stationary source of emissions, indicators of marker substances discharges for each wastewater release as part of the object of technological regulation are determined for existing and planned enterprises using data obtained from the analysis and study of technical, operational and project documentation, information and technical reference books of BAT (Fig. 6).

The values of the annual gross emission, the annual discharge mass (t / year) of each marker substance M for the object of technological regulation are calculated as the sum of the mass of marker substance Mk emissions of all stationary sources of emissions (k), the

sum of the mass of marker substance discharges Mk of all wastewater discharges (k) as part of the object of technological regulation [10].

$$M = \sum_{k=1}^{\infty} Mk \quad (1)$$

The value of the annual output of V products is defined as an indicator of the maximum volume of products produced at the object of technological regulation during the year for several years, but no more than five years preceding the year in which calculations of technological standards are made.

The specific values for mass emissions, discharges each marker substances per unit of output Msp are calculated by dividing the annual gross emissions, the annual mass discharges of each marker substance on the amount of annual production at the object of technological regulation [10].

$$\frac{M}{V} = Msp \quad (2)$$

How to determine the values of technological indicators for emissions, discharges and technological standards for the operating object of technological regulation depends on if the technological indicators of BAT are set as a specific value of the mass of emissions, mass of discharges of marker substances per unit of production, or if the technological indicators of BAT for emissions, discharges are set as concentrations of marker substances (table 8.) [10].

Table 8. Determination of values of technological indicators for emissions, water discharges and technological standards for the operating object of technological regulation.

Procedure for determining the values of technological indicators for emissions, discharges and technological standards for the operating object of technological regulation:	
Technological indicators of BAT are set in the form of specific values of mass of emissions, mass of discharges of marker substances per unit of production:	Technological indicators of BAT for emissions and discharges are set in the form of concentrations of marker substances:
• the values of technological indicators for emissions, discharges of marker substances for the operating object of technological regulation are assumed to be equal to the specific values of the mass of emissions, the mass of discharges of this substance;	• as a technological indicator for emissions and discharges of a marker substance of the object of technological regulation, the highest value of the concentration of this substance in the emissions of stationary sources, wastewater releases as part of the object of technological regulation, determined during the analysis of technical, operational, project documentation and BAT reference books is taken;
• if technological indicator for emissions, discharges the marker substance is less BAT technological indicator for emissions, discharges the marker substance or equal, in this case the values of technological standards for emissions, discharges on this marker substance (t/year) is determined by multiplying the technological indicator for emissions, discharges the operating object of technological regulation by the amount of annual production;	• if the technological indicator for emissions and discharges of a marker substance is less than or equal to the BAT technological indicator of this marker substance, then the value of the technological standard for this marker pollutant (t/year) is determined by multiplying the specific value of the mass of emissions, mass of discharges of this marker substance by the value of annual output;

• if the technological indicator for emissions, discharges of marker substance exceeds the technological indicator of BAT for emissions, discharges of this marker substance, then the value of the technological standard for emissions, discharges of this marker substance (t / year) is determined by multiplying the technological indicator of BAT by the annual output of the objects of technological regulation.	• if the technological figure for emissions, discharges at the marker substance exceeds the BAT technological indicator this marker substances, then the value of the technological standard of this marker pollutant (tons/year) determined by multiplying the BAT technological indicator by the annual value of the gas emissions mixture or the annual wastewater flow rate, determined according to the program of ecological efficiency

Technological indicators for emissions and discharges of marker substances may not exceed the technological indicators of BAT for the objects designed and planned to be put into operation.

In accordance with the Rules of development of technological regulations, approved by order of the Ministry of natural resources and ecology of Russia from 14.02.2019 No. 89, technological standards for each marker substance for the object of technological regulation are defined as the sum of the technological standards of all objects of technological regulation in the object of technological regulation.

4 Conclusions

As noted above, the established system of technological regulation should help to reduce the negative impact on the environment, environmental risks, and the formation of an effective and environmentally oriented model for the development of urban development activities. However, this requires resolving a number of problems at this stage. For example, some already approved BAT information and technical reference books do not contain the values of technological indicators necessary for establishing technological standards and ensuring the operability of the new regulation system [25].

When updating BAT information and technical reference books the issues related to the environmental restoration of urban and industrial territories polluted by BAT application are also need to be reflected. This approach is presented in Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control). Where there is established that BAT reference documents should contain appropriate measures for remediation of contaminated sites [18,22].

Taking into account the established period of 7 years for updating the reference books, and the revision of technologies identified as the best available BAT technology is carried out at least once every ten years, the way out may be to improve existing and develop new national standards in this direction. For example, such as national standard GOST R 57446-2017 "Best available technologies. Reclamation of polluted land and sites. Restoration of biological diversity" [17].

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