

# 9. Waste

## Annual volume of wastes

Rational and efficient use of natural resources is an important element of stable development. Waste is a considerable loss of material and energy resources.

### Production wastes

The volume of wastes includes wastes generated in the process of economic activities (production of goods, energy, work process, services), side and accompanying products of mining and minerals' enrichment. During 2005-2009 in Belarus about 34,656 tons of wastes were processed annually, about 23901 tons (68%) out of them were the halite wastes and halite slimes clay-salt formed in the RUE «Production Association «Belaruskali».

Totally about 1,4 thousand of wastes is formed in Belarus with a wide range of morphological and chemical properties. If we consider the structure of industrial wastes properties without taking into the consideration the potassic recycling, the total of mineral wastes is about 53%, wastes of plant and animal origin – 35%, vital life



wastes and similar, as well as chemical production and associated with it – from 5 to 6%, the wastes of water boiler and drinking water, wastewater, rainwater and the water use in power plants – about 1,4%, medical waste – less than 1% (Fig. 9.1).

From 2005 to 2008 there was a gradual increase in the volume of industrial wastes (Fig. 9.2). In 2009 industrial wastes fell mainly due to the reduction of wastes in the halite formation in RUE «Belaruskali» – by 52% compared to 2008. The volume of other wastes was gradually increasing and in 2009 was 13810 tons, that is 1,5 times more than in 2005. This increase was mainly due to the growth of mineral wastes (from 4619 to 7305 tons) and plant and animal origin

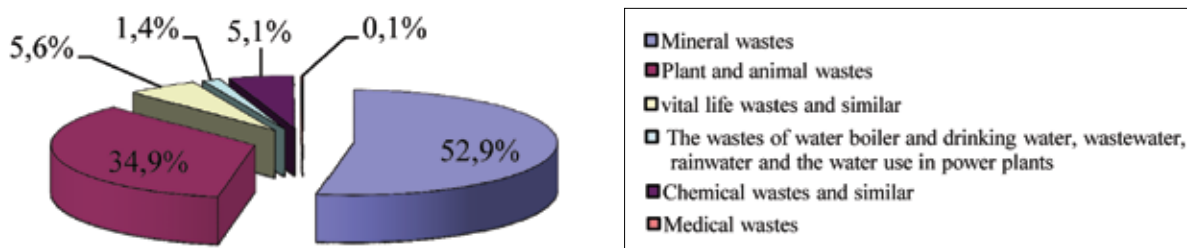


Figure 9.1 – The structure of industrial wastes in Belarus in 2009 (Excluding halite wastes and halite slimes clay-salt)

