

Project financing opportunities in the digital economy of municipal solid waste

Gubernatorov A.M.

Department of the economy and finance
Financial University under the Government of the Russian
Federation
Vladimir, Russia
gubernatorov.alexey@yandex.ru

Tutukina E.B.

Financial University under the Government of the Russian
Federation
Moscow, Russia
etutukina@mail.ru

Kiloeva M.M.

Financial University under the Government of the Russian Federation
Moscow, Russia
kiloeva-m@mail.ru

Abstract — The solution of the problem of sustainable economic development largely depends on the system of solid waste management (MSW). The accumulation of waste brings a huge indelible environmental, economic and social damage, reduces the potential of environmental sustainability of the Russian Federation. The destruction and processing of MSW is now considered as one of the most important aspects of sustainable development of mankind, because there is a tendency of progressive growth in the number of MSW produced, in megacities - up to 1 ton per year per person. Effective waste management includes the involvement of recycled raw materials in processing and environmentally safe disposal (recycling), is a determining factor of the economic and social situation of the country and regions. In the EU, the waste management system implies an integrated system of various aspects: social, economic, regulatory, managerial, technical. In addition, the principles of sustainable development define the main direction of waste management and form the basis of a hierarchy of waste management methods. These principles form the basis of all regulations related to waste management. For the phased implementation of the concept of waste management, EU legislation, on the one hand, establishes requirements for various aspects of waste management, taking into account development targets (the target of the degree of recovery of secondary raw materials and processing, the number of compost fractions sent to landfill), on the other hand, create conditions for their achievement. Legal and physical responsibility for each task of waste management is delegated at different levels of government (Federal, Federal subject, municipal). Russia is implementing such a complex and multifaceted national project "Ecology" designed for the period up to 2024 and developed in pursuance of the Decree of the President of the Russian Federation on the goals and strategic objectives in terms of environmental well-being. Available technical solutions in the field of solid waste processing and including five main methods of processing (composting, burning, sorting, anaerobic decomposition, landfill storage) are not universal. The absence of mechanisms and methods for the formation of management of relations between actors in the field of solid waste relating to the development and implementation of interaction in the processes of treatment of solid waste, is the main reason for the low efficiency of control of

this area. In this regard, there is a need to develop scientific and methodological foundations for the formation of a system of solid waste management on the basis of the development and implementation of project financing mechanisms.

Keywords — *system of organization and management of processes of treatment with TKO, project financing, joint consumption, social risks, environmental risks, financial risks, recycling, environmental safety, financial institutions.*

I. INTRODUCTION

The transition to the principles of sustainable economic development is directly related to the solution of environmental problems, including the trend of progressive growth in the number of generated MSW (up to one ton per person in megacities annually). In Russia, the annual volume of TKO is about 50 million tons, of which no more than 52% are involved in secondary turnover, 7% are disposed of, and more than 90% of TKO is placed on landfills or replenishes unauthorized dumps — now there are more than 22 thousand.

According to Art. 1 of the Federal law of 24.06.1998 N 89-FZ "about production and consumption wastes" (ed. of 25.12.2018) production and consumption wastes are substances or objects which are formed in the course of production, performance of works, rendering of services or in the course of consumption which are removed, intended for removal or are subject to removal according to this Federal law.

The main types of waste are shown in figure 1.

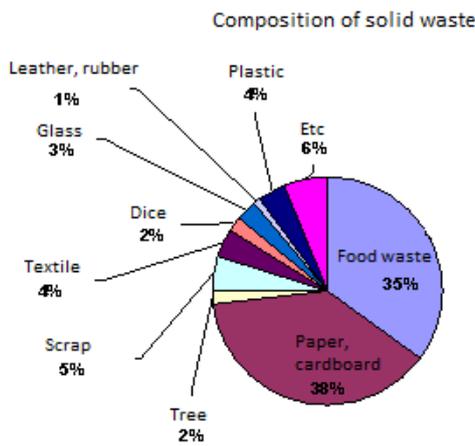


Fig. 1. Waste classification

II. RESULTS

In accordance with FKKO, approved by the order of Rosprirodnadzor of 22.05.2017 No. 242 in the type "municipal Waste, similar to municipal in production, waste in the provision of services to the population" with the code 7 30 000 00 00 0.

Order of Rosprirodnadzor dated 28.11.2017 No. 566 "on amendments to the Federal classification catalogue of waste approved by order of Rosprirodnadzor dated 22.05.2017 No. 242" (Registered in the Ministry of justice of the Russian Federation 24.01.2018 No. 49762) allocated another group of waste types related to MSW:

7 41 119 00 00 0 municipal solid waste sorting residues classified as MSW.

