Eco-product Innovation in Energy Sector

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Abstract

Limited access to traditional energy sources, and finding alternative sources of energy for provision of industrial needs and quality of life of the population at a high level simultaneously with increasing of requirements to ecological safety of production and consumption of various types of energy cause a worldwide problem. This formulation of the problem corresponds to modern research directions in the world of science, aimed at looking for solution of actual problems of development of economy and society, overcoming the threat of "energy hunger", to prevent further contamination of the environment and global climate change, prevent the reduction of life quality of population.

The paper examines the eco-product innovation in energy sector and the possibility of innovation cluster creating in energy sector of Russian regions.

Key-words: eco-product innovation, eco-technology innovation, energy sector, alternative energy, bio-energy, energy efficiency, "green" economy, sustainable development.

Introduction

Energy consumption is an objective condition for the existence of mankind.

The population is growing steadily. Naturally the amount of consumed resources is increasing. This fully applies to the energy resources that are used in all sectors of the economy and spheres of social life. The growth of consumption of various kinds of energy and resources sharply increases as the promotion of world economy on the path of industrialization and accelerated economic development. So, compared to the mid-twentieth century, the consumption and generation of electricity in the world has increased more than 15 times, and during the last 5 years, energy consumption in the dynamically developing countries has increased: in China by 76%, in India - by 31%, Brazil - by 18%. At preservation of existing rates of growth of economy and the consumption of resources or traditional sources of fuel and energy (coal, oil, gas, etc. would be exhausted in the next 100-150 years. Thus the cost of their extraction is constantly increasing.

In addition to the physical limits and the impossibility of renewal of existing technologies of processing of traditional fuel and energy resources adversely affect to the environment. Waste of energy facilities in the form of gaseous, liquid and solid phases cause negative changes in ecosystems at all levels, from local to global. Heat power engineering is a "producer" of the great masses of solid waste (tailings coal, ashes, slags, etc.), which also violates the balances of existing ecosystems. Therefore, in recent times, the leading countries of the world has determined its strategic priority of the transition to alternative energy sources, first of all they are focuse on bio-energy, and widespread introduction of "green technologies".

The Methodology

The authors have experience in research and implementation of practical recommendations in the field of sustainable development in relation to national and regional levels, structural modernization of the economy in the process of transition to the principles of rational environmental management, resource and energy saving and the introduction of low-waste and wasteless and ecologically clean technologies in selected enterprises, sustainable development of forestry complex of Russia and its regions, forest management, assess the prospects for the development of green economy in Russia and its regions.

During the previous scientific and applied studies the authors developed their own methods of research of innovation receptivity of individual territories, economic and ecological safety of territories, development effectiveness of alternative energy, including bio-energy on the basis of fuel wood and other issues.

Research Problems, Objectives and Plan

The actuality of the research is determined by the aggravation of the following contemporary issues, vital for human development and requiring immediate solutions:

• the depletion of natural capital as a factor of economic growth;

• absolute decreasing population of the Earth natural resources in connection with exhaustion of the whole range of non-renewable resources and the growth of world population, which according to the forecast of the United Nations in 2050 (medium variant of development) will be 9 billion people (compared with 7 billion in 2011). However, more than half the world's population will live in Asia, one quarter in Africa, 8.2% in Latin America, 7.4% in Europe, 4.7% in North America. This will require changes in the structure of resourcing, including energy, society for preservation of quality of people life;

• increase in the share of nature exploration and polluting industries, caused by the increase of volumes of industrial production in the economy of developing countries, strengthening of the environmental impact on the economy of these countries and the global ecosystem as a whole from these countries;

• increasing environmental risks and risks of technogenic catastrophes, connected with the physical deterioration of the equipment of many enterprises, including in traditional sectors of energy production, and also the systems of transportation of oil and gas;

• adverse climate change and global warming, due to the economic activities of people. The share of the four countries (China, USA, India and Russia) accounted for more than half of GHG emissions and their environmental policies, national programs of environmental safety of production and consumption, applying the principles of "green" economy, depends largely on the future of our planet;

• the growing negative impact of environmental pollution on human health (according to modern studies established that the health of a person at least 30% depends on the environmental situation in the region and many diseases are directly dependent on ecosystem state territory).

These and some other problems threaten the existence of man on Earth and the leading countries of the world are now actively searching for ways of addressing them, including through the transition to the ecology-oriented production and implementation of the principles of "green" economy.

Together the key issues of modern economy energy supply issues play an important role. Energy production and energy consumption in real time all over the world were based mainly on the use of traditional renewable energy sources (coal, oil, gas, mining and processing of lead pollution. The existing imbalances in the sphere of production and use of

hydrocarbon exacerbate the problem of energy poverty in many regions of the world. In connection with this important question is the development of alternative energy, allowing for the necessary volumes of production and consumption of energy based on renewable resources, avoid pollution and to achieve the necessary efficiency of energy production.

The solution of this problem is possible on the basis of the development of promising energy – bio-energy wood fuel. This kind of energy production, economically feasible, through the use of wood waste, reducing dependence on a monopoly supplier, since it allows to use Autonomous energy installation. He is a very promising for Russia, occupying according to Food and Agricultural Organization the 1st place in the world reserves of natural resources.

Modern bio-energy uses renewable bio-fuels for energy production and allows to solve the problem of power supply with substantial economic effect, reduction of the technogenic load on the ecosystems of the regions, increased autonomy for power supply of production, and social spheres of the society. One of such alternative sources of energy is wood raw material, consisting primarily of the waste of timber cutting and woodworking. For Russia the decision of problems of increase of economic returns and reduce waste in the forest industry is of high relevance and practical significance. On the other hand, the existence of huge stocks of forest resources (first place in the world), which also must be used rationally, forms the objective preconditions for the development of bio-energy with a focus on wood fuel with simultaneous introduction of principles of "green" economy. High economic and social importance of bio-energy development at the modern stage also related to the fact that the manufacture and use of bio-energy installations on the first stages of development of bio-energy provides creation of new high-tech jobs and increase employment of the population, both in the field of energy and related industries. This is especially true for economically underdeveloped or mono-industrial regions of the country. Bio-energy development in the Russian Federation also will allow to create new high-tech production in remote and northern regions, providing them with an autonomous energy sources.

Conclusion

In order to solve the problem it is necessary to create prerequisites for a significant development of modern scientific knowledge in the field of studying of green economy such as:

1) development and deepening of the idea of modern theory of "green economy" and a role in its development of bio-energy; development of national models of "green economy", especially in those countries that give the greatest burden on the ecology of the planet Earth;

2) development of studies of the economic potential of individual countries and regions including Russia, allowing to obtain scientific and practical provisions to develop a model bio-energy;

3) assessment of the region's potential for transition to the principles of the regional economy "green" economy;

4) determining factors and underlying conditions necessary for the successful development of alternative energy in the regions of Russia, with a focus on bio-energy in conditions of transition to the national model of "green" economy";

5) assessment of the possibility of innovation cluster creating in energy sector of Russian regions.

The results that were obtained during the study are important for the development of the ideas of "green" economy based on alternative energy and its practical development in many countries aimed at a successful solution to the problems of energy supply, pollution and global climate change.

Acknowledgements

The work is carried out based on the task #2014/152 on fulfillment of government contractual work in the field of scientific activities as a part of base portion of the state task of the Ministry of Education and Science of the Russian Federation to Perm National Research Polytechnic University (topic #1487).