
MUNICIPAL SOLID WASTES MANAGEMENT

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Waste utilization problems are of current importance and they are related to the principles of Green Economy and, thus, present one of the most important ecological factors for improving environmental quality.

Key words: green economy, municipal solid wastes management, waste disposal sites, ecology, Kazakhstan, processing, utilization.

President of the country, N.A. Nazarbayev, back in 1990s when leading the development of “Strategy 2030” set a task for effective use of natural resources and implementation of eco-friendly technologies. However still many problems require non-conventional measures for their solution. During an extended meeting with the Government of the Republic of Kazakhstan (Astana, January 2012) President raised an issue of wastes processing and utilization and gave call to urgently resolve the issue with treatment and processing of solid wastes.

For fulfilling Head of state’s instruction a work on analysis and assessment on current state of wastes treatment has been conducted.

The problems with wastes treatment need to be divided into two parts.

First. Condition of municipal solid wastes (MSW) disposal sites. Today there are 4587 disposal sites in the country, 3927 of them do not comply with ecological and sanitary requirements.

At the same time 603 disposal sites (13%) have permits for emission into environment and relatively comply with active construction and sanitary norms.

The situation with individual regions is as follows.

Almaty region (or oblast):

— on the territory of the oblast there are 772 human settlements, number of MSW disposal sites — 462, of which 10 (2.2%) — comply with ecological and sanitary requirements; 452 (97.2%) — do not comply;

— no firms for collecting and further processing wastes containing mercury;

— no permits for allocating wastes;

— no log book for wastes accounting is kept.

East Kazakhstan oblast:

— throughout the region there are 590 localities — number of MSW disposal sites — 476, and 9



Fig. 1. MSW disposal site near Almaty

(1.9%) of them conform to ecologic and sanitary requirements; 467 (98.1) — do not conform;

— a problem with unauthorized landfills. In 2011 12 unauthorized landfills were liquidated out of planned 20, 2262 m³ removed;

— no MSW processing;

— the construction of wastes processing facility is required in Semey city.

Pavlodar oblast:

— 412 populated areas are located in the region, number of MSW disposal sites — 316, of them 3 (1.9%) do correspond to the requirements; 313 — do not;

— no measures are taken for bringing disposal sites and landfills in accordance with sanitary, ecologic, construction norms and requirements;

— presence of significant number of unauthorized landfills;

— no wastes treatment and sorting facilities, MSW processing and recycling for reusing as raw materials;

— the problem with initial sorting has not been resolved.

North Kazakhstan oblast:

— in oblast there are 719 localities, number of MSW disposal sites — 630, of them 5 (0.8%) — comply with ecologic and sanitary requirements, 625 (99.2%) — do not;

— emergency condition of the existing MSW disposal site of Petropavlovsk city;

— no facilities and firms for MSW processing;

— problem with natural landfills;

— non-ideal MSW collection system;

— rise of generated and accumulated household and industrial wastes.

Thus, more than 90% of disposal sites in localities of the regions do not comply with ecologic norms and requirements, in fact they are just landfills.

Characteristic lack of all disposal sites are:

— structure of all disposal sites for communal wastes in large cities (except for disposal site in Astana) allows isolation of the bottom section only with a method of natural isolation (clay layer of 0.05 meter wide), which is the reason for soil and ground water pollution;

— no quality system for landfill gas monitoring;

— no quality monitoring of ground water condition;

— no measures aimed at preventing atmosphere pollution from landfill gas.

Second problem — is an increase in volume of MSW generation and accumulation, and *existing state of solid wastes separation, utilization and treatment*.

On the territory of the country around 100 million tons of MSW have been accumulated by now. Around 4—5 million tons of MSW are formed annually.

In addition, household use of goods containing toxic materials — luminescent lamps, mercury-containing devices, batteries and others — remain a serious problem.

Government of the Republic of Kazakhstan approved legislative proposals of the Ministry of Industry and New technologies “On energy conservation and increasing energy efficiency” and “On introduction of supplements and amendments to some legislative acts of the Republic of Kazakhstan on issues of energy conservation and energy efficiency”. Legislative proposals foresee stage-by-stage ban to manufacture and sale of incandescent light bulbs.

As a result in near future a problem of organizing collection of mercury-containing devices from people and organizing sites for their utilization will become critical.

An issue with “electronic wastes” is also of current importance. There are millions of units of electric and electronic devices being sold per annum in Kazakhstan and sales volumes are gradually increasing. This inevitably leads to rise in wastes formation. According to estimates of Electronics Take Back around 126 000 tons of electronic wastes are formed yearly. Many components of these wastes contain dangerous materials such as lead, mercury, polychlorinated biphenyls and other POPs, polyvinylchloride and others. The resulted situation with the issue of wastes treatment is determined by these factors:

- 1) lack of general law in the field;
- 2) non-ideality of active legislation;
- 3) outdated construction norms in use and sanitary rules for structure and maintenance of disposal sites;
- 4) lack of target parameters and indicators:
 - by quantity and quality of wastes;
 - by impact of wastes on environment;
 - of resource reuse;
- 5) insufficient financing;
- 6) departmental and functional dissociation between state agencies in wastes management issues;
- 7) lack of unified centre for wastes management;
- 8) insufficient improvement rate of ecologic education and enlightenment system;
- 9) lack of stimulating measures.

