

Sustainable development of companies and environmental innovation

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Abstract. this article discusses the process of ecological activities of the modern enterprises. The prerequisites of the formation of ecological behavior of economic agents are determined. The dynamics of the costs associated with environmental innovations on economic activities in the Russian federation is analyzed.

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Introduction

Under modern conditions, most of the developed and developing countries are choosing a path in line with the concept of sustainable development [1, 2, 3]. Sustainable development is a path based on maintaining a long-term productive capacity of expanded reproduction, human resources and the environment. Sustainability science is a rapidly expanding field [4]. Sustainability is a new philosophy of social development taking into account social, environmental and economic issues while decision making and in practical activities directed to provide life of future generations [5, p.13].

The stability of functioning and development of the enterprise is seen as stability and gradual increase of its productive economic and financial activity with strict implementation of social obligations and minimal anthropogenic impact on the environment [6, p.54].

The resolution of the ecological and economic contradictions determines formation of a new structure of social reproduction, where priorities are environmental component, an ecological approach to the reproduction of the product. Human role in solving the problem of environmental quality is high. We are talking about the formation of a strong institutional, organizational, informational base for the development of ecological production, including the rational use of conditions, factors and resources to create products and services without violating the necessary properties for life quality of the environment and ecological reproduction, where production, distribution, exchange and consumption are in harmony with nature.

Duality and bipolarity of the economic system determine the aggravation of environmental and economic contradictions that arise between greening of economic activity and economic growth while using natural resources. These contradictions also reveal the difference between private and public interests in relation to environmental management

and the impact of industrial activity on the environment. However, the scenario of economic development in which environmental aspects of the operation are of crucial importance to society is becoming more likely. Alongside with the emergence of ecological paradigm of economic life this leads to developing ecological and economic needs and environmental and economic interests of market participants.

The major objectives of greening are:

- 1) Optimization of human life conditions through preservation and improvement of the environment;
- 2) Transfer to non-waste production and closed cycles of resources;
- 3) Management of natural resources for their protection, restoration and expanded reproduction;
- 4) Protection and preservation of the gene pool of flora and fauna [7, p.15].

On the basis of ecological and socio-economic interests and needs there emerges environmental behavior of an economic entity that promotes social production while maintaining liveable properties of the environment.

Stimulation of this behavior requires certain efforts of the state, which should be aimed at the development of environmental behavior of market participants in order to reduce the negative impact on the environment. That is the environment is not only the condition and the boundary of production processes, but also the end product in the form of "green" and "environmental technology", "green products" and "environmental services."

Until relatively recently- just half a century ago - science functioned "in parallel" with the processes that developed in the field of production without affecting significantly the basics of human activity and attracting public attention [8, p.78].

Science in the modern world has become a direct productive force, which on the one hand

contributes to the aggravation of global problems, and on the other hand, provides for the development.

Currently the most progressive trend of economic development of any country is an innovative development that is implemented within the country in the form of a national innovation system [9, p.48].

It should be noted that the state and the development of this emerging system is largely determined by the system of indicators characterizing its functioning.

Since 2009, the state statistics service has begun tracking the following indicators:

- Special costs associated with environmental innovation;
- The proportion of organizations engaged in innovation to ensure the environmental safety in the use of innovative consumer goods, works and services.

Ecological innovations are of social character as they are the outer factor of improving life quality of the present as well as the future generation. Minimization of the negative impact on the environment is often considered as one of the prior goals of innovation environmental activities [10, p.55].

The statistical analysis of the costs associated with environmental innovation indicates that from 2009 to 2012, they decreased by more than 30 % based on a single organization (table 1). At the same time, it should be noted that the total cost of environmental innovation in the same period for all activities as a whole increased by 12.4 % (from 24,337.1 mln rubles to 27768.7 mln rubles).

Table 1. Special costs associated with environmental innovation based on a single organization of economic activity, mln rubles¹⁾

| Economic activities | 2009 | 2010 | 2011 | 2012 |
|--|-------|-------|-------|-------|
| Total | 84.2 | 56.3 | 43.2 | 58.8 |
| Mining and quarrying | 314.3 | 278.6 | 259.0 | 333.1 |
| Manufacturing | 77.8 | 43.0 | 36.3 | 47.2 |
| Production and distribution of electricity, gas and water | 44.6 | 23.5 | 21.3 | 89.6 |
| Communication | 0.4 | 0.3 | 3.0 | 8.9 |
| Activities associated with the use of computers and information technologies | 0.7 | 0.0 | - | 0.0 |
| Research and development | - | - | 2.8 | 4.8 |
| Other service activities | 18.8 | 113.3 | 2.4 | 0.3 |

¹⁾ According to form #4 of federal statistical observation –“data on innovation activities of the organization” (annual).