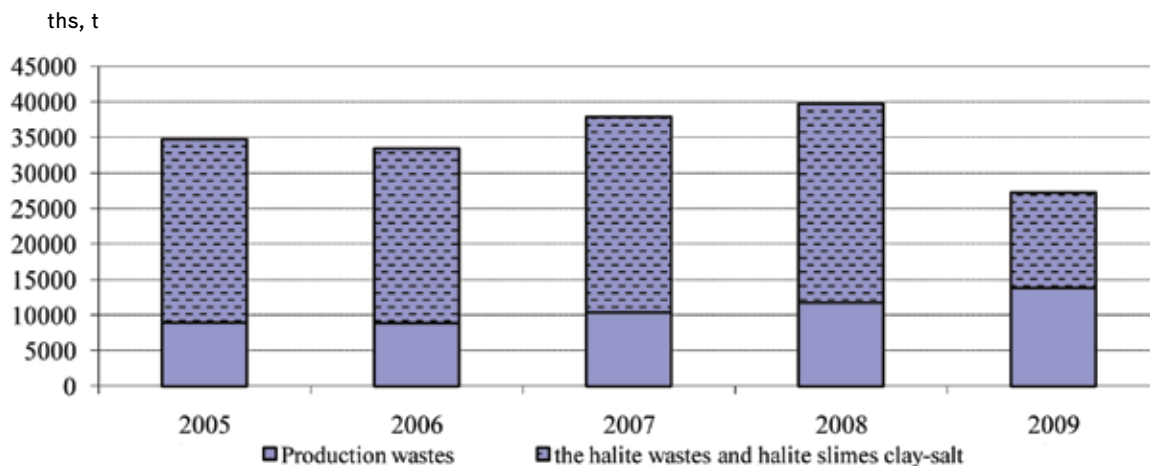


Figure 9.2 – The dynamics of industrial wastes in Belarus in 2005-2009

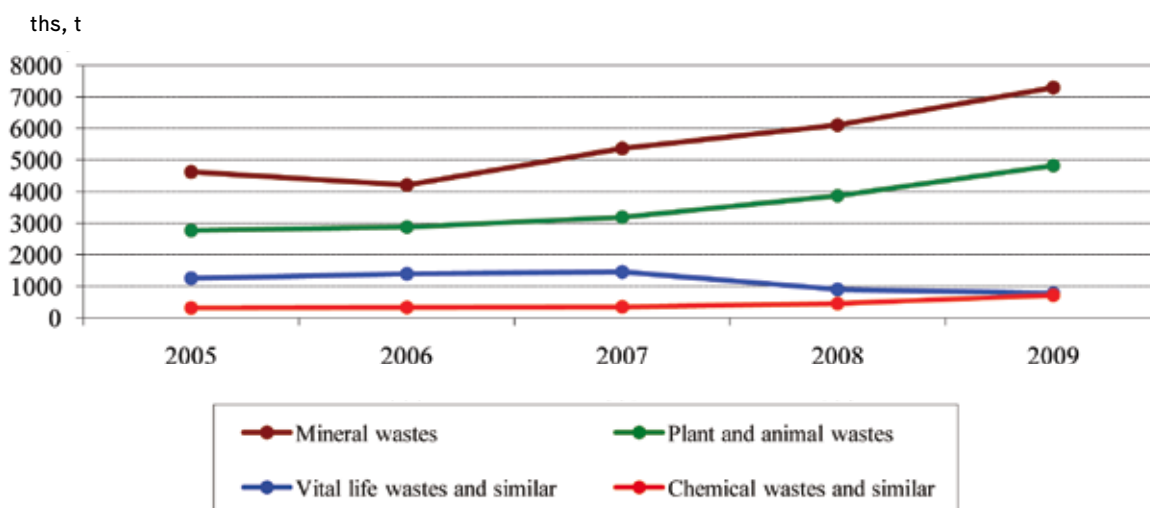


Figure 9.3 – Dynamics of the formation of some types of industrial wastes in Belarus in 2005-2009

wastes (from 2763 to 4819 tons) (Fig. 9.3). The volume of vital life wastes and similar, decreased slightly over the period – from 1248 to 773 tons or 1,6 times.

### Municipal solid wastes

Municipal solid wastes (MSW) are the wastes generated in the process of human life, not related to the economic activities, the wastes in the garage cooperatives, garden communities and other consumer cooperatives, street and backyard sweepings produced on the public, as well as waste

products, such as vital activities wastes. The list is approved by the Ministry of Municipal Affairs and Housing of the Republic of Belarus and the removal of which is organized the local executive and administrative bodies.

During the period of 2005-2009 in Belarus 3248 tons of municipal solid wastes were produced annually.

In the last decade there is increase in the formation of municipal solid waste – the indicator increased in this period from 0.485 kg/person per day to 0.877 kg/person per day, it means almost 2 times and

