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The problems of solid waste disposal on the territory of Karaganda region and their solutions

In the article are presented data devoted to the problems of municipal solid waste, as they are one of the most acute economic and environmental problems. In the cities, there is an intensive accumulation of solid waste and bulky waste, which, if improperly and untimely removal seriously pollute the environment. Creating a normal conditions of people lives in the city — the primary task of public utilities engaged in sanitary cleaning and cleaning of urban areas, the disposal of solid waste. Therefore, there is a need to develop new approaches in the system of waste management and the creation of modern components the relevant infrastructure in the field of solid waste management. According to the results of the literature review, the main objective is the modernization of regional waste management systems, using the best available technology to manage waste without causing unbearable cost for the user. The aim will be achieved by implementing an investment project for building in the area the waste management complex, consisting of the plant sorting and processing of waste and landfill, as well as the introduction of separate collection of waste from households and businesses.

Key words: MSW, pollution, biogas, dump.

At this stage the assessment of environmental components shows a generalized characteristic of the natural and socio-economic environment in the area of the planned activity, considered the basic directions of the economic use of the area and identified principle positions of assessment environmental impact, including:

- analysis of the production activity of the enterprise to establish the species and the scale of the potential impact;
- analysis of production activities to establish types and intensity of the impact on the environment, the spatial distribution of impact sources;
- air protection from pollution;
- protection of water resources from pollution and depletion;
- characterization of formation and distribution of the amount of waste production and consumption in the process of the planned activity;
- forecast of emergency situations and their prevention;
- environmental protection measures to reduce the anthropogenic load on the environment;
- recommended measures to minimize the impact on the above components of the environment [1–3].

Determination of the optimal solution is always a compromise between desires and opportunities, and in the particular case — between the environmental benefits and financial capabilities. These two aspects determine the need of the proposal for political leadership (akimat) and public generally three alternatives:

- 1) the most profitable from the economic point of view — «0» Alternatives, where everything remains as it does;
- 2) the best from an environmental (or the use of the best technology) point of view — the maximum recycling and minimum waste disposal;
- 3) basic alternative — a realistic, balanced as environmental requirements with economic opportunities, including economic and social aspects [4].

For selecting alternatives are used the following criteria: economic, environmental, technological and social components. Economic criteria should have a priority when choosing the optimal number of regional landfills which would be built. We have to apply minimum the following criteria:

- in accordance with the requirements of regulations;
- the amount of investment costs;
- operating costs;
- cost per unit of output produced goods (material);
- availability for users (their ability to pay) [4].

Justification of the choice of strategic alternatives

To determine the alternatives were developed different options for collecting and processing waste for the prediction of the formation and disposal of solid waste collected separately, sorted, processed recycled, passed back and buried at the polygon. Analysis and forecasts of the flow of solid waste form the basis for the definition of requirements to potential and volumes of different methods of collection and processing.

After analysis of alternatives it is obvious that the alternative 1 is not acceptable because does not comply to requirements of policy decisions and according to the applicable regulations. In addition, following this alternative will be continued adverse impact on such environmental components as soil, groundwater and surface water, the air. At the same time in the economic cycle will not be returned to a significant amount of recycled materials which will adversely affect the economy of the region and the country as a whole because they do not increase revenues in the budgets of all levels. Accordingly, the waste management industry will not get development and therefore does not increase the number of jobs that doesn't not allow the development of the social sector. Therefore, this alternative is not further considered.

Carried out further analysis of the alternatives can be concluded that the alternative actions allow you to have the greatest benefits from ecological aspects' point of view using technology theoretically allowing to achieve the highest level of environmental protection will be unfavorable and unacceptable in terms of both investment and operating costs. This may cause an adverse impact on the social environment as well as lead to the unwillingness of the population to use the system for solid waste management. This phenomenon, which can be caused by prohibitive costs of public services for waste management, in the final turn, may have an adverse impact on both the environment and the social environment, because the population is supposed to take the opportunity of the illegal dumping of waste into the environment.

Accordingly, the above implies that the planning of the system must be found a compromise between environmental and economic aspects of the issue. This is crucial economic factor, because the solvency of the user by the system plays a critical role in creating viable from economic point of view of the system. By the method of finding such a compromise, which would correspond to the requirements of current regulations, is to carry out financial — economic analysis.

Technical alternatives of development of the waste management system

Here it is considered an alternative to the further development of the waste management system. Choosing the best option for solid waste management system in accordance with the requirements.

Technical tasks, based on the analysis of alternatives:

- selection of the place;
- design, which depends on the choice of location and technology solutions.

When choosing alternatives are decisive legislative factors that determine the minimum necessarily followed the requirements, and also financial — economic aspect, in the end, it is crucial in assessing the possibility of implementing and operating the system. Moreover, the actual content of the system is determined by the solvency of the system user, assuming that realizing the principle «polluter pays».

