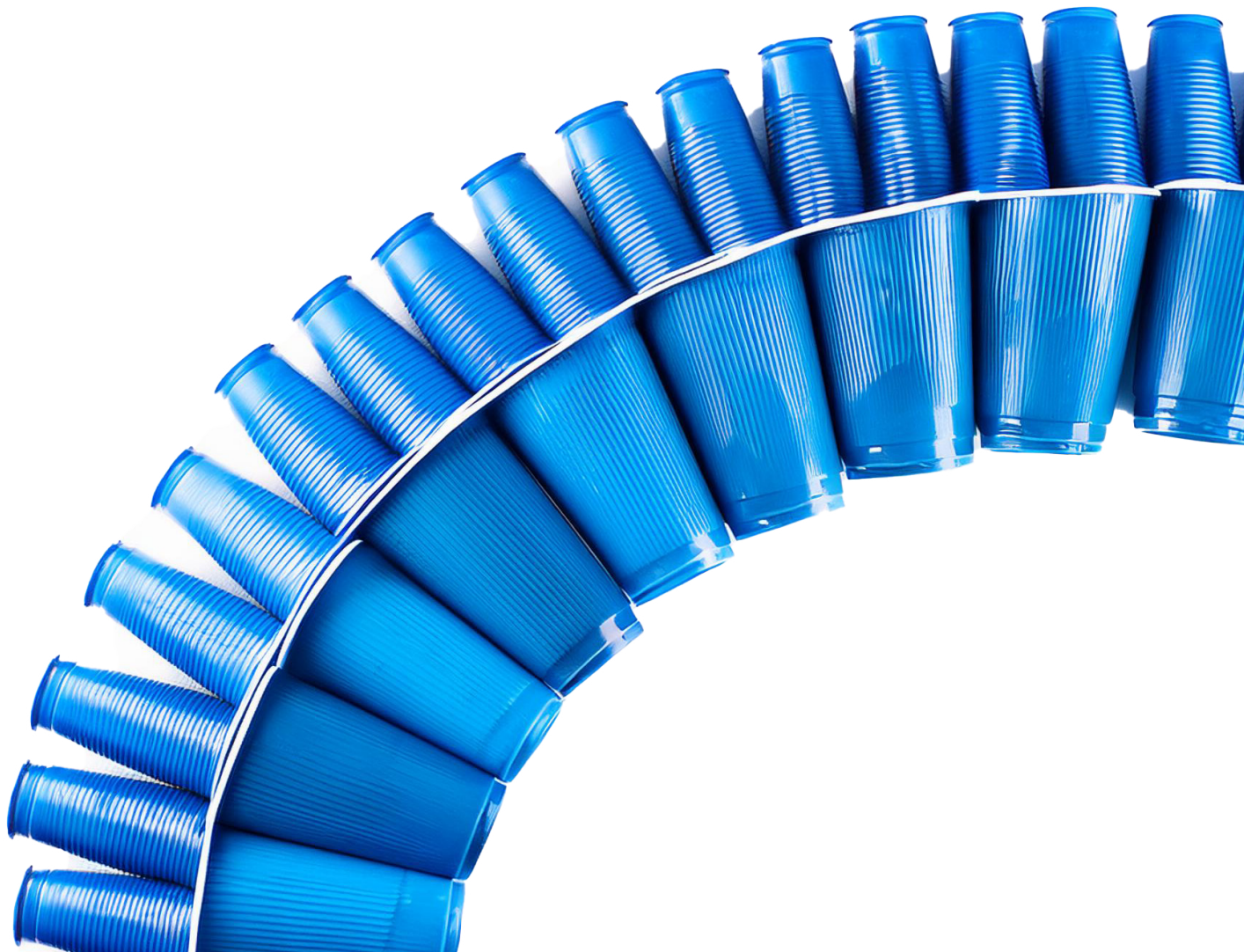


NATIONAL INVENTORY MAJOR SOURCES OF PLASTIC POLLUTION IN UKRAINE



The review was prepared by the NGO „Chemical Safety Agency“ (CSA) within the framework of the project „Addressing the worsening plastic crisis in five countries of Eastern Europe, Caucasus and Central Asia (EECCA)“

INTRODUCTION

The growing consumption of plastic, both globally and in Ukraine, is a growing crisis with devastating consequences for the environment, human health, human rights, environmental justice, indigenous rights, biodiversity and climate.