Complexity with introducing the system for sorting wastes on areas of formation is characterized by:

- lack of sorting routine in population as well as in communal services;
- low tariffs for collection, removal and utilization of wastes;
- lack of improvements in recycling technologies, except for scrap metal;
- lack of tax breaks and budget preferences for recycling technologies for supporting their feasibility and attracting equity capital.

In European countries, for instance, in 2009 (data from Eurostat) 24% of municipal wastes were recycled, from which recycled material or compost were obtained. In Germany, the leader in waste treatment, 48% of MSW is recycled, 34% is combusted, 14% is composted, 0% is disposed off. In Belgium 36% of wastes is recycled, 35% combusted, 24% composted, 5% is disposed off. The highest proportions of wastes combusted are in Sweden and Switzerland, which are 49%, and composted most in Netherlands — 28%.

Wastes utilization, apart from solving environmental problems, allows solving economic and social tasks. In Europe industry of utilization of 7 essential materials from wastes: plastic, paper, and cardboard, iron and steel, copper, nickel, and aluminium, precious and other metals (lead, zinc, molybdenum etc.), produces a turnover of 60 billion euro (Eurostat 2008). This allows creating over 3 million job opportunities, annual increase in the number of new job positions results in 10—16% rise. Conservation of re-

sources comprises: iron and steel, paper — up to 40%; other metals — up to 30%; glass — up to 15%.

Utilization of useful constituents from wastes is in full accordance with *Green economy*. Utilization of wastes leads to improvement of resource effectiveness, decreasing impact on groundwater, allows decreasing extraction of primary resources, creating new job and business opportunities. Very large contribution by waste treatment is made on minimization of greenhouse gas emissions. In EU, 2010, a reduction of more than 50 million tons of CO₂-equivalent (compared to the figures in 1990) of greenhouse gas emissions is achieved from waste treatment.

It is necessary to note that in the field of industrial, MSW and dangerous wastes management in Kazakhstan there is a number of problems present, requiring immediate response.

In practice all instruments of ecologic policy do not work in full capacity. Regarding industrial wastes (tailings, slag, ashes etc.) and dangerous wastes (POPs, toxic, medical etc.) in recent years many research and works have been conducted, including those with participation of international organizations. Definite measures are taken by authorized state agencies and wastes owners that are being part of regional plans of actions on environmental protection. It is necessary to take measures primarily aimed at minimization of wastes. It is important to emphasize that in the Republic of Kazakhstan a law “On introduction of supplements and amendments to some legislative acts of the Republic of Kazakhstan on ecologic issues” has been approved. From 2013 a new management instrument is introduced, which proved its effectiveness for solving problems with wastes minimization in developed countries. It is Wastes management program. The program will involve actions on reducing formation of wastes and increasing utilization and processing. As a result fewer wastes will accumulate in waste disposal sites.

In conclusion, solving problems in the field of MSW management is possible only by complex approach and reformation of all instruments simultaneously. All amendments must carry regular characteristic and be designed for long-term.

Recommended solutions

Short-term actions:

- 1) conduct inventory of the existing MSW disposal sites with the purpose of assessment of their technical and ecologic conditions;
- 2) determine a number and organization of new locations for MSW disposal sites;
- 3) during construction and reconstruction of facilities:
 - choose more effective methods and technologies in and around newly built MSW disposal sites;
 - carry out works based on standards, which are accepted in international practice;
- 4) for introducing investment component in tariff associated with removal of wastes and water effluents, revise system of corresponding tariffs formation;
- 5) revise current system of using the incoming ecologic payments into local budget with the focused increase in resource allocation dedicated to solving ecologic problems of the regions;

6) develop and approve new technical and construction requirements for MSW disposal sites;

7) introduce a section on green procurement in the “On state procurements” law that takes into account goods, which have been produced from recycled materials as “green” goods.

Long-term actions:

1) develop instruments for “green” investments through introducing ecologic target parameters in all existing investment instruments;

2) develop a new legislative proposal “On wastes”, in which principal conditions of wastes management system are to be determined;

3) set wastes hierarchy: prevention, sorting “from sources”, preparation for repeated use, recycling, utilization and removal;

4) approve normative documents, which will regulate rules for handling specific wastes coming from household use in accordance with the EU directions;

5) set target parameters for reducing wastes formation and increasing treatment share; for example, one of the target parameters must become an indicator of increase in the share of processed wastes, by taking point the active system of processing — 10% — as the starting point:

— until 2015 — 20%;

— until 2020 — 30%;

— until 2025 — 50%.

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УПРАВЛЕНИЕ ОТХОДАМИ ПРОИЗВОДСТВА И ПОТРЕБЛЕНИЯ

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Проблемы утилизации отходов являются актуальными и полностью соответствуют принципам «зеленой» экономики и поэтому являются важнейшим экологическим фактором улучшения качества окружающей среды.

Ключевые слова: «зеленая» экономика, твердые бытовые отходы, полигоны твердых бытовых отходов, экология, Казахстан, переработка, утилизация.