Factors determining the choice of alternatives

Determination of the optimal solution is always a compromise between desires and opportunities, and in the particular case — between the environmental benefits and financial capabilities.

To select alternatives was used the following criteria — according to their order of viewing:

- geographical (location of new infrastructure);
- technological, including the use of the best available technologies;
- legislative or requirements of regulations, including determining a set of measures to protect human health and the environment;
- economically-social, which, in total, determine the system;
- administratively — political, especially in cases where is not meeting economically-social criteria [5].

The main, on condition, that we want to have a cost-effective system that is socio — economic criteria. Therefore, they are decisive in the choice of technology — both for the individual components and the system as a whole.

Deviation from this is possible only if making administrative and political decisions about grants for the creation of a system and / or subsidize its operation. However, it should be time-limited nature, since the age of unprofitable systems is short-lived.

In the European Union it is usually grants for the creation of systems. In the waste management sector, these grants are very significant — they reach 85 % of the total investment (excluding VAT, which is paid by the Client). The purpose of the grant — the alignment of differences of socio-economic conditions between «old» and «new» members of the European Union. In the specific case to achieve the purpose it is solving two objectives: ensuring compliance with regulations (mandatory) and to implement the best available technologies (where possible) [5].

To select the alternatives, taking into account the foregoing, the following basic criteria for evaluation of the proposed new system for waste management:

- in accordance with the requirements of regulations;
- the amount of investment costs;
- operating costs;
- availability for users (their ability to pay).

Geographical alternative

When creating or improving any system that requires the placement of stationary objects, almost always there are alternatives for location of the new facility. Always, in the case of development or improvement of the existing system, as the first and main alternative to consider the possibility of development of the system in place already allocated for these purposes. Of course, if the continuation of this activity is not possible on the requirements of regulations or other legitimate reasons, or is not appropriate for economic reasons, necessarily a consideration of new places, alternative that already exist.

City uses four operating landfills in the region of Karaganda, Saran, Shakhtinsk, Temirtau and Abay. In addition to these, there are many unauthorized dumps throughout the region. Here are some of them.

Proposed two alternative variants of placement, for which the connection point to sources of engineering communications and distance does not change and will not result in significant changes in the lining of networks. According to the applied reference sites on the barren and lack of groundwater. Correction of technical solutions will be implemented in the work project stage (Table 1).

Table 1

The location and size of existing storage of researching region

№	Storage	Required space/volume	The start of exploitation
1	2	3	4
1	Karaganda		
1.1	Acting polygons	10.80 hectares	1991–
1.2	Maikuduk	2.55 hectares	2004–2005
1.3	Prishahtinsk	15.80 hectares	1999–2007
1.4	Sortirovka	3.15 hectares	–2010
	st. Balkhash	200 m ³	
	st. Okhotskaya-Badina	150 m ³	
	st. per. Radio	120 m ³	
	st. Shakhanskaya	300 m ³	
	st. Crimean	600 m ³	
	st. Dzhangildin	200 m ³	
	st. Dzhangildin	150 m ³	
	st. Ternopil	260 m ³	
	st. Chaikinoi, 152	500 m ³	
	st. Bibliotechnaya, 25	3000 m ³	
	st. Chaikinoi, 157	600 m ³	
	near 85 school	150 m ³	
	st. Medical, 60,	385 m ³	
	st. Chaikinoi, 138	150 m ³	
	Md. «Vostok-5» (pit unfinished schools)	100 m ³	
	st. Chaikinoi 145	150 m ³	
	st. Medicinskaya, 1	170 m ³	
	st. Mirnaya 10	150 m ³	

1	2	3	4
	st. Ishim, 78	100 m ³	
	st. Govorov, 14, 18, 20, 22	100 m ³	
	st. Moldagulova, 89	150 m ³	
	st. M.Mametova 60	100 m ³	
	st. Carpathian, 38	100 m ³	
2	Saran	2.10 ha	1999–
3	Shakhtinsk	3.28 ha	> 40 years
	vil. Shahan		> 40 years
	vil. Novodolinka		> 40 years
	vil. Dolinka		> 40 years
4	Temirtau	49.00 ha	
	st. Temirtau, 46	50 m ³	
	pr. Miraotul. Karaganda. Highway till st. Kalinina	120 m ³	
	st. Central, 28,	70 m ³	
	117 quarter (former cinema «Stroitel», cafe «Molodezh»)	100 m ³	
5	Abay	9.51 ha	2003–
	«Abai-1»	931 m ³	2002–

Image of illegal dumps is presented in the Picture and storage in the Table 2.



Picture. Illegal dumps on the st. Radio (120 m³)

Table 2

№	Storage	Area, ha
1	Karaganda	
1.1	The acting polygon	10.8
1.2	Maikuduk	2.55
1.3	Sortirovka	3.15
1.4	Prishahtinsk	1.58
2	Saran	2.1
3	Shakhtinsk	3.28
4	Temirtau	49
5	Abay	9.57
	Total	82.03

Even at authorized acting dumps is not available facilities for capturing or burning of biogas emissions. Artificial layers for protecting of the subsoil is not installed. Some of these polygons are located in the old sumps and therefore have little natural subsoil. However, it is not known how much is enough to protect the subsoil and subsoil aquifer.