Global action to address this crisis is urgently needed, and the Global Compact to Reduce Plastic Pollution (hereinafter referred to as the Global Compact) is therefore an opportunity to pave the way for comprehensive national policies to regulate plastic production and consumption, sustainable management of plastic waste. The Global Compact, if adopted, has the potential to become one of the significant environmental agreements in human history.

The Ukrainian Scientific Center for Marine Ecology together with the EMBLAS project investigated that the amount of waste and plastic in the Black Sea has increased over the last 30 years and amounts to 90 units per 1 km², which is twice as much as in the Mediterranean Sea. This has a negative impact on the state of the marine ecosystem, because every hour between 6 and 50 elements of garbage are brought into the Black Sea with major rivers. In the garbage patches of the Black Sea, 68% of the pollution is plastic.

In the Black Sea, 83% of the garbage recorded by environmentalists is household plastic. It is because of plastic that the Black Sea turned out to be twice as dirty as the Mediterranean Sea.

And this is just one example of the crisis situation with plastic pollution, which directly affects Ukraine and requires immediate measures to reduce the burden of plastic on the environment and the health of the country's population.

The report, **National Inventory of Major Sources of Plastic Pollution in Ukraine**, analyzes the country's national plastic market (Section 1), providing official data from the State Statistics Service of Ukraine on production and sales of primary forms of plastics by polymer type in Ukraine in 2018-2022; foreign trade in polymers in primary forms in 2019-2023.

Section 2 of this Report analyzes official data on the plastic goods market in Ukraine, namely, the main types of plastic goods made from primary forms of plastics produced in Ukraine; the main types of plastic goods that are imported into Ukraine; and the main types of plastic goods that are exported from Ukraine.

Section 3 "Plastic Waste Management in Ukraine" contains official data on the volume of plastic waste generated in the country in 2019-2023; foreign trade in plastic waste in 2019-2023. This section also presents the existing system of plastic waste management in Ukraine, which are part of household waste, namely recycling (recovery, including sorting) of plastic waste; disposal (burial) of plastic waste; incineration of plastic waste.

Also presented here is the effect of the principle of extended producer responsibility for

packaging waste, which is defined in the Law of Ukraine “On Waste Management”.

Section 4 contains information on the labeling of plastic products in Ukraine.

Section 5 provides information on the impact of plastic on human health, namely, the attitude / concern of Ukrainian citizens to the negative impact of plastic on human health; legislative provision of sanitary protection zones for plastic production enterprises, incinerators and waste processing plants; data on harmful emissions from the production of plastic and plastic goods.

The Recommendations, prepared on the basis of the results of the national inventory of the main sources of plastic pollution, including plastic waste generation, present proposals for governmental structures, the public and the private sector to implement priority tasks and prepare future steps on the way of prevention and reduction of plastic pollution in the country, which are based on the implementation of existing legislative norms and preparation of new ones; opinions of the expert environment and producers; representatives of organizations of the local community; and representatives of the private sector.

1. ANALYSIS OF THE NATIONAL PLASTIC MARKET IN UKRAINE

1.1 Production and sales of primary forms of plastics by types of polymers in Ukraine in 2018-2022.

The main source of open data on production and realization of primary forms of plastics in Ukraine is statistical information of the State Statistics Service of Ukraine, namely available annual data «Production and realization of industrial products by types».

National Classifier of Ukraine «Classification of Economic Activities DK 009:2010» / KVED-2010 (as amended on 04.01.2023)¹ defines the following hierarchy of primary polymers production:

ITC 2010	DK 009:2010 list of sections
Section C Process Industry	
	Section 20 Manufacture of chemicals and chemical products
	Group 22.1 Manufacture of basic chemical products, fertilizers and nitrogen compounds, plastics and synthetic rubber in primary forms
	Class 20.16 Manufacture of plastics in primary forms

1 <https://zakon.rada.gov.ua/rada/show/vb457609-10#top>

Class 22.16 Manufacture of plastics in primary forms includes the manufacture of primary polymers, namely:

- polymers, including **ethylene, propylene, styrene**, vinyl **chloride**, vinyl acetate and acrylics;
- polyamides; phenolic and epoxy resins, polyurethane;
- alkyd and polyester resins and polyesters;
- silicone in primary forms, ion exchange resins based on polymers.

