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Green bonds — a new instrument for ecotechnoparks' financing in the Arctic

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Abstract. Green bonds are being increasingly used in the implementation of ecotechnoparks projects in Russia. Green bonds allow the use of the infrastructure mortgage mechanisms in the financing of ecotechnoparks projects' creation and development which is particularly relevant in the need for sustainable development of the Arctic zone belonging to the Russian Federation.

1. Introduction

The problem of waste, their disposal, processing, collection, and others is one of the most acute problems the humanity faces in the early XXI century. It is of concern to both the population and to its leadership. The solution to the problem of solid municipal waste (hereinafter-SMW) and solid industrial waste (hereinafter – SIW) disposal will be the use of ecotechnoparks (hereinafter – ETP), which are actively functioning abroad and have already appeared in Russia. At present, a Strategy for the development of industry for processing, utilization and disposal of production and consumption waste for the period up to 2030 has been approved, in which the concept of ETP creation and development seems promising for the formation of a waste management industry in our country (hereinafter – the Strategy) [1]. In world practice, the most well-known are ETPs operating in the cities of Denmark, Austria, Finland, Great Britain, China, and Sweden. The developers of the Strategy analyzed the principles of the existing ETPs and developed a model for creating similar clusters in the Russian regions. Japanese ETPs (Kitakyushu, Kawasaki, Minamaka, Aichi), South Korean ETPs (Penang, Seoul), Chinese ones (Caofeidian Eco-city), German (Freiburg), English (Liverpool, Manchester), Canadian (Edmonton), Australian (Sydney) and Brazilian (Curitiba) were considered as examples [2, 3].

2. Main body

In world practice, the concept of "ecotechnopark" is most often interpreted as a unit of enterprises that cooperate with each other and with the local community to effectively share resources, information, materials, water, energy, infrastructure and natural habitat, which leads to economic benefits and improves the environment quality [4].

At the same time, the concept of "eco - industrial park" is used along with the concept of "ecotechnopark"— it is an industrial association of enterprises in cooperation and interaction, improving the efficiency of natural resources usage through a systematic approach.

The purpose of creating eco-industrial parks is to achieve economic, environmental and social benefits while reducing the use of primary material and energy resources, the involvement of secondary resources in the production turnover, reducing the level of environmental impact of existing industrial facilities and the elimination of accumulated environmental damage [4].



In Russian practice, the normative definition of "ecotechnopark" is contained in the Strategy: according to this document "ecotechnopark is the complex of objects united by power communications, including buildings and constructions, technological and laboratory equipment used in activity on processing, utilization and neutralization of production and consumption wastes, providing continuous processing of production and consumption wastes and production of industrial products on their basis, as well as implementation of scientific and (or) educational activity in the sphere of production and consumption wastes management".

Thus, ETP is a combination of high-tech solutions for deep SMW and SIW processing used to obtain own finished products from recycled materials, as well as alternative fuel and energy. Within the ETP framework, it is planned to build a complex of enterprises with a waste sorting complex, secondary raw materials' allocation, alternative fuel production, organic waste composting, automobile tires and construction waste sorting and processing, and a full complex for secondary raw materials' processing, followed by the production of highly liquid types of goods. Thus, it is possible to obtain PET crumb, semi-finished products for the paper industry — from SMW, extrusion products from polyethylene, crushed stone, additives into building materials, biodiesel – from industrial waste. Thus, according to the authors, the ETP system development in the Russian Federation is the start of the Russian economy's transition to a fundamentally new sustainable model – a circular economy or a closed cycle economy [5].

Recycling and re-use of waste is an important element of circular economy and the transition to it has three undeniable advantages: the first – reducing the negative environmental impact by reducing the use of resources in production; the second – reducing production costs due to the reduction in the number of primary resources used; and the third – the emergence of new markets, which means – the creation of new jobs and increasing the overall level of well-being [6]. However, currently, according to many authors, waste processing in Russia is in its infancy [7, 8].

In our opinion, the creation of new and development of existing ETPs on the territories of the subjects of the Russian Federation should be carried out taking into account the strategy of spatial development of the Russian Federation, as well as territorial planning schemes of the Russian Federation and of its subjects.