Tables 2, 3, 4 show the dynamics of the proportion of organizations engaged in innovation to

ensure the environmental safety in the use of innovative consumer goods, works and services based on the reduction of power consumption or loss of energy resources, reducing pollution of air, land, water resources, increasing the noise level and improving the capabilities of recycling products after use.

The data analysis suggests that the proportion of organizations engaged in innovation to ensure environmental safety by reducing energy consumption increased from 2009 to 2012 by 17,3% (table 2).

Table 2. The proportion of organizations engaged in innovation to ensure environmental safety through the reduction of energy consumption or loss of energy (as a percentage of the total number of organizations engaged in environmental innovation)¹⁾

| Economic activities | 2009 | 2010 | 2011 | 2012 |
|--|------|------|------|-------|
| Total | 49.1 | 49.7 | 52.0 | 57.6 |
| Mining and quarrying | 53.8 | 34.2 | 31.5 | 42.6 |
| Manufacturing | 49.7 | 50.9 | 50.6 | 57.1 |
| Production and distribution of electricity, gas and water | 44.2 | 51.6 | 54.0 | 52.2 |
| Communication | 47.1 | 46.2 | 46.3 | 64.1 |
| Activities associated with the use of computers and information technologies | 60.0 | 40.0 | 66.7 | 100.0 |
| Research and development | - | - | 63.2 | 63.9 |
| Other services | 40.0 | 47.7 | 52.5 | 68.4 |

¹⁾ According to form #4 of federal statistical observation - "data on innovation activities of the organization" (annual).

The data in table 3 indicate that the proportion of organizations engaged in innovation to ensure environmental safety through the reduction of air, land, water pollution, decreasing noise level in 2012 made 57.6% of the total number of organizations engaged in environmental innovations. Compared to 2009 the share of such organizations did not change.

Analysis of the data in table 4 suggests that the proportion of organizations engaged in innovation to ensure environmental safety by recycling within the analyzed period decreased slightly by 6.4 %.

Thus, environmental innovations are now being analyzed at the federal level which may indicate that these figures are taken into account in the management decision making process and environmental strategies are beginning to be seen as competitive in today's business environment, which will inevitably contribute to sustainable socio - ecological economic systems both on the level of individual enterprises and on the federal level.

Table 3. The proportion of organizations engaged in innovation to ensure environmental safety through the reduction of air, land, water pollution, noise reduction (as a percentage of the total number of organizations engaged in environmental innovation) ¹⁾

| Economic activities | 2009 | 2010 | 2011 | 2012 |
|--|------|------|------|------|
| Total | 57.5 | 47.7 | 47.6 | 57.6 |
| Mining and quarrying | 57.7 | 46.1 | 41.1 | 72.2 |
| Manufacturing | 59.1 | 51.9 | 49.2 | 58.3 |
| Production and distribution of electricity, gas and water | 53.8 | 42.6 | 39.3 | 47.8 |
| Communication | 41.2 | 16.9 | 25.6 | 15.4 |
| Activities associated with the use of computers and information technologies | - | 20.0 | 19.0 | - |
| Research and development | - | - | 58.8 | 67.1 |
| Other services | 60.0 | 34.8 | 41.8 | 63.2 |

¹⁾ According to form #4 of federal statistical observation - "data on innovation activities of the organization" (annual).

Table 4. The proportion of organizations engaged in innovation to ensure environmental safety by improving the possibilities of recycling the goods after use (as a percentage of the total number of organizations engaged in environmental innovation) ¹⁾

| Economic activities | 2009 | 2010 | 2011 | 2012 |
|--|------|------|------|------|
| Total | 26.6 | 21.3 | 20.8 | 25.0 |
| Mining and quarrying | 34.6 | 18.4 | 21.9 | 37.0 |
| Manufacturing | 27.1 | 24.8 | 23.6 | 28.5 |
| Production and distribution of electricity, gas and water | 17.3 | 9.6 | 10.4 | 9.6 |
| Communication | 17.6 | 9.2 | 9.8 | 10.3 |
| Activities associated with the use of computers and information technologies | 20.0 | 26.7 | 9.5 | - |
| Research and development | - | - | 22.7 | 23.9 |
| Other services | 20.0 | 12.9 | 11.5 | 15.8 |

¹⁾ According to form #4 of federal statistical observation - "data on innovation activities of the organization" (annual).

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