Statistics on production and sales of plastics in primary forms by polymer type for 2018-2022 are available here.²

Similar data for 2023 are not yet available due to the development work on the new official statistics portal <https://stat.gov.ua/index.php/uk>.

The Study presents annual statistical surveillance data related to the production and sales of primary forms of plastics by type of polymers proposed in the Project objectives, namely **ethylene, propylene, styrene and vinyl chloride** polymers for the five-year period from 2018 to 2022.

Table 1.1 provides data on the quantity of products produced and sold, as well as data on the value of products sold for each primary form of plastics by polymer type according to the Nomenclature of Industrial Products.

It should be noted that most of the data are not made public in order to fulfill the requirements of the Law of Ukraine «On Official Statistics» on ensuring the guarantees of state statistical offices regarding statistical confidentiality.

Table 1.1.

Production and sales of primary forms of plastics by polymer type in 2018-2022*

2022			
Product name according to the Nomenclature of Industrial Products	Quantity of industrial products produced, tons	Quantity of industrial products sold, t	Cost of realized industrial products, UAH ths.
<i>Polyethylene</i> linear with specific gravity less than 0.94 in primary forms	3456,0	3276,8	192548,7
<i>Polyethylene</i> other with specific gravity less than 0.94 in primary forms (except linear polyethylene)	c/w	c/w	c/w
<i>Polyethylene</i> with specific gravity of 0.94 or more in primary forms	c/w	c/w	c/w
<i>Copolymers of ethylene</i> with vinyl acetate in primary forms	c/w	c/w	c/w

² <https://www.ukrstat.gov.ua>

<i>Polymers of ethylene</i> in primary forms (except polyethylene, copolymers of ethylene with vinyl acetate)	c/w	c/w	c/w
Expandable <i>polystyrene</i> in primary forms	3927,2	853,9	134127,4
<i>Polyvinyl chloride</i> , not mixed with other substances, in primary forms	c/w		c/w
<i>Polyvinyl chloride</i> , unplasticized, mixed with other substances, in primary forms	c/w	c/w	c/w
<i>Polyvinyl chloride</i> plasticized, mixed with other substances, in primary forms	22607,6	20037,4	1106632,3
<i>Polypropylene</i> in primary forms	1601,3	1224,7	c/w
2021			
Product name according to the Nomenclature of Industrial Products	Quantity of industrial products produced (gross output), tons	Quantity of sold industrial products produced from own raw materials, t	Cost of realized industrial products produced from own raw materials, UAH ths.
1	2	3	4
<i>Polyethylene</i> linear with specific gravity less than 0.94 in primary forms	5265,0	3396,8	101902,8
<i>Polyethylene</i> other with specific gravity less than 0.94 in primary forms (except linear polyethylene)	2900,6	2406,9	c/w
<i>Polyethylene</i> with specific gravity of 0.94 or more in primary forms	c/w	c/w	c/w
<i>Copolymers of ethylene</i> with vinyl acetate in primary forms	c/w	c/w	c/w
<i>Polymers of ethylene</i> in primary forms (except polyethylene, copolymers of ethylene with vinyl acetate)	c/w	c/w	c/w
Expandable <i>polystyrene</i> in primary forms	c/w	c/w	c/w

<i>Polyvinyl chloride</i> , not mixed with other substances, in primary forms	c/w	c/w	c/w
<i>Polyvinylchloride</i> not plasticized, mixed with other substances, in primary forms	c/w	c/w	c/w
<i>Polyvinyl chloride</i> plasticized, mixed with other substances, in primary forms	60214,3	55976,2	2818941,2
<i>Polypropylene</i> in primary forms	c/w	c/w	c/w
2020			
1	2	3	4
<i>Polyethylene</i> linear with specific gravity less than 0.94 in primary forms	4491,0	4586,2	123252,8
<i>Polyethylene</i> other with specific gravity less than 0.94 in primary forms (except linear polyethylene)	c/w	c/w	c/w
<i>Polyethylene</i> with specific gravity of 0.94 or more in primary forms	c/w	c/w	c/w
<i>Copolymers of ethylene</i> with vinyl acetate in primary forms	c/w	c/w	c/w
<i>Polymers of ethylene</i> in primary forms (except polyethylene, copolymers of ethylene with vinyl acetate)	c/w	c/w	c/w
Expandable <i>polystyrene</i> in primary forms	c/w	c/w	c/w
<i>Polystyrene</i> other (except expanded polystyrene) in primary forms	c/w
<i>Styrene polymers</i> in primary forms (except polystyrene, styrene-acrylonitrile copolymers (SAN) or acrylonitrile-butadiene styrene copolymers (ABS))	c/w	c/w	c/w
<i>Polyvinyl chloride</i> , not mixed with other substances, in primary forms	c/w	c/w	c/w