Currently, one of the most important problems in the sustainable development of the Arctic zone belonging to the Russian Federation (hereinafter-the Russian Arctic), which primarily affects the lives of its population and its environmental condition, is the problem of solid municipal waste and solid industrial waste disposal, as well as the elimination of accumulated environmental damage. The principles of waste management in the Arctic zone differ significantly from those adopted in regions with less severe climate. Features of waste management in the permafrost zone are determined by the lack of fertile soils and low temperatures that prevent natural decay. According to environmentalists, the disposal of garbage in permafrost soils is unsafe and causes serious damage to the environment. In addition, there are sparsely populated areas and settlements with low transport accessibility in the regions located in the permafrost zone. For example, 33 settlements of the Yamal-Nenets Autonomous Okrug are home to 2 - 400 people.

Today, the elimination of accumulated environmental damage is one of the key tasks in the reform of the waste management system in the Russian Arctic. Thus, the waste management system in the Russian Arctic must simultaneously and consistently solve two important tasks, without which a sustainable development of the Russian Arctic is impossible, within the framework of the Strategy [1] and the national project Ecology [9]:

- creation of a modern waste management system, including the creation of the SMW recycling industry;
- elimination of accumulated environmental damage [10].

Taking into account all the above, ETPs will become the basis for reforming the waste management system in the regions of the Russian Arctic, and optimally – the regional ETP system (a regional cluster on solid waste management). This cluster should become the core of the regional circular economy

development. It is in it, in the process of its development, that the task of creating a waste processing industry and transition to a closed-cycle economy will be solved [6].

Currently, this approach is most fully and systematically implemented in Murmansk region. In 2013, a concession agreement was signed between Murmansk region and "Waste Management" JSC; by the end of 2017, in the Northern part of Murmansk region, a waste sorting complex, SMW landfill, and three garbage loading stations were established. A part of the complex is located on the territory of a closed administrative-territorial formation, Aleksandrovsk. The territorial scheme of waste management approved at the end of last year determined the optimal scenario for the SMW management system development in Murmansk region, which is based on two basic criteria:

- minimization of the number of waste disposal facilities taking into account the priorities of state policy;
- compliance with environmental and sanitary-epidemiological legislation.

The Murmansk project is in many ways unique due to the climate and territory. This is the only project in the world, when not only a modern landfill for waste processing and disposal has been created above the Arctic circle, but also a garbage processing plant is being built, where useful fractions will be extracted and sent to secondary use.

Under the concession agreement, the project includes SMW landfill with a capacity of 250 thousand tons/year, a waste sorting complex with a capacity of 180 thousand tons/year and four waste transshipment stations with a total capacity of 70 thousand tons/year. After the facility commissioning, it is planned to attract personnel with a total number of about 200 people. The volume of investment in the creation of the object of concession agreement will be 1 billion 250 million rubles for the two stages.

The ecotechnopark in Murmansk region, the first of this level in the Arctic zone of the Russian Federation, will be able to process more than half of the solid municipal waste generated in the region. In total, the region produces about 400 thousand tons of solid municipal waste per year. The ecotechnopark, according to its design capacity is capable of processing no less than 250 tons per year. It will serve the Northern technological zone.

In Murmansk region, there are currently no enterprises which would use secondary raw materials in their production, so all sorted waste will be sent for processing to other regions. However, next summer it is planned to launch a pyrolysis plant at the site of the Ecotechnopark and to obtain fuel for boilers.

Unfortunately, this project is the only example of such a systematic approach to the creation of a modern MSW management system in the Russian Arctic. A striking example of the opposite approach to the development of a regional waste management system is Arkhangelsk region, which is developing a "populist story" with Shies ETP [11, 12].