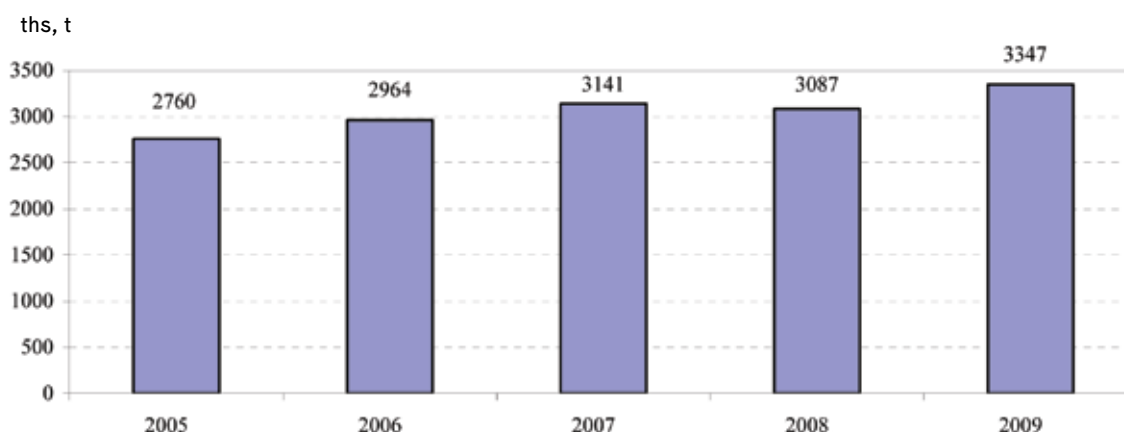


Figure 9.4 – The dynamics of the formation of municipal solid wastes production in Belarus in 2005-2009



approached the value characteristic for the EU countries (0,85-1,70 kg/person per day). From 2005 to 2009 the amount of municipal solid wastes in Belarus increased from 2760 to 3347 tons or for 21% (Fig. 9.4).

According to the experts in the structure of municipal solid wastes the proportion of polymeric materials and waste from packaging and glass increased in the recent years.

Thus, our analysis of wastes volume in Belarus in 2005-2009 led to the following conclusions:

- In the reporting period the volume of industrial wastes in Belarus was about 34,656 tons, out of which about 68% were halite wastes and halite slimes clay-salt.

- The total mass of wastes (excluding potassic wastes) the proportion of mineral

wastes is about 53%, plant and animal origin wastes – 35%, vital life wastes and similar, as well as chemical production and associated with it – from 5 to 6%, the wastes of water boiler and drinking water, wastewater, rainwater and the water use in power plants – about 1,4% , medical waste – less than 1%;

- In 2009 compared with 2005 the volume of production wastes (excluding potassic wastes) increased by 1,5 times mainly due to the growth of mineral wastes, as well as plant and animal origin wastes;

- The formation of municipal solid wastes in Belarus during this period was equal to the average of 3248 tons per year;

- For the past ten years, the specific indicators of MSW increased from 0.485 to 0.877 kg/person per day and approached the value characteristic to the EU (0,85-1,70 kg/person/day);

- From 2005 to 2009 the amount of municipal solid wastes in Belarus increased from 2760 to 3347 tons or for 21%.

### Recycling and use of wastes products

Recycling and using wastes means the involvement of wastes to the economic

circulation where they are used in the manufacturing of products, energy, work process, services. This indicator characterizes the level of wastes and the effectiveness of measures to prevent environmental pollution by wastes.

The level of industrial wastes, or, in other words, the weight of recycling and using wastes in total in the period 2005-2009 was in average 26.2%, increased from 21.0% in 2005 to 42,9% in 2009.

Figure 9.5 shows the direction of wastes use in Belarus in 2005-2009. In the considered period most part of wastes (53,8%) was used for the needs of the enterprises, 46.2% transferred to other enterprises, implemented or exported for further use.

The level of production wastes excluding halite wastes and halite slimes clay-salt in 2005-2009 ranged from 68.0 to 77.6%, in average 72.7%. In absolute terms, the use of industrial wastes in the reporting period varied from 5652.2 to 10210.1 tons per year, in average 7385.5 tons per year (Fig. 9.6). As shown on Figure 9.6, the level of production wastes use in 2005-2009 increased proportionally to the volume of their formation.

Mostly plant or animal origin wastes are fully recycled (Fig. 9.7). Wastes from the production of food and flavoring products are used in agriculture, woodworking wastes are recycled or burnt for energy. In the volume of mineral wastes about 70% is



stripping soils which are almost fully used for backfilling quarries and restoration of disturbed lands

Other types of wastes are less used (see Fig. 9.7). Out of the total amount of wastes during 2005-2009 (53639.1 ths t) 16711.8 tons remained unused (excluding potassic wastes). Main unused mineral waste is phosphogypsum (from 2921.5 tons used 37 thousand tons or 1.3%). The wastes of the following kinds are mostly unused: water boiler and drinking water, wastewater, rainwater and the water use in power plants.

The use of halite wastes in 2005-2009 varied from 3,4-8,0% – from 827.9 to 1036.4 thousand tons per year were implemented by public utilities of Belarus, Ukraine, Russia and Moldova.