<i>Polyvinyl chloride</i> , unplasticized, mixed with other substances, in primary forms	c/w	c/w	c/w
<i>Polyvinyl chloride</i> plasticized, mixed with other substances, in primary forms	56613,4	52213,7	1712702,0
<i>Polypropylene</i> in primary forms	c/w	c/w	c/w
2019			
1	2	3	4
<i>Polyethylene</i> linear with specific gravity less than 0.94 in primary forms	3242,8	3180,9	54224,8
<i>Polyethylene</i> other with specific gravity less than 0.94 in primary forms (except linear polyethylene)	9670,1	8139,9	91804,6
<i>Polyethylene</i> with specific gravity of 0.94 or more in primary forms	c/w	c/w	c/w
<i>Copolymers of ethylene</i> with vinyl acetate in primary forms	1568,5	1666,4	86167,6
<i>Polymers of ethylene</i> in primary forms (except polyethylene, copolymers of ethylene with vinyl acetate)	c/w	c/w	c/w
Expandable <i>polystyrene</i> in primary forms	4510,4	678,4	42060,9
<i>Polystyrene</i> other (except expanded polystyrene) in primary forms	c/w
Styrene <i>polymers</i> in primary forms (except polystyrene, styrene-acrylonitrile copolymers (SAN) or copolymers acrylonitrile-butadiene styrene (ABS))	c/w	c/w	c/w
<i>Polyvinyl chloride</i> , not mixed with other substances, in primary forms	c/w	c/w	c/w
<i>Polyvinyl chloride</i> , unplasticized, mixed with other substances, in primary forms	c/w	c/w	c/w

<i>Polyvinyl chloride</i> plasticized, mixed with other substances, in primary forms	58449,0	53980,4	1834388,1
<i>Polypropylene</i> in primary forms	2219,3	1632,5	74275,9
2018			
1	2	3	4
<i>Polyethylene</i> linear with specific gravity less than 0.94 in primary forms	2871	2691,0	44276,6
<i>Polyethylene</i> other with specific gravity less than 0.94 in primary forms (except linear polyethylene)	2194	1407,0	87166,1
<i>Polyethylene</i> with specific gravity of 0.94 or more in primary forms	c/w	c/w	c/w
<i>Copolymers of ethylene</i> with vinyl acetate in primary forms	c/w	c/w	c/w
<i>Polymers of ethylene</i> in primary forms (except polyethylene, copolymers of ethylene with vinyl acetate)	c/w	c/w	c/w
Expandable <i>polystyrene</i> in primary forms	3105	734,0	48367,2
<i>Polyvinyl chloride</i> , not mixed with other substances, in primary forms	c/w	c/w	c/w
<i>Polyvinyl chloride</i> unplasticized, in mixture with other substances, in primary forms	c/w	c/w	c/w
<i>Polyvinyl chloride</i> plasticized, mixed with other substances, in primary forms	61122	53888,0	2027374,6
<i>Polypropylene</i> in primary forms	2228	1596,0	70095,7

*) Data are given without taking into account temporarily occupied territories and part of the territories where hostilities are (were) conducted.

Designations:

k/c - data are not made public in order to fulfill the requirements of the Law of Ukraine «On Official Statistics» on ensuring the guarantees of state statistical offices regarding statistical confidentiality.

... No information.

Table 1.2 shows the dynamics of production and sales rates of primary forms of plastics

using the example of **linear polyethylene with a specific gravity of less than 0.94 in primary forms** for the period 2018-2022.

Table 1.2.

Production and sales rates of linear polyethylene with a specific gravity of less than 0.94 in primary forms during the period 2018-2022.

	2018	2019	2020	2021	2022
Quantity of industrial products produced, tons	2871	3242,8	4491,0	5265,0	3456,0
Quantity of industrial products sold, t	2691,0	3180,9	4586,2	3396,8	3276,8

These data show a steady increase in production and sales of primary forms of linear polyethylene with a specific gravity of less than 0.94 from 2018 to 2021. In 2022, with the onset of full-scale hostilities, production and, consequently, sales decreased.