According to the authors, the SMW control system in the Arctic has its own specifics. And in this case, it is necessary to use the experience of our neighbors in the Russian Arctic. For example, natural and climatic conditions and problems of living in small and remote settlements of Canadian Far North are generally similar to the conditions of the Russian Arctic. In this regard, the Canadian experience is applicable in our country. In 2017, the Ministry of Environment of Canada developed guidelines for planning, design and operation of municipal waste management systems for small and remote settlements (Solid Waste Management for Northern and Remote Communities: planning and technical guidance document). The purpose of the document is to create modern waste management systems in the Far North of Canada that meet local conditions of modern waste management systems [13]. Its adaptation to the Russian Arctic conditions will perfectly fit into the general concept of SMW circulation system reforming.

In the introduction of new technologies in the field of waste management, the national project "Ecology", which passport has recently been approved by the government of The Russian Federation, should play a decisive role. It consists of four large blocks: "Air", "Water", "Waste" and "Biodiversity". It includes 11 Federal projects: "Clean country", "Integrated system of solid municipal waste management", "Infrastructure for waste management of hazard classes I and II", "Clean air", "Clean water", "Volga Recovery", "Preservation of Lake Baikal", "Preservation of unique water bodies",

"Conservation of biological diversity and ecological tourism development " and "Forest Conservation". The most capacious and important is "State support for the introduction of the best available technologies (BAT)". As we can see, the four FPs are directly related to the management of SMW handling.

The introduction of BAT will be implemented as an investment project and, at the same time, the state support of pilot projects will be carried out within the framework of costs' reimbursement mechanism for the payment of coupon income on bonds issued within the framework of investment projects for the implementation of the best available technologies at facilities that have a significant negative impact on the environment and are related to the areas of application of the best available technologies. A mechanism will also be implemented to provide subsidies from the Federal budget to Russian organizations to reimburse some of the costs of paying coupon income on bonds issued as part of investment projects to introduce the best available technologies at facilities that have a significant negative impact on the environment and are related to the areas of application of the best available technologies [9].

It is important to choose the method of waste management when creating a waste management system. Most countries here follow (at least tend to) the so-called waste management hierarchy. According to that, all types of recycling and re-use of waste as resources are optimal for the purposes of circular economy and the environment, then there are various ways of processing to produce energy, the worst options that do not correspond to the concept are simple burial or combustion.

The most important task of the ETP projects implementation is their financing. First of all, this is due to the complexity of such projects, the lack of their own funds in regions and municipalities. An important role is also played by the significant timing of such projects. Traditionally, they use the mechanism of public-private partnership (hereinafter – PPP), and, therefore, for ETP creation and development projects it is necessary to use this mechanism. At present, there is extensive foreign experience [14] in PPP projects' implementation in solving environmental problems in various countries, for example, the construction of a landfill in Vancouver (Canada) with landfill biogas utilization and its production of electricity.

As for the projects implemented on the territory of the Russian Federation, a positive example is the reconstruction of Incinerator No. 3 in Moscow. In 2007, the reconstruction of the plant was carried out to optimize the conditions for the implementation of Moscow Government Decree № 1030-PP dated December 17, 2002 "On the implementation of the program of reconstruction and construction of sanitary facilities of the city", in pursuance of Moscow Government Order № 1915-RP dated September 29, 2004.

Work on the incineration plant's reconstruction was carried out in accordance with the project approved by the Austrian company EVN AG. During the reconstruction, some modern equipment was installed, including that for cleaning emissions into the atmosphere. As a result of the reconstruction, due to the introduction of modern technologies for thermal neutralization and purification of flue gases, the plant activity safety increased. This plant is designed to process 330 000 tons of waste per year and neutralize the resulting hazardous waste. After the reconstruction and organization of the sanitary protection zone, the operation of the plant did not lead to a deterioration of the environmental situation in the area of its location. There are also positive examples of projects in the field of solid municipal waste management in Nizhny Novgorod, Samara, Volgograd, Murmansk regions and the Republic of Chuvashia under concession, using the funds of non-state pension funds [15].