Thus, the analysis of wastes volume of reuse and recycling in Belarus during the period 2005-2009 led to the following conclusions:

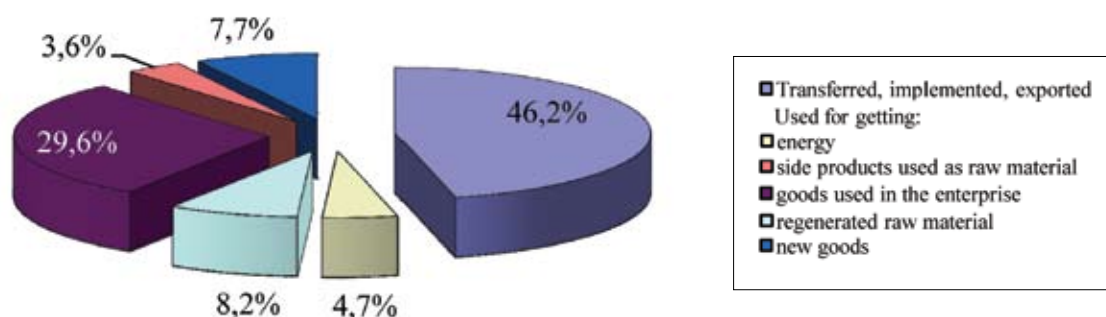


Figure 9.5 – The structure of the industrial wastes in Belarus in 2005-2009

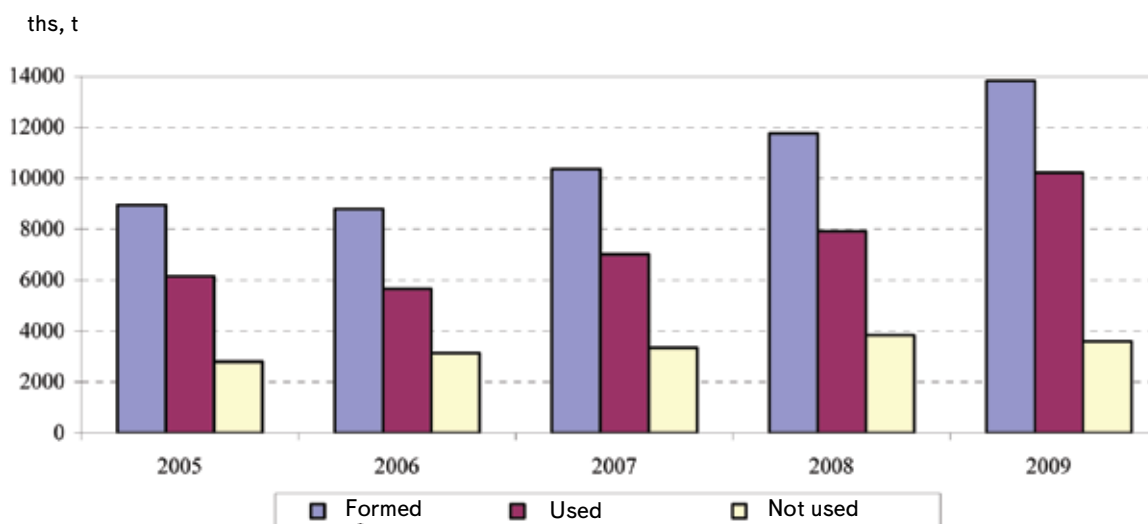


Figure 9.6 – The dynamics of formation and use of industrial wastes in Belarus in 2005-2009 (Excluding halite wastes and halite slimes clay-salt)