Unfortunately, due to the lack of data, which are not made public in order to fulfill the requirements of the Law of Ukraine «On Official Statistics», it is impossible to perform the corresponding analysis for other primary forms of plastics by types of polymers.

According to YouControl - analytical system for compliance, market analysis, business intelligence and investigations - today in Ukraine there are 301 active companies and 73 active physical persons - entrepreneurs, carrying out activities in the CFED 20.16 Manufacture of plastics in primary forms.³

The largest producer of certain plastics in primary forms is KARPATNEFTEKHIM LLC⁴ - a petrochemical and chemical production complex, which is the only Ukrainian producer of low-pressure polyethylene HXF-4810H and polyvinyl chloride suspension grades KSR-67, KSF-70.

1.2 Foreign trade in polymers in primary forms in 2019-2023.

Table 1.3 summarizes annual exports and imports of primary forms of **polymers of ethylene, propylene, styrene, styrene, vinyl chloride, and polyethylene terephthalate** for 2019-2023.⁵

Table 1.3.

Foreign trade in primary forms of plastics in 2019-2023.

UKT VED code and name	Exports			Import		
	Quantity, tons	Cost, USD	thousand	Quantity, tons	Cost, USD	thousand
2019						

3 <https://youcontrol.com.ua/catalog/kved/20/16/>

4 <http://www.knh.com.ua/uk/>

5 Economic Statistics / Foreign Economic Activity. - <https://www.ukrstat.gov.ua>

3901000000 Ethylene polymers in primary forms	68550,0	76398,8	273592,8	332138,4
3902000000 Polymers of propylene or other olefins in primary forms	154,1	272,6	132323,3	169010,1
3903000000 Styrene polymers in primary forms	407,5	794,6	72602,1	99165,6
3904000000 Polymers of vinyl chloride or other halogenated olefins in primary forms	186554,2	158015,2	80707,7	84917,5
3907600000 - poly (ethylene terephthalate)	11664,9	10125,4	147602,6	168805,9
2020				
3901000000 Ethylene polymers in primary forms	53728,4	44489,5	272245,3	285942,7
3902000000 Polymers of propylene or other olefins in primary forms	227,4	488,8	137558,0	147964,2
3903000000 Styrene polymers in primary forms	224,3	457,6	72861,9	86187,3
3904000000 Polymers of vinyl chloride or other halogenated olefins in primary forms	177088,9	152629,3	64147,2	67449,8
3907600000 - poly (ethylene terephthalate)	5244,3	3964,1	76145,0	70096,2
2021				

3901000000 Ethylene polymers in primary forms	71291,3	93774,9	286488,5	477364,9
3902000000 Polymers of propylene or other olefins in primary forms	1112,4	2228,7	141862,4	248687,3
3903000000 Styrene polymers in primary forms	460,9	1083,5	85806,0	163457,5
3904000000 Polymers vinyl chloride or other halogenated olefins in primary forms	212137,6	346959,7	62374,1	106939,7
3907600000 - poly (ethylene terephthalate)	-	-	-	-
2022				
3901000000 Ethylene polymers in primary forms	13929,1	21007,0	189049,9	328010,2
3902000000 Polymers of propylene or other olefins in primary forms	771,8	1270,8	86360,2	147419,9
3903000000 Styrene polymers in primary forms	483,9	1307,7	49755,8	114356,9
3904000000 Polymers of vinyl chloride or other halogenated olefins in primary forms	45762,6	78724,1	55715,9	96621,6
3907600000 - poly (ethylene terephthalate)	-	-	-	-
2023				

3901000000 Ethylene polymers in primary forms	901,9	1866,9	257691,5	349313,9
3902000000 Polymers of propylene or other olefins in primary forms	195,6	319,3	107837,3	144825,7
3903000000 Styrene polymers in primary forms	67,1	156,7	59149,5	100293,8
3904000000 Polymers of vinyl chloride or other halogenated olefins in primary forms	742,5	1274,7	89491,5	104103,2
3907600000 - poly (ethylene terephthalate)	-	-	-	-

The analysis of the data on export and import volumes of polymers in primary forms for the period 2019-2023, which are shown in Table 1.3, showed that imports of these products to Ukraine are many times higher than their exports.

