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Improvement of public administration in the sphere of solid household waste management

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Problem setting. One of the most actual environmental problems in Ukraine is the accumulation and utilization of the solid household waste. Due to the considerable volumes of garbage accumulation, Ukraine is considered to be the one of the most technically inflicted countries in the world. In its experience of solid domestic waste treatment, our state is for a few decades behind the developed countries of Europe. There are tens of thousands of spontaneous dumps in Ukraine and more than 6 500 official landfills.

Recent research and publications analysis. The analysis of researches on the assessment of the status of waste disposal sites in Ukraine has shown the lack of scientific works on the integrated assessment and forecast of solid waste landfills' state and the minimization of their impact on the environment. The imperfection of modern measures to minimize the impact of dumps on the environment and the lack of an effective monitoring system necessitate the development of a set of measures to ensure the ecological safety of landfills.

Aim of the article. To study the problem of solid waste accumulation and utilization in Ukraine and to identify ways of public governance's improvement in the sphere of dealing with them.

Main material. Hundreds of thousands of tons of solid household waste are being collected annually in urban landfills. Location, arrangement and operating conditions of most sewage dumps do not meet regulatory requirements, this increases the ecological danger of these objects. There are about 2000 objects in Ukraine, which are organized without projects and engineering and hydrogeological exploration. The consequence of this is the pollution of groundwater by filtrate and the migration of pollutants along with ground and underground flows.

Due to widespread problems with solid household waste throughout Ukraine, the entire power vertical faces this question. At the local level, attempts to start a business in the sphere of waste sorting and recycling have taken place for several years. There are a lot of reports on the building of waste sorting and waste recycling enterprises in different regions of Ukraine.

The garbage market, where it would be possible to sell secondary raw materials, has not yet been developed in Ukraine. According to experts, for example, waste produced only by the capital itself, can be estimated at 3 billion UAH in a year. Thus, tens of billions of hryvnias can be got for the country's secondary raw materials. It has been estimated, that 100 waste processing plants are needed in order to clean the country from garbage.

Taking into account the general difficult economic situation in the country, experts see the solution of this issue in attraction of foreign investments into the construction of such enterprises. For Ukraine there is a need for a state waste management strategy.

Positive trends in the sphere of state regulation of the waste management system can be seen in recent years, but Ukraine has not created the appropriate legal and regulatory framework yet that would gradually reach the requirements of the European legislation.

Conclusions of the research. The enshrined regulations of national rules on disposal and solid waste management are currently not implemented fully. This calls for the improvement of enforcement practice on this issue, as well as the introduction of amendments and additions to existing legal acts. It is necessary to develop an effective state program that would include a complex of state measures for the creation of specialized enterprises for sorting and processing of solid waste in Ukraine, to conduct a series of educational actions among citizens. Ukrainian legislation on the effective solution of the problem of solid household waste management should be based on national characteristics and positive experience of relevant European legislation in this sphere. And the attraction of foreign investments in the waste recycling industry will definitely contribute to the improvement of the ecological situation in Ukraine.

Keywords: ecological safety; solid household waste; utilization; landfill

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Удосконалення державного управління у сфері поводження з твердими побутовими відходами

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Стаття присвячена дослідженню складної соціально-економічної проблеми поводження та утилізації твердих побутових відходів в Україні. Наведено приклад трагічних соціальних та екологічних наслідків несвоєчасного вирішення цієї проблеми. Доведено необхідність проведення подальших наукових досліджень цієї проблематики у галузі державного управління. Висвітлено сучасний критичний стан експлуатації і функціонування полігонів твердих побутових відходів та несанкціонованих сміттєзвалищ, розглянуто ключові загрози екологічній безпеці у цій сфері. Встановлено практичну відсутність роздільного збирання твердих побутових відходів в Україні та необхідність популяризації культури поводження зі сміттям серед населення. Вказано на негативні наслідки для навколишнього середовища та здоров'я людей функціонування сміттєспалювальних заводів. Зазначено, що сміттєпереробна галузь в Україні знаходиться сьогодні на етапі становлення і вважається перспективною з точки зору інвестування. Наведено огляд проектів зі створення сміттєпереробних підприємств, які впроваджуються або плануються до впровадження на території України. Проаналізовано передовий європейський досвід поводження з твердими побутовими відходами. Розглянуто перспективи розвитку сміттєпереробної галузі в Україні в контексті залучення іноземних інвестицій із залученням сучасних технологій. Доведено необхідність створення державної стратегії поводження з відходами.