The field of waste management is the subject of legal regulation by PPP. So, Federal laws # 224-FZ "About public-private partnership, municipal-private partnership in the Russian Federation and modification of separate legal acts of the Russian Federation" (hereinafter — FZ-224) and #115-FZ "On concession agreements" (hereinafter FZ-115) define the list of objects that are subject to regulation. In particular, for EPT, it is necessary to highlight the following:

- objects on which processing, utilization, neutralization, placement of solid municipal waste are carried out;

property complexes intended for industrial production and (or) implementation of other activity in the sphere of industry;

The implementation of such large-scale projects will require large-scale funding. For this purpose, the mechanism of infrastructure mortgage (hereinafter-IM) is proposed, the development of which is being completed in Russia [16, 17].

IM is often called PPP 2.0. A lot has already been done. Chairman of the Russian Government approved the IM roadmap. Amendments were made to the legislation related to the syndication of loans, the development of the bond mechanism for securing loans.

Vnesheconombank has become a "factory of project financing". An IM infrastructure is being created. In particular, since January 1, 2019, the Development Fund has been operating: this is a part of the Federal budget, which is the source of budget allocations for financial support of activities and state programs of the Russian Federation in accordance with the procedure established by the Government of the Russian Federation. The maximum amount of the Development Fund is set annually by the Federal law on the Federal budget for the next financial year and the planning period until the amount of up to 3.5 billion rubles is reached in 2024.

At its core, the infrastructure mortgage is an improved PPP, the mechanism of which is that a private partner takes a loan and builds an object, while the users of this object gradually repay the loan. That is, the return is due to regular payments from the infrastructure owners and budgets of different levels. The use of state guarantees mechanism makes the loan cheaper.

In the economy, mortgage is understood as collateral lending, in which the right to dispose of the collateral remains with the debtor (the borrower). Accordingly, if an IM project is implemented, the private investor will be able to credit the project for the construction of a road, a bridge or another infrastructure project, receiving a guaranteed annual income.

Return on private investors' investment into projects is proposed to be carried out at the expense of regular payments, which will come from the main beneficiaries of infrastructure facilities. Such IM will allow to implement large projects involving payments from users and private investors. At the same time, "green" financing mechanisms have significant potential in the framework of projects' implementation in the field of IM.

"Green" Finance (hereinafter — "GF") refers to the use of financial services and instruments to support economic activities that contribute to the improvement of the environment, mitigation of climate change and more efficient use of natural resources. This activity includes, among other things, selection, funding and implementation of 'green' projects.

As foreign practice shows, the most common GF instruments are lending and debt issuance, which differ in the targeted nature of the placement/provision of funds: the financing attracted through these instruments can be directed only to the implementation of environmentally oriented projects, the "green" status of which is confirmed by an independent assessment.

The global 'green' bond market has been steadily growing over the past years. According to Climate Bonds Initiative (CBI), in 2017, the total issue of these securities increased by 55 %, reaching \$ 160.8 billion. In 2016, there was more than a twofold increase – from 42 billion in 2015 to 87.5 billion dollars.

The continued growth is accompanied by significant changes in the structure of issuers. The share of financial institutions is gradually declining, with the role of sovereign and sub-sovereign borrowers, as well as companies with state participation becoming increasingly important¹. These processes reflect the interest of national governments and regional authorities in using this financial instrument to attract funding for long-term environmentally oriented projects. In the medium term, these categories of borrowers will be the main drivers of the 'green' debt market in both developed and developing countries.

¹ In the initial stages of market development in 2007-2013, the overwhelming number of issues accounted for international development banks (European Investment Bank, IFC, and IBRD). However, in recent years there has been a trend to reduce their share (from 44% in 2014 to 29% in 2017), while the share of municipalities increased to 21% in 2017, of sovereign issuers – to 11% [15].

Renewable energy, 'green' construction and energy-saving technologies, as well as the development of low-carbon transport, are confidently leading in the sectoral structure of the distribution of funds raised by the results of the placement in 2017. At the same time, the share of energy has significantly decreased since 2015 against the background of construction and energy saving share growth. In absolute terms, the highest growth rates were shown by construction and water use (the volume of investments has increased more than 5 times since 2015), as well as by transport (4-fold growth over the period).