In Ukraine's foreign trade in primary forms of polymers are **polymers of ethylene, propylene, styrene, vinyl chloride and polyethylene terephthalate** and a number of other polymers, which are beyond the scope of this study.

Analysis of the dynamics of exports and imports of polymers in primary forms for the period 2019-2023 (Table 1.3) showed that exports of these products tended to increase until 2022, but decreased sharply with the outbreak of widespread hostilities in February 2022.

Similarly, import volumes of these products also had a positive trend until 2022, decreased sharply in 2022, and import volumes increased in 2023 and reached almost 2019 levels due to the establishment of appropriate supply volumes and logistics.

It should be noted that since the second half of 2020 polyethylene terephthalate has been absent from Ukraine's foreign trade.

Since 2022, there have been significant changes in the geography of foreign trade in primary forms of plastics - export-import from Russia and Belarus has stopped; export-import volumes to the EU countries have significantly increased.

2. PLASTIC GOODS MARKET IN UKRAINE

The market of plastic goods in Ukraine is quite wide and covers various categories of goods, which are made from primary forms of plastics of own production and imported raw materials.

Also on the national market of plastic products there are imported products, and plastic goods of own production are exported from Ukraine abroad.

Table 2.1 summarizes the dynamics of the plastic goods market capacity for the period 2019-2022, calculated according to the State Statistics Service of Ukraine and foreign economic trade databases.⁶

Table 2.1.

Dynamics of plastic goods market volumes in Ukraine for 2019-2022 in physical and monetary terms

	2019	2020	2021	2022
In physical terms, thousand tons				
Production	45,56	53,79	67,67	40,63
Import	77,71	74,12	86,48	71,9
Exports	45,15	42,47	49,76	19,35
Market capacity	78,12	85,44	104,39	93,18
<i>Growth rate</i>		+9%	+22%	-11%
In monetary terms, UAH bln				
Production	24,29	25,19	31,42	16,86
Import	45,58	38,19	44,17	33,38
Exports	27,09	33,51	38,48	23,22
Market capacity	42,78	29,87	37,10	27,02
<i>Growth rate</i>		-30%	+24%	-27%

It should be noted that in contrast to the natural indicators, monetary indicators had a significant drop in 2022, which was due to a decrease in the production of value plastic goods due to the occupation of the territories where the largest enterprises of the industry were located. At the same time, supplies of cheap imported plastic goods increased in Ukraine.

As of 2022, 418 importers and 225 manufacturers of plastic products were operating in the national market for various plastic products.

Below are the main categories of plastic goods, which are in the greatest demand on the Ukrainian market and in foreign economic activity with codings according to the Nomenclature of Products of Industry (NPP)⁷ and Ukrainian classification of goods of

⁶ <https://pro-consulting.ua/ua/issledovanie-rynka/analiz-rynka-izdelij-s-plastika-v-ukraine-2023-god-1>

⁷ <https://zakon.rada.gov.ua/rada/show/v0309832-23#Text>

foreign economic activity (UKT VED)⁸ (according to Pro-consulting company):⁹

Category	NPP coding	Coding by UKT VED
Packaging products Boxes, crates, stoppers, caps, lids, caps, packaging, bags, film, tubes, containers for research or use in chemical, medical analysis, transportation of specific or hazardous substances, special packaging	22.22.13 Boxes, crates, lattice containers and similar articles of plastics	3923 10: Boxes, crates, baskets and similar articles
	22.22.19.50 Corks, caps, caps and similar closures, of plastics.	3923: Plastic articles for transporting and packing goods; stoppers, caps, lids, caps and other plastic closures including: 2923 30: Bottles, bottles, flasks and similar articles 2923 50: Corks, caps, caps and other devices for sealing, closing and corking
	22.22.11 Bags and pouches, including cone-shaped bags, of ethylene polymers 22.22.12 Bags and pouches, including cone-shaped bags, made of plastics other than ethylene polymers.	3923 21: Bags and pouches, including cone-shaped bags, made of ethylene polymers 3923 29: Bags and pouches, including cone-shaped bags, of other plastics (except those made of ethylene polymers)
	22.22.19-90.00 Plastic articles for transportation and packaging of goods, other	3923 90 90 00: Plastic articles for transporting and packing goods; corks, caps, lids, caps and other closures made of plastics; other
Dishes Reusable plastic cups and plates, kitchen utensils	22.29.23-20 Plastic tableware and kitchen utensils	3924 10 00 00: Table and kitchen utensils, cutlery and kitchen utensils