Ключові слова: екологічна безпека; тверді побутові відходи; утилізація; сміттєзвалище

Совершенствование государственного управления в сфере обращения с твердыми бытовыми отходами

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Статья посвящена исследованию сложной социально-экономической проблемы обращения и утилизации твердых бытовых отходов в Украине. Приведен пример трагических социальных и экологических последствий несвоевременного решения этой проблемы. Доказана необходимость проведения дальнейших научных исследований этой проблематики в области государственного управления. Освещено современное критическое состояние эксплуатации и функционирования полигонов твердых бытовых отходов и несанкционированных свалок, рассмотрены ключевые угрозы экологической безопасности в этой сфере. Установлено практическое отсутствие раздельного сбора твердых бытовых отходов в Украине и необходимость популяризации культуры обращения с мусором среди населения. Указано на негативные последствия для окружающей среды и здоровья людей функционирования мусоросжигательных заводов. Отмечено, что мусороперерабатывающая отрасль в Украине находится сегодня на этапе становления и считается перспективной с точки зрения инвестирования. Приведен обзор проектов по созданию мусороперерабатывающих предприятий, внедряются или планируются к внедрению на территории Украины. Проанализированы передовой европейский опыт обращения с твердыми бытовыми отходами. Рассмотрены перспективы развития мусороперерабатывающей отрасли в Украине в контексте привлечения иностранных инвестиций с привлечением современных технологий. Доказана необходимость создания государственной стратегии обращения с отходами.

Ключевые слова: экологическая безопасность; твердые бытовые отходы; утилизация; свалка

Problem setting. One of the most actual environmental problems in Ukraine is the accumulation and utilization of solid household waste. Due to the considerable volumes of their accumulation, Ukraine is considered to be one of the most technically inflicted countries in the world. In its experience of treating solid domestic waste, our state is for a few decades behind the developed countries of Europe, what is confirmed by the fact that the total annual accumulation of solid waste by a population of about 45 million exceeds in 3 - 3.5 times the correspond-

ing aggregate indicators of Western European countries with a population of about 400 million (Bezzub, nd).

The tragedy at the Lviv landfill site in May 2016, when three rescuers and one municipal died as a result of the fire extinguishing, had shown the ineffectiveness of the state policy and the absence of effective programs and mechanisms of public administration in the sphere of solid waste management at all levels of state power.

Lviv Polygon of SDW is the only one legal place for the accumulation of garbage from Lviv and the surrounding villages. Its area is over 33 hectares, it has been in operation since 1958. The issue of its closure and the construction of a waste recycling plant (WRP) has been raised repeatedly over the past decades. 43 enterprises from 14 countries offered to build their own project plants, but local authorities have not solved this issue yet (Wikipedia, 2017)

The solid waste processing industry in Ukraine is not developed enough still, while 7% of Ukrainian territory is covered by dumps. Garbage plots grow very quickly, contaminating soil, groundwater and air. There are tens of thousands of spontaneous dumps that are being formed continuously in Ukraine, and more than 6 500 official landfills. Large cities have already taken up the sorting of waste, but it is ineffective as the garbage is being brought usually on a one single dump. Waste utilization is the task for WRP that should reduce the rate of landfill growth and would contribute to the reuse of resources (UNIAN, 2015).