To date, the most acute environmental problems are associated with the formation and disposal of waste. They are sent to the landfill, recycled. Some types of waste are reused (for example, plastic and glass containers), neutralized, etc. each of these methods has its positive and negative sides.

The purpose of solid waste landfills is to protect the environment from decomposition products of municipal solid waste (MSW). Currently, the concept of MSW combines municipal solid waste and municipal solid waste.

No less acute is the problem of sorting separate accounting and waste collection. According to the research holding "ROMIR", which conducted a survey of 1,500 people aged 18 to 60 years and older living in cities with a population of 100 thousand people revealed that the implementation of the idea of separate waste collection is supported by 70% of Russian citizens [5]. More than half of the respondents (55%) are already ready to sort their garbage and throw out its different types separately. However, at the moment 92% of respondents are not actively engaged in waste sorting. 6% separately collect and hand over plastic, 2% — glass and paper with cardboard, another 1% - metal.

In Germany, for example, separate collection of household garbage began in the late 1980s, in 1996 a national law came into force, since 2015 the country has a single system of selective garbage collection. The Germans distribute household waste into biomass, waste paper, glass, metals and plastics, installing their own containers for each type. Manufacturers and trading companies pay fees to organize the collection of packages, expired drugs are taken by pharmacies, for old batteries there are reception points in stores. Germany has become the leader in recycling household waste in Europe-recycling 66% of garbage. Moreover, its processing has become a profitable business: in 2017, the turnover of the waste processing industry amounted to about 70 billion euros, more than 250 thousand people are employed in this area.

Purpose of research

The aim of the study is to solve the problem of solid municipal waste management on the basis of the development and implementation of project financing mechanisms in conjunction with the methods of sharing economy (sharing economy), allowing the use of "economies of scale".

III. DISCUSSIONS

In the world, a new socio-economic model is gaining popularity – the economy of joint consumption (from the English. sharing economy), affecting the consumption of goods and services in a revolutionary way. The basic principle of an alternative form of economic activity of society-the collective use of goods and services, or sharing (from the English. sharing). The new socio-economic model also solves environmental problems.

Sharing economy refers to the technological and temporary sharing or leasing of personal goods that include fees or other forms of monetary compensation. [1]

The sharing economy describes shared consumption, which results from sharing, sharing, and renting goods or services without owning them [2]. Indeed, the concept of co-consumption was coined by Felson and Speth (1978) and referred to the circumstances in which people co-consume goods or services. Although co-consumption is not a fundamentally new concept, it has only recently become prevalent with the advent of the sharing economy (Henten and Windekilde, 2016) [2].

The idea of shared consumption was proposed by Rachel Boatswain, who is a recognized expert in issues of cooperation and trust, based on digital technologies. She defined the theory of "shared consumption" in her first book, *What's Mine Is Yours*, which she co - authored with Roo Rogers. [4] The concept was subsequently named by TIME as ONE of "10 ideas that will change the world". Sharing economy is a powerful cultural and economic force of great commercial and cultural importance and enables the buyer to pay more for temporary access to goods or services than to be the owner of these goods or services.

The economy of collaborative consumption shows a rapid growth. PWC estimates that global ESP could reach \$335 billion by 2025. THIS area is becoming increasingly important for Russia, especially in light of the development of the digital economy. At the heart of ESP is a community of users, without whom this model cannot exist [6].

The economy of joint consumption is a dynamically developing socio-economic model in Russia. It is already making a serious contribution to the development of the national and regional economy. The establishment of additional administrative barriers can reduce the pace of development of the industry and cause Russia to lag behind other countries. Participants in the sharing economy are developing their own service quality control system based on horizontal connections and user trust. We are talking about user reviews and rating system. Traditional consumer protections complement the control system created by the sharing economy. Participants in the sharing economy are allowed to use or share resources efficiently, reducing the burden on the environment. They help to generate additional income for many people from different countries of the world, thereby performing an important social function. The income of the companies themselves, as a rule, is not more than 15% of the turnover. Users get the rest. Users of this economy, as a rule, receive additional earnings-about 25% of the annual income of the family. Basically, it goes to cover the costs associated with the maintenance of the property (fuel, utilities, insurance, etc.).

