

Organizational and economic bases for the formation of an investment project of an environmental orientation in the conditions of the advanced development of the national economy

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Abstract. The article develops methodological recommendations on the formation of mechanisms for state regulation of investment activity and a methodology for the formation and coordination of investment, environmental and industrial policies in the region, mechanisms for their implementation. Options for improving the economic mechanism of state regulation of investment activity of environmental orientation based on the determination of the environmental effect from the implementation of an investment project are proposed. The proposed investment project for the North Caucasus Federal District (Serevo-Kavkazsky Federal District) is based on the technology of recycling depreciated tires by mechanical grinding. The multiplicity of the project is based on the relationship with the markets of financial, labor, information, material and technical, secondary resources, as well as with the real estate market. The investment project being created will, in the process of implementation and full development, influence the market of suppliers of tires as material resources, the real estate and equipment market, since equipment will be purchased and the building will be reconstructed, thirty-six people will be attracted from the labor market, of which thirty are workers, which will serve the technological process in two shifts. Consequently, the investment project will bring not only environmental, economic, but also social effects, reducing the unemployment rate and ensuring stable wages.

1 Introduction

The problem of recycling used tires is of great economic and environmental importance for any region, including Russia as a whole. Since from an environmental point of view, worn tires are environmental pollutants, since they are not biodegradable, they are a flammable material that is difficult to extinguish in the event of a fire. When stored for a long time, tires become a habitat for rodents, blood-sucking insects and serve as a source of the spread of infectious diseases [1].

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At the same time, shock-absorbing tires are a valuable secondary raw material containing 65-70% rubber, 15-25% high-quality metal, 10-15% textile cord and being a source of valuable rubber raw materials.

According to the European Tire Recycling Association (ETRA), about 2 million tons of used car tires are produced annually in Europe. Most of the collected tires, and this is only 20% of their total amount, is used as fuel, and no more than 10% is recycled by shredding [1].

In the countries of the European Community at the end of the last century, a program was developed, according to which the following tasks should be solved at the beginning of this century: the estimated number of car tires is reduced by 10% per year; the share of retreaded tires will increase to 25-30%; recycling of scrap tires to produce crumb rubber will increase up to 60%; the export of tires to landfills will be reduced to zero tons [2].

On the territory of Russia and its regions, the problem of recycling used tires is even more urgent than in Europe, since in 1998-2000 projectors for 5% of tires from their total number were restored, and 1% was recycled in order to obtain crumb rubber. The total number of used tires, for example, in Moscow, according to various estimates, ranges from 60 to 90 thousand per year. Of these, approximately 8-10 thousand tons are processed annually, which is 11-13%, at the regenerator plant in the city of Chekhov, and the remaining amount replenishes, as a rule, unauthorized dumps and pollutes the territory, creating its long excess dumping.

In the south of Russia on the territory of the North Caucasus Federal District, every year, according to various estimates, from 50 to 70 thousand tons of used tires are produced. Of this amount, from 2 to 5% is recycled, and the rest ends up in unauthorized landfills, in suburban forests. This situation is also observed in all of Russia, however, despite this, in 2000, the existing production for the processing of tires with a textile cord into rubber crumb and reclaim was liquidated. Industrial enterprises for the processing of tires with a metal cord do not yet exist at all.

Experts have calculated that up to 1 million tons of worn tires of various types are accumulated in Russia annually, which can become a source of valuable rubber raw materials. Currently, there are only 8 pilot plants in Russia that use the barodestruction method and the mechanical method, however, according to experts, these industries are inefficient and energy-intensive: "MPZ" Udmurtvtorresurs "(Izhevsk), Retsikl Plant (St. Petersburg), FPP LEADER (Novosibirsk), Kvant special plant (Novosibirsk), Plitpolimer company (Leningrad region, Annino village), Plarus plastics processing plant (Moscow region, Solnechnogorsk), Plant "Double PET" (Volgograd), Plant "Bionet", which is the only manufacturer of fuel pellets from hydrolytic lignin in the world (Arkhangelsk region, Onega)

The processing of tires with textile cords is carried out on the outdated equipment of the Polymer plant (Slantsy). An investment project has been developed for the processing of 6 thousand tons of tires per year at an industrial enterprise, which, presumably, will be located in the Stavropol Territory.

The Stavropol Territory is distinguished by an optimal combination of external and internal factors, territorial proximity to a large source of used tires - the entire North Caucasus Federal District.

The main characteristics of the investment project are production capacities, which are designed for an annual processing volume of 14,769 tons of raw materials. The yield of the final product to the amount of raw material is the following proportions: fine rubber powder - 65%, metal cord waste from the bead ring - 25%, textile cord waste - 10% [2].