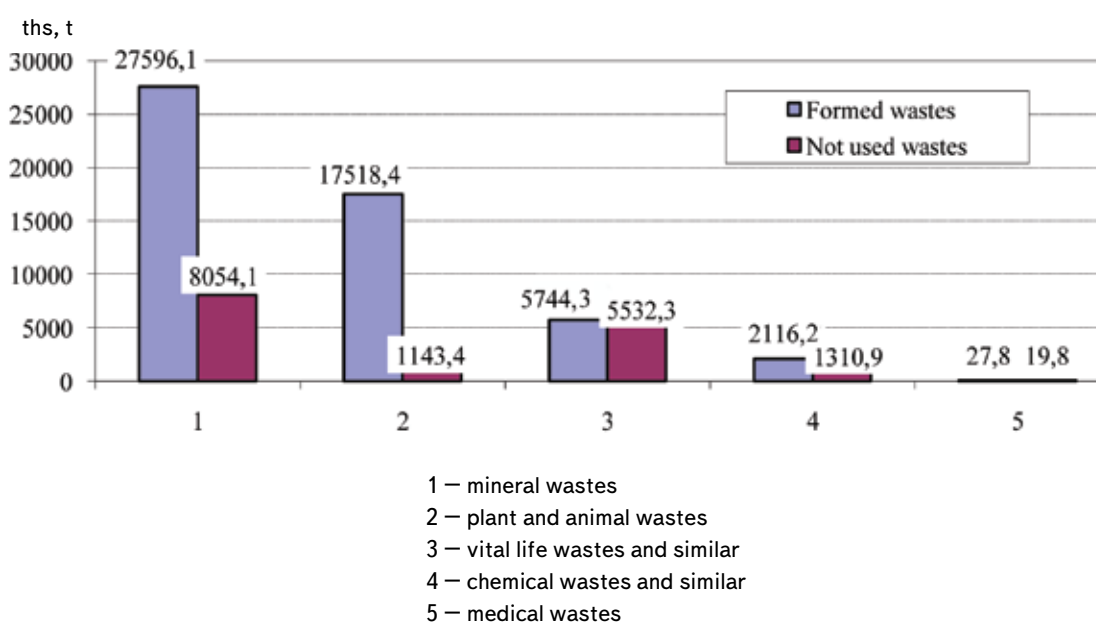


Figure 9.7 – The proportion of formed and unused industrial wastes of various kinds in 2005-2009 (Excluding halite wastes and halite slimes clay-salt)

– The weight of recycling and using wastes in total in the period 2005-2009 was in average 26.2%, increased from 21.0% in 2005 to 42,9% in 2009; excluding halite wastes and halite slimes clay-salt this indicator ranged

from 68.0 to 77.6%, in average 72.7%;

– In absolute terms, the use of industrial wastes in the reporting period varied from 5652.2 to 10210.1 tons per year, in average 7385.5 tons per year.

## Final waste disposal

This indicator allows to determine the impact on the environment of the waste disposals and the effectiveness of the measures to prevent and reduce environment pollution.

### Industrial wastes

Unused industrial wastes in Belarus are stored in departmental stores and enterprises. At the end of 2009 the total volume of wastes at storages was 911600 tons. The largest volumes of wastes are characteristic for RUE «Production Association «Belaruskali» (876947 ths tons) (*Table 9.1*), and phosphogypsum (19614.3 tons) and hydrolytic lignin (4267.5 tons) (*Figure 9.8*).

Unused industrial wastes (3-4 classes of hazard and non-hazard) are mainly disposed at landfills of municipal solid wastes. This is characteristic for cities where there is a lack of capacities or there are not specialized facilities for storing wastes.

In 2009 compared with 2005 the volume of wastes at storage facilities increased from 817400 to 911600 tons or 11.5%. The annual waste accumulation in the considered period ranged from 13300 to 29200 tons. The amount of wastes in the salt dumps of RUE «Belaruskali» in 2005-2009 increased

annually in average 19222.4 ths t, and the total amount of halite slimes clay-salt – to 2584.3 ths tons.