As our state belongs to the countries with the largest volumes of formation and accumulation of solid waste, which leads to a progressive deterioration of the ecological situation. The solution of this problem requires the optimal combination of legislative, economic, environmental and scientific levers (Bezzub, n.d.).

Recent research and publications analysis.

Environmental safety as a socio-natural and scientific reality is the subject of research in various sciences, as it covers a complex set of human-environment interactions.

The resolution of environmental problems and certain environmental aspects of state management in the sphere of environmental protection has been studied in works of V.I. Vernadsky, V.I. Andreytsev, O.Y. Lazor, S.M. Alekseev, Y.P. Lebedinsky, T.V. Gardashuk,

S.I. Doroguntsov, V.I. Ovchinnikov, Y.S. Shemshuchenko, A.V. Stepanenko, M.M. Kyselyov, M.H. Koretsky, I.M. Potravnyj, M.F. Reimers and others.

In particular, the principles of formation of the ecological network of Ukraine have been studied by Maluga V.M. and Yukhnovsky V.Y. (Maluga & Yukhnovsky, 2012). Problems in the sphere of the solid waste management have been investigated in works of Yureskul V.O. (Yureskul, 2008), Bilopil's'ka O.O. (Bilopil's'ka, 2014), Korbut M.B. (Korbut, 2015), Krivenko S.V. (Krivenko, 2012), Khodarev O.V. (Khodarev, 2011) and others.

In the sphere of public administration, the problem of the solid waste management was the subject of research by Shaforostova M.I., Burling R.I., Khizhnyakova N.K., Kozachenko T.P., Beryuk O.V., etc. (Olenichenko, 2017).

The analysis of studies on the assessment of the status of waste disposal sites in Ukraine has shown an absence of scientific works on the comprehensive assessment and forecast of landfill sites conditions and minimization of their impact on the environment. The imperfection of modern measures to minimize the impact of landfills on the environment and the absence of an effective monitoring system necessitate the development of a set of measures to ensure the ecological safety of dumps (Korbut, 2015).

However, despite the large number of scientific papers on environmental issues, the issue of ecological safety on dealing with solid waste in Ukraine requires further research in the sphere of public administration science.

The aim of the article is to investigate the problem of the accumulation and utilization of the solid waste in Ukraine and to identify ways to improve public administration in the sphere of dealing with them.

Main material. Hundreds of thousands of tons of solid waste are annually accumulated on urban landfills. Location, arrangement and operating conditions of most sewage dumps do not meet regulatory requirements, which increases the ecological danger of these objects. In Ukraine, there are about 2000 objects, which are organized without projects and engineering and hydrogeological exploration. The result of this is the groundwater contamination by filtrate and the migration of pollutants along with ground and underground flows (Korbut, 2015).

The scope of the waste management in each

country consists mainly of industrial processing enterprises, incinerators, as well as landfills for burial. It has been proven by leading countries a long time ago that the priority in waste management is its recycling. Burning and burial should be limited as much as possible. Positive results of waste management activities are the result of a reasonable combination of all available technology opportunities (Sale Price Company (SPC), 2017).

The functioning of the incinerators has extremely negative consequences for the environment and human health. This is caused by the high content of dioxins and other toxic substances in the gas emissions of these enterprises. In this regard, a two-stage purification of the exhaust gases of the incinerators has been implemented in the developed countries. Of course, the construction and operation of incinerators, which would meet the most stringent environmental requirements, requires a lot of costs. However, in the presence of efficient systems for collection and industrial processing of the solid waste, the need for incinerators becomes relatively small. Nowadays scientific and technical developments of high-temperature waste processing processes, such as pyrolysis, are being conducted abroad in order to find an alternative to burning.

The incinerators in Ukraine are represented by only four objects, which were built in the late 80's. This list includes stopped incinerators in Kharkiv, Sevastopol, Dnipro, as well as the Kyiv incinerator «Energy», which does not work at full capacity now. The production process of these enterprises does not meet modern environmental requirements, and equipment is morally and physically outdated.