Thus, textile cord and metal, which make up one third of the total volume of worn tires, will become waste products. The processing technology is based on a method patented in the Russian Federation for mechanical grinding of tires to a powder fraction, followed by

separation of the metal and textile components - waste. The advantage of the project may be that the technology provides for the processing of several types of tires - with a textile cord, with a metal cord, combined tires. In addition, the project provides for a high degree of purification from by-products, low energy consumption compared to other technological methods [3-20].

The competitive advantages of this investment project include: a high level of security, constancy and uninterrupted supply of the main feedstock - worn tires; the absence of enterprises for the processing of automobile tires on the market, which leads to a significant excess of the supply of raw materials over demand and, consequently, a low level of prices for used tires. The supply of raw materials is supposed to be carried out by the recycling and specialized motor transport enterprises of Stavropol and the North Caucasus Federal District, without building their own procurement network.

The need for labor resources is supposed to be met by attracting residents of the Stavropol Territory. The proposed investment project is being developed for a target market of producers and consumers of rubber powder, where there is practically no competition. If about 1 million tons of used car tires of various types are accumulated annually in Russia, then for their complete processing, according to experts, at least 100 plants equipped with a processing line being developed in this project will be required. Since in recent years the demand for rubber powder with a dispersion of less than 1.0 mm, which will be produced at the projected industrial enterprise, has sharply increased, the economic efficiency is obvious, since the cost of such a powder has approached the price of primary natural raw materials - rubber. However, despite the increased demand for fine powders, production is limited by rather high energy costs and the capital intensity of processing equipment.

In Europe, recyclers usually receive subsidies from used tire dealers. In Russia, the most rational way to stimulate the introduction of such investment projects is to develop such processing technologies that will lead to a reduction in energy costs, capital intensity of equipment, and therefore to a decrease in the cost of rubber powders obtained, an adequate increase in demand.

The consumer market consists of manufacturers of automobile tires, which use rubber powder as an additive, the share of which is from 5 to 20% of the mass of a new product. Powdered rubber is also used to make rubber shoes, roll roofing, rubber slates, rail pads, rubber bitumen mastics, roll waterproofing materials.

The production program is based on four types of goods, which differ in the dispersion of rubber crumb and can change towards an increase in one group and a decrease in another (9 other groups) depending on the current market demand. At the same time, the gross volume of production remains at the same planned level.

The volume of the production program for the first years of capacity development is: in the first year - 75%, in the second year - 85%, in the third year 90-95% of the installed design capacity (Table 1).

Table 1. Development of the production program by years of implementation of the investment project

Name of indicator	years				
	1	2	3	4	5
The level of production load from the design capacity, %	75	85	95	95	95
Consumption of raw materials - worn-out car tires, tons	11077	12554	14031	14031	14031
Output of products - fine rubber powder, tons	7200	8160	9120	9120	9120
Metal waste, tons	2769	3138	3508	3508	3508
Textile waste, tons	1108	1255	1403	1403	1403

The data presented in Table 1 make it possible to judge that the investment project under consideration will partially solve the environmental problem of dumping in the territory of the North Caucasus Federal District, since if the design capacity for processing 70 thousand used tires per year is reached in three years, the level of pollution of the territory by worn tires will decrease approximately 20% of their annual education.

The implementation of this investment project allows not only to solve an important environmental problem, but also to ensure high economic efficiency of investment costs, which in the proposed project means the costs of acquiring fixed assets, including equipment for the production process, the costs of developing a technical assignment, creating and coordinating a working project, placing orders for equipment and purchasing the equipment itself, including non-standard equipment, carrying out construction and installation works, installation and installation of equipment, commissioning (tab. 2).

Table 2. Main items of investment expenses and their share in the total amount, percentage

Expenditures	Amount, c.u.	Share, %
Development of technical documentation	50000	3
Purchase of production equipment	1120000	67
Construction and installation works and reconstruction of buildings	380000	23
Installation and installation of equipment	100000	6
Commissioning works	20000	1
TOTAL	1670000	100

The calculation of current production costs is based on an analysis of current market prices for raw materials, auxiliary materials, tariffs for utility bills, electricity, average monthly wages in the North Caucasus Federal District, mandatory payment rates, as well as an analysis of real data on the cost structure of industrial enterprises with comparable capacities (Tab. 3). It should be noted that the most significant current costs presented in Tab. 3, occupy depreciation and income tax, their shares are equal to 24.4, respectively; and 20%. The second place is occupied by expenses for the purchase of worn tires - 17.9%, the third place is occupied by wages with a single social tax - 13%.