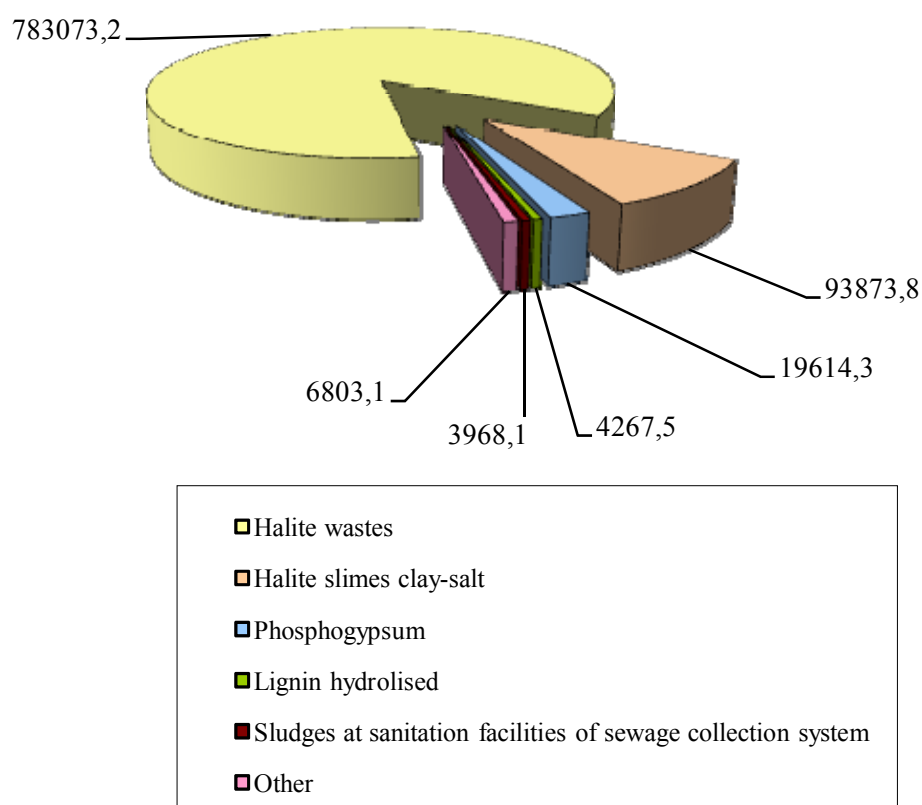
The weight of finally disposed industrial wastes in the total volume of wastes during 2005-2009 ranged from 48.8 to 72.9%, in average 66.5%. For halite wastes and halite slimes clay-salt this figure was even higher – from 92.8 to 97.0% in average 95.6%.



Table 9.1

### Amount of halite wastes at salt dumps and sludge depository of RUE «Belaruskali» in 2005-2009 (details at end of year), ths t

Year	Total amount of wastes in the salt dumps	Total amount of halite wastes and halite slimes clay-salt
2005	703 383,6	83 536,8
2006	724 216,7	86 335,2
2007	747 885,9	89 444,8
2008	771 988,9	92 460,2
2009	783 073,2	93 873,8



**Figure 9.8 – The volume of accumulated wastes in the enterprises of Belarus (The end of 2009), t**

### Municipal solid wastes

Municipal wastes are disposed at landfills of municipal solid wastes (about 90,4%) and at mini-landfills. The amount of disposed wastes at landfills during 2007-2009 is given in *Table 9.2*. As the table shows, the volume of

MSW disposed at landfills in 2009 increased compared with the two previous years in 1,2 times mainly due to consumption waste.

Totally in Belarus there are 164 landfills of MSW serving regional and district centers and large urban settlements. Each

Table 9.2

**The volume of municipal solid waste disposed at landfills of MSW and the mini-landfill in 2007-2009 t/m<sup>3</sup>/t**

Year	Municipal solid waste		
	Total	including:	
		consumption wastes	industrial wastes, similar to vital life wastes
2007	12 383	9 428	2 955
2008	13 584	10 342	3 242
2009	16 739	11 772	4 967

district has one, rarely 2-3 landfills. There is centralized export of municipal wastes in all settlements for which were created 3710 mini-landfills.

The total area of land for landfills of MSW is about 900 hectares, more than 50% of which is full with wastes. Mini-landfills have about 3 hectares of land.

Thus, the analysis of final waste disposal in Belarus in 2005-2009 led to the following conclusions:

- In 2009 compared with 2005 the volume of wastes at storage facilities increased from 817400 to 911600 tons or 11.5%; the annual waste accumulation in the considered period ranged from 13300 to 29200 tons;

- The amount of wastes in the salt dumps of RUE «Belaruskali» in 2005-2009 increased annually in average 19222.4 thousand tons, and the total amount of halite slimes clay-salt – to 2584.3 thousand tons;



- The weight of finally disposed industrial wastes in the total volume of wastes during 2005-2009 ranged from 48.8 to 72.9%, in average 66.5%. For halite wastes and halite slimes clay-salt this figure was even higher – from 92.8 to 97.0% in average 95.6%;

- The volume of MSW disposed at landfills in 2009 increased compared with the two previous years in 1,2 times mainly due to consumption waste.