The efficiency of the solid waste processing is inextricably linked with the successful implementation of systems of its separate collection among the population, waste transportation and processing technologies, which are used at this or that plant. Currently, the competition in the sphere of waste management exists only in the segment of its transportation. For example, in Kiev there are private companies Eco-Auto, German company «Remondis», French one «Veolia Environmental Group». They are competing with smaller companies Spetskommuntekhnik, Dniproenergotrans, Volodar-Roz and others, as well as the state-run enterprise Kyivspetstrans. According to the representatives of these com-

panies, the main difficulty in entering the market is over-regulation of the market of solid waste transportation services, as well as the search for new customers.

There are also enterprises that collect recycled materials, such as glass, paper waste, polymer waste. After the accumulation of a certain amount of raw materials, it is transferred to enterprises for further processing on the basis of concluded contracts. This activity is subject to state licensing.

But, unfortunately, there is practically no culture of separate collection of household wastes among the population in Ukraine. Such systems are implemented so episodically that the practical benefits of them are close to zero. The only one economically interested party in this process are carriers of waste. Some of them set special containers for separate collection of household waste in residential districts. Secondary raw materials, such as glass, plastics, metal, etc., are sold to businessmen who carry out their further processing (Sale Price Company (SPC), 2017).

As it was noted, the solid waste recycling industry in Ukraine is at the stage of formation now and is considered to be promising from the investing point of view. However, many aspects of such activity remain non-clarified, including the legal framework and the mechanisms for returning investment. It seems that the authorities have not yet made final decisions about most of the essential conditions for conducting business in this area. Recently, the biggest attention is paid to the implementation of the ambitious state project «Clean City», within which the construction of WPPs should be carried out in Kyiv, Sumy, Kharkiv, Vinnytsia, Chernivtsi, Poltava, Ternopil, Kirovograd, Khmelnytsky, Dnipropetrovsk. This project covers 15.4% of the population of Ukraine. Within the framework of the project, it is planned to build plants in Kyiv and Kharkiv with a capacity of 300 thousand tons per year each, a plant with a capacity of 200 thousand tons / year in Dnipro. In other participating cities, the capacity of the plants will be 100 thousand tons / year. The main tasks of the project are: the creation of modern waste recycling complexes in the form of public-private partnership in ten cities of Ukraine; bringing up the waste management regulations in line with the EU's current legislation (Sale Price Company (SPC), 2017).

The following technologies of solid waste disposal as burial at landfills, separate collection, thermal processing, biological processing are going to be used in the project. Till now, the feasibility study on the construction of WPPs has been approved within the project, and contests for investors have been announced. According to the Ministry of Regional Development of Ukraine, there are also investment projects for the construction of objects of the waste processing industry: Ivano-Frankivsk - a plant with a capacity of 50 thousand tons / year, construction costs - 34 million UAH; Chernivtsi - 60 thousand tons / year, 60 million UAH; Donetsk - 450 thousand tons / year, 5 billion UAH, Ternopil - warehouse with the use of «BALA» technology, 24 million UAH respectively.

Due to the widespread problem of the solid waste across Ukraine, the entire power vertical has faced the question of its solution. At the local level, attempts to start a business in the sphere of sorting and recycling waste have taken place for several years already. There are a lot of reports on the examination of construction projects for creation of waste collection and recycling enterprises in different regions of Ukraine. For example, in Rivne, the Ukrainian-German company Ukreko-Indusry is building a mechanical processing plant for solid waste, which will work in two stages: the distribution of garbage and minerals, and the sorting of waste with its subsequent processing for alternative fuels. According to experts, this fuel will allow the plant saving significant money on the purchase of more expensive coal. The cost of the complex is about 16 million euros, which are invested by German investors. The capacity of the plant is about 60 thousand m³ per year. The payback period of the plant is expected to be 12 years. Today the construction of the plant is at the final stage. Also, all the necessary equipment has already been brought from Germany.