Due to the production of biogas there is a high risk of fire (for example, a fire at the Karaganda range). The fire at the polygons generates large environmental and social impacts.

Many illegal dumps across throughout region, often in residential areas leads to high environmental and social risks. At present, there is no control over the export of waste in these places. Typically, they have a high risk of fire. Fire can spread to neighboring houses. Also, the combustion of plastics produces toxic gases.

If there are an organic waste on the dump, it will attract animals such as rats, cockroaches and others. They can be passive carriers of germs on the surface of their bodies, including those that are potentially harmful to human. Sewage water penetrating into the soil, contaminating the aquifer. The wells (sumps) in the area may be contaminated and be a source of disease for people who use the water.

In addition, for children, these dumps are very interesting to play. In this case, there is a risk of illness or injury, for example, by broken glass or razor blades.

For the prevention of disease and injury is absolutely necessary to clean these areas and control to avoid a new accumulation of waste in these areas.

Technological alternatives

These two aspects determine the need of the proposal for political leadership (akimat) and public generally three alternatives:

1) the most profitable from the economic point of view — «0» alternative, where everything remains as it does, but that is not acceptable from the point of view of the requirements of regulations and sustainable development of society;

2) the best from an environmental (or the use of the best technology) point of view — the maximum recycling alternative.. It involves the use only the best available technologies, but it is unfortunately not acceptable for economic reasons, since the user of the system is not able to pay for its operation;

3) trade-off between «0» alternative and «maximum» alternative — «the base.» It balanced legislative, technological and economic requirements, namely:

a. met the minimum requirements of regulations;

b. introduced, as it allows the economic factors, the best available technologies;

c. met two mandatory requirements for cost-effectiveness of the system (in the case of waste management): the «polluter pays» and user of the system is solvent.

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Қарағанды облысында қатты тұрмыстық қоқыстарды жою мәселелері және оны шешу әдістері

Мақалада қатты тұрмыстық қоқыстар (ҚТҚ) мәселесі қарастырылған, себебі ол өміріміздің, табиғатты қорғау және шаруашылықтағы өзекті мәселелерінің бірі болып отыр. Қала маңында қатты тұрмыстық қоқыстар мен көлемді қоқыстардың көптеп тасталуынан жылдам және тез жиналуына байланысты,

олардың кейбіреулерінің дұрыс және уақытында жойылмағандықтан, қоршаған табиғи ортаға көптеген зиян әкеледі. Авторлар қала тұрғындары өміріне қолайлы жағдай туғызу коммуналдық қызмет көрсетушілердің негізгі жұмысы деп түсінеді. Олар қала аймағында санитарлық тазарту жұмыстарын жүргізу барысында ҚТҚ жою жұмыстарын тікелей жүргізуге тиіс. Сондықтан бұл жүйеде жұмысқа жаңаша қарағанымыз және ҚТҚ жою саласында инфрақұрылымға сәйкес келетін заманауи компоненттер шығару қажет. Әдебиетке бейне нәтижесінде шолу жүргізу аймақтық қоқысты басқару жүйесінің модернизациясындағы басты мақсат — қоқыспен жұмыс істеу үшін қолданушыға көп шығару келтірмейтін, ең жақсы қолжетімді технологияларды пайдалану. Мақсатқа жету үшін қоқыс басқару кешенін ұйымдастыру керек, яғни, қоқыстарды реттейтін зауыт, қоқыстарды көметін жер, кәсіпорындар мен тұрғындардан қоқыстарды жеке-жеке жинау жүйесін енгізу қажет.

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Проблемы утилизации твердых бытовых отходов на территории Карагандинской области и способы их решения

В статье рассмотрена одна из самых острых хозяйственных и природоохранных проблем — проблема твердых бытовых отходов (ТБО). Отмечено, что интенсивное накопление твердых бытовых отходов и крупногабаритного мусора при неправильном и несвоевременном удалении серьезно загрязняет окружающую природную среду. Создание нормальных условий жизни людей в городе — первоочередная задача коммунальных служб, занятых санитарной очисткой и уборкой городских территорий, утилизацией ТБО. Назрела необходимость в разработке новых подходов в системе управления отходами и в создании современных компонентов соответствующей инфраструктуры в сфере утилизации ТБО. Главной целью проведенного авторами литературного обзора является показ модернизации региональных систем управления отходами с применением лучших доступных технологий для управления отходами, не вызывающими непосильные затраты для пользователя. Цель планируется достичь путём реализации инвестиционного проекта по созданию в данном регионе комплекса управления отходами, состоящего из завода сортировки и переработки отходов и полигона захоронения отходов, а также внедрения системы отдельного сбора отходов у населения и предприятий.

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