Table 3. Structure of costs for the first quarter of the first year of development of the design capacity

Expenditures	Amount, rub.	Share, %
Raw materials	41538	17,9
Salary (settlement) payment with a single social tax	24900	13
Electricity, utility bills	9000	3.9
Maintenance and operation of equipment	4500	1.9
Maintenance of production premises	3000	1.7
Selling expenses	9304	4.3
Fare	9304	4.2
other expenses	13957	6.5
Depreciation	56914	24.4
Property tax	6816	2.2
income tax	53650	20
TOTAL	232883	100

The calculation of tax payments was made in accordance with the current legal and economic mechanisms in the Russian Federation, the Stavropol Territory and the

municipality, where the construction of an industrial enterprise for the processing of used tires is planned.

Taxes:

- value added tax in the amount of 20% of its value (Tax Code of the Russian Federation, Chapter 21);
- corporate property tax in the amount of 2.2% “On the average annual book value of fixed assets” (Law of the Russian Federation of October 11, 2003 N 139-FZ “On corporate property tax) with amendments and additions”);
- unified social tax in the amount of 30.2% of the wage fund (Tax Code of the Russian Federation);
- income tax in the amount of 20% of gross profit, of which 3% goes to the federal budget, 17% of the calculated tax goes to the budgets of the constituent entities of the Russian Federation.

The forecast of financial results, based on an expert study of trends in market demand for products, the level of prices for raw materials, wages, is presented in Table. 4.

Table 4. Forecast of financial results by years of project development, thousand rubles

Indicators	Years				
	1	2	3	4	5
Revenue	1550.7	1845.3	2165.5	2273.8	2387.5
Expenses	631.9	686.9	747.1	771.9	801.1
including variables	269.9	304.1	340.0	355.9	373.9
of which: raw materials and materials	138.4	164.6	193.3	203	213.1
wages with a single social tax	100.9	107.0	111.9	118.0	124.0
Electricity and utility bills	30.5	31.9	34.0	35.5	37.4
permanent	362.0	384.0	407.4	417.0	426.0
of which: maintenance and operation of	15.3	15.0	17.0	17.7	18.6
equipment	10.2	10.7	11.3	11.8	12.4
maintenance of production premises	30.9	37.0	43.3	45.5	47.7
business expenses	30.9	37.0	43.3	45.5	47.7
fare	46.5	55.4	65	67.9	71.6
other expenses	227.7	227.7	227.7	227.7	227.7
depreciation					
Profit from sales	919.0	1158.2	1419.0	1500.9	1587.4
Property tax	25.6	21	16.5	12	7.3
Profit to tax	893	1137.2	1402.5	1490.0	1580
income tax	214.3	273.0	336.6	357.4	380.0
federal income tax	67	85.3	105.2	112.0	119.0
Net profit	678.6	864.3	1066.0	1131.8	1201.0

The calculated data presented in tab. 4 in the form of forecasts, allow us to estimate the expected economic efficiency, or the annual profitability for the years of implementation of the proposed investment project, starting from the first and ending with the fifth, will be 7.34%, 25.8%, 42.8%, 46.5%, respectively, 50%. Thus, according to forecast estimates, the investment project will pay off in three and a half years, and in the fourth year it will allow starting a new period, called the period after payback. In accordance with the existing mechanism of state regulation, presented in the form of Law No. 55-kz of October 1, 2007 “On Investment Activities in the Stavropol Territory”, investors are provided with a system of economic benefits and tax cuts credited to the regional budget of the Stavropol Territory, subject to investments in the main funds with an investment volume of at least 1 million US dollars.

The economic mechanism of state regulation of investment activity involves dividing the life of an investment project into two periods: the period of the actual payback of the project; two years after the date of actual payback. For the investment project under consideration, such a moment comes in three and a half years. According to the requirements, the economic mechanism of state regulation provides 100% property and income tax benefits during the actual payback period, and 100% property tax benefits and 30% income tax benefits in the second period. The amount of reductions for the entire period of preferential taxation of 5.5 years will be 445 thousand US dollars.

However, it should be noted that there are no normative and legislative acts in the existing mechanisms of state regulation that provide for the provision of preferential taxation for investment projects of an environmental orientation. In our opinion, such a benefit can be quantitatively comparable with the prevented environmental damage, expressed in terms of cost - economic damage, or the economic benefit received. So, for example, the production of rubber powder at the highest capacity of 95% uses 14,032 tons of used car tires as feedstock, 9,120 tons of rubber powder will be obtained from them, and the remaining 4,912 tons will be waste. Consequently, the environmental effect will be 9120 tons annually, and the dumping of the territory will decrease, taking into account the metal and textile waste formed after processing, by 13%.