In Chervonograd, Lviv region, a waste sorting plant was opened in August 2012 together with a landfill for the utilization of organic matter. Secondary resources will be sold to processing enterprises, and organic waste will be removed to the landfill. The similar waste sorting line was opened in Chernivtsi at the end of 2011 (Sale Price Company (SPC), 2017).

Representatives of the Romanian Waste Management Program «Ekoverde» have offered an investment program for processing solid

waste on concession terms to the local councils of Rogatyn and Kalush regions of Ivano-Frankivsk oblast. These projects are being studied now by local authorities and communities. A project on arrangement of a waste sorting line for solid waste in the city of Nikolaev is implemented now together with Italian investors. The volume of foreign investments in this project is 600 thousand euros. The funds will be spent on equipment and reconstruction of plant's buildings, as well as on the line equipment and the purchase of containers and garbage trucks.

A large complex of solid waste processing plants is also planned to be built on the territory of Kherson region. The investor is the American company PPI Energo Group. Within the framework of the project it is planned to build WPPs, sorting stations and thermal power stations in Golopristsansky district, as well as sorting lines in three districts of Kherson region. The total investment in the project should be 350 million dollars USA. The capacity of the plant will be about 200 thousand tons of solid waste per year (Sale Price Company (SPC), 2017).

From the above-mentioned, the conclusion can be made that potential investors are still studying the general possibilities of investing in Ukrainian waste processing and are waiting for the implementation of announced legislative and regulatory changes. Due to this fact, the national focus is on the implementation of the Clean City project. This project has a chance to become the demonstrative one, and the changing investment climate in the industry will depend on from the practical results of its implementation.

There are no utilization plants in Ukraine now. Experts insist on the construction of WPPs, especially paying attention to the harmful effects of waste burning. Such enterprises should sort and process the solid waste into alternative fuels and secondary raw materials. This will reduce the amount of garbage, accumulated on landfills in Ukraine; the air and soil will not get harmful waste, and this will lead to the improvement of the state of the environment; SWP plants can produce alternative fuels, which are in fact a substitute and are used for cement and thermal power plants. However, it is also not worthwhile to refuse from waste burning now. As for the WBP, of course, their emissions are harmful to the environment, but these plants are useful in such aspect that it is possible to obtain a heat carrier for heating buildings by burning garbage.

More than 90% of garbage gets into landfills that are already overflowing. And only 4% of solid waste is processed.

While Ukraine is planning to build waste utilization plants, the first built Rivne waste recycling plant doesn't operate. Its construction was completed in 2013, and waste recycling began in May of that year. 70% of rubbish of Rivne and the region was recycled at the plant then. In total, over May-December 2013, up to 250 thousand m³ of waste were processed, from which more than 2,200 tons of alternative fuels were produced. However, a few months after the launch, the plant stopped its work. The reason for this was not the technical failure or lack of raw materials, but the inaccuracy in legislation, which has not been regulated until now. Therefore, today the plant operates in the sorting of garbage on recycled materials (UNIAN, 2015).

European experience shows that the market for secondary raw materials is profitable and promising, given that processing of raw materials is cheaper than extraction. Reuse is more rational than burning of materials, as it is not necessary to spend energy on creating the same materials. There is also the question of food waste, which simply rot in the landfill, combine with poisonous substances from other wastes and then fall into water or air. The way out of this situation is composting.

But unfortunately, not all types of rubbish can be recycled, like polyethylene packages, for example. Use of secondary raw materials is necessary. This is not only a matter of Ukraine's problem, it is a global problem. Garbage can be used with benefit, it is necessary to make recycling and not throw away immediately what was used so that it contaminates the environment. For example, in Sweden, the garbage business is called a «recycling revolution», as 99% of all waste is reused. The country did not achieve such a result spontaneously: environmental development is caused by legislation, scientific technology and environmental culture. Each house in Sweden has containers for separate collection of various types of garbage. Sorting for the Swedes is a common practice, and fines are imposed for non-compliance with certain standards. In Sweden waste that can not be disposed of is burned. In particular, it is about 330 thousand tons of solid fuel, so that 90% of homes are supplied with electricity and heat. In general, thanks to «non-waste production», Sweden

receives electricity and recycled garbage, and is one of the cleanest and greenest countries in the world.