The use of the mechanism of 'green' bonds makes a significant contribution to the qualitative change and modernization of a number of economy sectors. In turn, these processes involve the definition of new targets for products and processes and stimulate the development of breakthrough technologies. The current absence of such an approach in the Russian economy means that products, technologies, services that will not meet the changed targets and requirements in the future may face additional difficulties in entering foreign markets. For our country, this will actually mean an increase in technological and – as a consequence – economic backwardness.

The introduction of 'green' technologies should be one of the ways to overcome the technological gap of the Russian Federation, which President Vladimir Putin called one of the most important tasks in his Message to the Federal Assembly on March 1, 2018. Following the results of the extended meeting of the State Council Presidium held on November 23, 2018, the following items were included in the list of instructions to the Russian Federation government within the framework of the national project "Ecology":

- p. 31: "To ensure the early launch of the 'green' bond mechanism, which will increase the attractiveness of Russian and foreign direct investment and reduce the cost of borrowing in the implementation of environmental projects»;

- p. 37: "In cooperation with the executive bodies of the constituent entities of the Russian Federation to study the issue...of financing investment mechanism introduction through future taxes" [18].

According to these instructions, along with the 'green' bonds, it is planned to launch a mechanism of deferred tax payments (Tax Increment Financing, TIF) in Russia, which assumes that the investor's infrastructure costs within the project framework will be compensated by taxes received from its implementation. This measure will significantly increase the attractiveness and reduce the risk of many investment projects.

"KhMAO Resurssberezheniye (Resource Saving)" company has become the pioneer of the Russian market of 'green' debt obligations. On December 19, 2018, it placed 'green' bonds with a total nominal value of 1.1 billion rubles with a yield of 9.76 % on the Moscow exchange. The bond coupon is tied to inflation and the key rate of the Bank of Russia [19]. According to Rating-Agentur Expert RA GmbH Agency [20], the use of funds raised by "KhMAO Resurssberezheniye (Resource Saving)" LLC will be carried out in accordance with the voluntary "Principles of green bonds" (Green Bond Principles 2018), developed under the auspices of the International Association of Capital Markets (ICMA) and currently serving as the basic criterion for assessing the bond issue's compliance with the status of a 'green' one [21].

The projects implemented by the company fall into the category of projects on "environmentally efficient waste management" and on the use of production technologies and processes aimed at reducing the harmful effects on the environment. The selection of projects and the funds management in the process of their implementation also meet the "Principles of green bonds". The cash proceeds from such bonds' issue will be disposed of under the control of a special financial institution – a representative of the bondholders, and in accordance with the designated purpose, specified in the prospectus.

The funds from the placement of debt obligations will be used to finance the concession project on creating an integrated inter-municipal landfill for SMW placement, neutralization and processing in Nefteyugansk, Pyt'-Yakh cities and settlements of Nefteyugansk region. "KhMAO Resurssberezheniye (Resource Saving)" LLC plans to publish quarterly and annually reports on the targeted use of funds in the framework of the project, as well as on the overall impact of these investments on sustainability

indicators. The company also committed itself to report the environmental impact of projects through appropriate impact indicators.

In the first half of 2019, it is planned to create a separate sector of sustainable development on Moscow exchange stock market, in which ecobonds will be traded. It is estimated that the launch of this platform will allow a number of issuing companies in both the manufacturing and financial sectors to enter the market.

3. Conclusion

The implementation of the project on establishing a landfill for SMW placement, disposal and processing in Khanty-Mansiysk with the use of 'green' bonds is the first example of these securities used in Russia. At the same time, further development of the regulatory framework governing their issuance and control over the use of attracted financing may allow in the medium term to significantly increase the scope of application of this financial instrument in the field of infrastructure projects, primarily through the activation of domestic investors (corporate sector, development institutions, pension funds, insurance companies, etc.). A major role in this process could be played by the practice of issuing sovereign 'green' obligations.

Thus, the appearance of the first ecotechnoparks in Russia, beyond the Arctic circle, and the first issue of green bonds, though not in the Arctic, but in the Northern region (Khanty-Mansi Autonomous Okrug — Yugra), allow to assert with confidence that the green bonds will become an important and necessary tool to finance projects of ecotechnoparks' creation and development in the Russian Arctic.

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