Hence, two options for calculating benefits can be proposed. The first option is calculated as the area of land occupied by automobile tires in places of unauthorized dumps, multiplied by its market value and multiplied by the reduction in dumping of the territory, the formula:

$$ARTP = A_1 \times C_1 \times Sh_1, \text{ rub.} \quad (1)$$

where, ARTP - the amount of reduction in tax payments, cash units;

A_1 - is the area of land in a constituent entity of the Russian Federation occupied by dumps of used car tires, sq. km.;

C_1 - the cost of 1 sq. km. land by market value, monetary units;

Sh_1 - share of land area released as a result of recycling of car tires, environmental effect

The second option is based on determining the share of the freed area as a percentage of the reduction in profit, namely 13% annually at full load of the design capacity, according to the formula:

$$ARTP = Sh_1 \times IT, \text{ rub.} \quad (2)$$

where, IT - income tax, cash units.

In addition, the investment project will provide full payback and net profit for 5 years will be about 5 million US dollars.

The implementation of the environmental investment project under consideration will make it possible to influence external factors in the development of market relations in the North Caucasus Federal District. Using the idea of analysis of mutual influence, it is possible to identify the relationship of this project with the markets of financial, labor, information, material and technical, secondary resources, as well as with the real estate market (Fig. 1).

On fig. 1 clearly shows that the industry of the market of material and technical resources is formed due to worn-out tires - waste, 20% of which per year from the total generated volume will be recycled. The information resources market supplies new technologies for the processing of tires and the production of four types of rubber powder, which are protected by patents and licenses. The market for fixed assets, or real estate, is developing through the construction of new premises and the purchase of equipment in the

amount of 1.5 million US dollars. The producer market receives rubber powder used for the production of various products with increased strength and wear resistance, including new tires, and the consumer market buys the necessary products - shoes, tires, rugs. The labor market, based on the existing staff list, supplies 36 people for new jobs and management positions, whose monthly total income will be 8300 am. dollars.

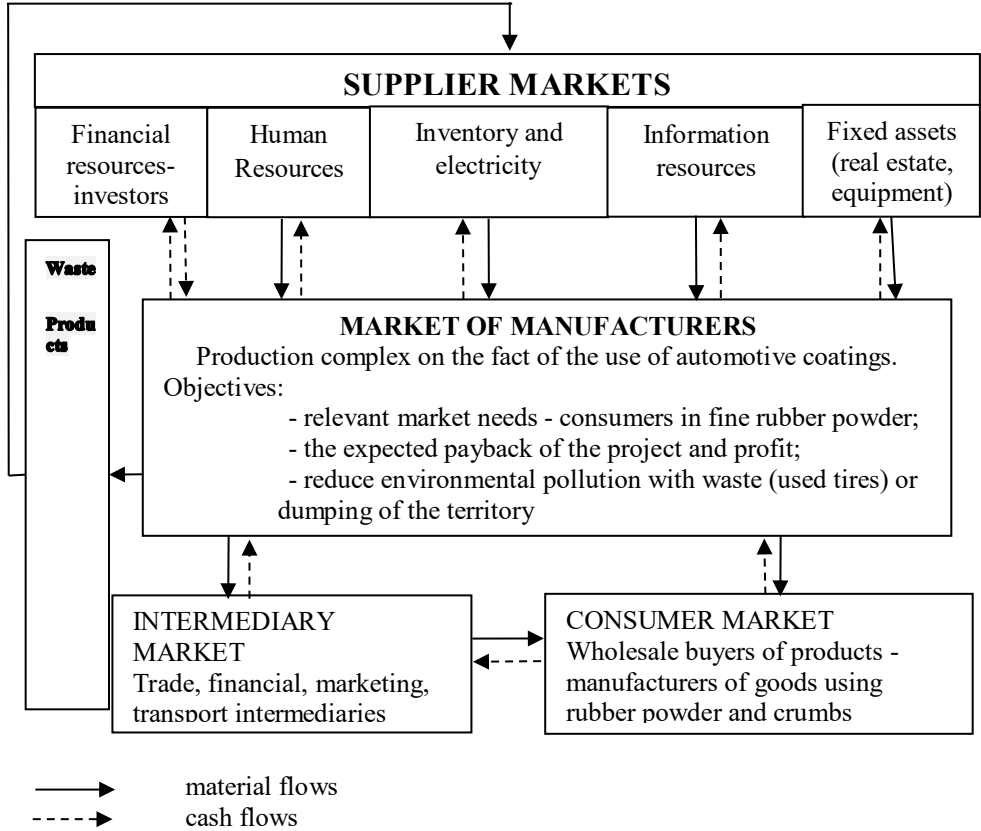


Fig. 1. Scheme of mutual influence and relationships of the investment project for the processing of used tires with different markets in the North Caucasus Federal District.

Thus, the proposed investment project will bring not only environmental and economic, but also social effects, reducing the unemployment rate in the region and providing stable wages to those employed in production.

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