The garbage market, on which it would be possible to sell secondary raw materials, has not been developed yet in Ukraine. According to experts of the public organization «Public Audit», waste, which is produced only by the capital itself, can be estimated at 3 billion UAH in a year. Thus, tens of billions of hryvnias can be got for the country's secondary raw materials. It has been estimated that 100 waste processing plants are needed in order to clean the country from garbage.

Taking into account the general difficult economic situation in the country, experts see the solution of this issue in attracting foreign investment in the construction of such enterprises. However, such investments will come at a time when the garbage processing enterprises of Ukraine will be state-owned, not private. Such investments are possible only if the system of competition is absolutely transparent and the state will act as the guarantor and owner of such plants. In principle, this is understood at the state level. We are now concentrated on the necessity to amend the SWP Law in order to stimulate investors to build an WPP. And, as long as the bureaucratic procedures continue, it is necessary to popularize the culture of garbage handling within the population. In modern realities, this requires economic incentives.

For Ukraine there is a need for a state waste management strategy. In order to solve the problem of rubbish in Ukraine and to attract investors to this sphere, a state strategy on waste management and a law adapted to European requirements are needed. Local communities have more opportunities to deal with garbage now. There were serious changes in the tax and budget laws two years ago, decentralization has led to the fact that 80% of the environmental tax goes to the places. Therefore, local authorities need to develop landfill reclamation projects that require to be closed today (UNIAN, 2015).

Ukraine has been trying to implement its own options and other countries' experiences in dealing with solid waste for several years. In recent years, the positive trends can be seen in the sphere of state regulation of the waste management system, but Ukraine has not created the appropriate legal and regulatory framework yet that would reach gradually the requirements of Eu-

ropean legislation. Profile ministries and departments, the public of the country devote insufficient attention to the control over the placement of waste, its impact on human health and the environment. The discrepancy between progressive accumulation of wastes and measures, aimed at preventing their creation, utilization, disposal and disposal, threatens the deepening of the environmental crisis and the worsening of the socio-economic situation in the country (Bezzub, n.d.).

People should understand the real danger to their lives and health through the uncontrolled dumping of solid waste. It is one of the main factors that will lead to a solution to the problem. Power should be stimulated in this matter. The influence of the public on the control over the development of this sphere in Ukraine can not be overestimated. After all, will this industry work or not, depends on the consciousness of Ukrainians.

Particular attention should be given to the introduction of the EU project «Waste Management and Regulation - the European Neighborhood and Partnership Instrument – East» in Ukraine. This project was officially launched on December 17, 2009 and is funded under the European Neighborhood and Partnership Instru-

ment (ENPI) of the Eastern Regional Action Program, approved in 2008, and has a total budget of 5,845500 euros. The project is aimed at the improvement of waste management systems, introduction of more effective waste prevention initiatives, increase of collection and sorting capacity, and increase of reuse, recovery and safe disposal of waste.

Conclusions of the research. The enshrined regulations of national rules on disposal and solid waste management are currently not implemented fully. This calls for the improvement of enforcement practice on this issue, as well as the introduction of amendments and additions to existing legal acts. It is necessary to develop an effective state program that would include a complex of state measures for the creation of specialized enterprises for the sorting and processing of solid waste in Ukraine, to conduct a series of educational actions among citizens. Ukrainian legislation on the effective solution of the problem of solid household waste management should be based on national characteristics and positive experience of relevant European legislation in this sphere. And the attraction of foreign investments in the waste recycling industry will definitely contribute to the improvement of the ecological situation in Ukraine.

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