Users whose main income comes from the sharing economy are self-employed or micro-entrepreneurs, thus contributing to the economy. In this regard, it would be useful to expand the list of activities available to self-employed citizens - to cover more activities involved in the sharing economy. Participants in the sharing economy allow citizens around the world to come together to share resources. Even small participants can be global. Interacting with a community from around the world without actually being in them helps to minimize the cost of services for users. The cost of segmenting and nationally localizing information flows through participants in the sharing economy may exceed the revenue generated by the service. It is in the interests of participants in the sharing economy to improve the rules for members of their communities, ensuring that users comply with all legal requirements. This applies to all aspects of activity - from informing service providers about the mandatory receipt of permits to quality control of services. Participants in the sharing economy, providing information services, are responsible for the completeness and reliability of the information provided.

The main features of the share business in the formation of the system of treatment of TKO are:

- is a fully automated online service, the process requires virtually no maintenance;

- crowdfunding rating system: user ratings and reviews are collected, processed, affect the final rating of utility providers.;
- payment for the final result;
- user content, user feedback, information sharing;
- market prices due to extremely low costs associated with waste generation and disposal.

In 2018, the government of the Russian Federation approved the "Strategy for the development of the industry of processing, recycling, neutralization of production and consumption waste for the period up to 2030". One of the innovative tools for the development of the waste treatment, recycling and disposal industry in accordance with the above Strategy is the development of a network of ecotechnoparks, one of the tasks of which is to Finance large-scale investment projects in the field of TCO management.

Typical features for project financing of the system of treatment of MSW are:

- system analysis, risk sharing between ecotechnopark and other stakeholders of the project in the field of treatment of TKO (creditor banks, guarantors, investment brokers (investment banks), financial advisors, initiators and / or managers of banking consortia, institutional investors who purchase securities of project companies, leasing institutions, etc.) and their monitoring;
- use of indicators characterizing the " safety margin " of the project;
- tender approach to selection of service providers and contractors (with participation of regional operator);
- developed system of contract law;
- comprehensive monitoring of the project.

A model of economic growth based on the use of depleted natural resources leads to the risk of a resource crisis with the threat of shortages and rising prices.

Developed countries are moving towards a cyclical economy and sustainable development. They effectively manage resources by applying economic instruments aimed at protecting the environment. Adopt programs that ensure the transition to rational models of production and consumption.

Innovative economic development requires new approaches to the organization of interaction between industry, financial institutions, scientific and educational institutions, as well as other market actors. One of these approaches is the organization of ecotechnoparks, United not only on a territorial basis, but also on specialization of processing, utilization and neutralization of production and consumption waste, as well as in the future production of finished products.

The main objectives of the formation of a network of ecotechnoparks as areas of deep waste processing and use of secondary resources in the framework of environmental industrial policy and the development of the industry for processing, disposal and disposal of waste are:

- reduction of environmental damage through recycling with subsequent production of products and / or energy;
- reducing the amount of landfill waste disposal and increasing the use of secondary resources in production processes;
- stimulation of the development of the Russian technological base of the waste processing industry;
- reduction of environmental damage from existing production.

The ecotechnopark provides a convenient mechanism for taking advantage of the advantages of large economic facilities, which occurs when unit costs decrease as production increases. Ecotechnopark can enable a larger company to group small companies around it.

It is necessary to develop a network of ecotechnoparks-objects United by energy and interdependent material and raw material flows and connections, including buildings and structures, technological and laboratory equipment used in the processing, utilization and neutralization of waste, ensuring their continuous processing and production of industrial products based on them, as well as the implementation of scientific, research and (or) educational activities. Autonomous objects located far from settlements are created in order to save money not only for investors, but also for the population - on payments for municipal services for waste management and on the cost of final products on the shelves. The main goal of forming a network of ecotechnoparks within the framework of creating a waste processing industry is to reduce the amount of landfill waste disposal and hanging the level of used secondary raw materials in the production process. The network will also relieve social and environmental tensions by eliminating landfills and unauthorized dumps.

IV. CONCLUSION

There is little practical data on the Economics of sharing, but sharing a single product should also reduce environmental damage. Here, the shift from ownership to access creates many new opportunities in product design, consumption and

ultimately disposal. For manufacturers, this is an incentive to create durable and easily recyclable things. For consumers, paying not for the product but for the service they provide will inevitably lead to behavioral shifts.

At the same time, there are several obvious risks associated with the introduction of sharing in the construction of solid municipal waste management system:

- increasing production of biological materials will lead to changes in the earth's cover, and this will put additional pressure on the planet's ecosystem and biodiversity. - without proper control, the processing and reuse of materials on a mass scale will make society more vulnerable to the toxic substances contained in these raw materials.
- a side effect of the spread of the rank model may be a departure from the principles of environmental friendliness.

In addition, the cheapness and convenience of the rank economy frees citizens a certain amount of money that can go to increase consumption with a corresponding negative effect on nature.

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