8 https://www.ukrstat.gov.ua/klasf/nac_kls/op_ukzed_2016.htm

9 <https://pro-consulting.ua>

<p>Household products Cutlery and kitchen utensils, other household items, hygiene or toilet articles</p>	<p>22.29.23-50 Household and toilet articles of reclaimed cellulose. 22.29.23-90 Household and toilet articles of plastics, not included in other groupings (n. v. i. y. u.)</p>	<p>3924 90 00: Table and kitchenware, cutlery and kitchen utensils, other household, hygienic or toilet articles made of plastics, other</p>
<p>Building products Products for fasteners, cladding, creating guttering and waterproofing systems, etc.</p>	<p>22.23.19 Plastic products for construction 27.33.14 Plastic electrical insulating fittings</p>	<p>3925 90: Plastics building products, other including: 3925 90 10: Fittings and fastening kits designed for permanent installation in and/or on doors, windows, steps, walls or other parts of buildings 3925 90 20: Trunking, duct and cable trays, troughs for electrical networks 3925 90 80: Others</p>

For the production of plastic goods in Ukraine use various types of primary forms of plastics (raw materials), which are divided into separate categories according to the level of processing and the possibility of use in the food industry, namely:

1 - polyethylene terephthalate PET (E) / PET

PET (E) is often used for soft drink containers and packaging.

Product categories: liquid containers (about 65%), lids (55%) boxes (35%), bags and pouches (more than 50%), household products (30%), tableware (almost 100%).

PET (E) is recyclable.

2 - high pressure polyethylene PEHD / HDPE / PVT

PEHD is used to make shampoo and detergent bottles, flasks, plastic bags, plastic glasses, milk and water bags.

Product categories: liquid containers (15%), lids (5%), boxes (10%), pouches (40%).

It is considered suitable for use in the food industry.

3 - polyvinyl chloride PVC / PVC

PVC is the main material for the production of pipes, garden furniture, window profiles, detergent containers and blinds. PVC is also often used to make children's toys, jars for loose foodstuffs and bottles for edible oils.

Main product categories: building products (about 70%), household products

PVC is one of the most dangerous types of plastic; it is virtually unrecyclable and can release toxic substances.

4 - low pressure polyethylene PELD / LDPE / HDPE

PELD is used to produce garbage and food bags, flexible containers and film.

Main product categories: bags (10%), specialty products (20%).

Suitable for use in the food industry; recyclable.

5 - polypropylene PP/PP

PP is used in the food industry (ketchup bottles, yogurt cups, bottle caps), toys and baby bottles, packaging for medical products.

Product categories: bottles (20%), specialty goods (20%), home goods (30%)

6 - polystyrene PS/PS

Although PS is used for the production of some food packaging (egg containers, meat liners), cutlery, glasses, toys, etc., it is considered potentially hazardous, especially in cases of combustion. It is mainly used for household products (30%)

7 - polycarbonate and other plastics OTHER/ O / OTHER

This category includes all other primary forms of plastics (raw materials), including polycarbonate, which is used to produce transparent solid products such as baby bottles.

2.1 Main types of plastic goods, which are made of primary forms of plastics produced in Ukraine

Ukrainian production of plastic goods covered a significant part of consumers' needs. Table 2.2 presents data on their production volumes in physical terms in the period 2019-2022.¹⁰

Table 2.2.

The dynamics of plastic goods production in 2019-2022.

	2019	2020	2021	2022
Production, thousand tons	45,56	53,79	67,67	40,63
Growth rate, %		18 %	26 %	-40 %

Table 2.3 summarizes the production volumes of the main categories of plastic goods in volume terms for the period 2021-2022.¹¹

Table 2.3.

Production of the main categories of plastic goods in Ukraine in 2021-2022.

Production, thousand tons	2021	Share, %	2022	Share, %
Goods for packaging*	27,08	40 %	17,70	44 %
Building products	22,08	33 %	10,85	27 %

¹⁰ <https://www.ukrstat.gov.ua>; Pro-consulting assessment

¹¹ <https://www.ukrstat.gov.ua>; Pro-consulting assessment

Dishes	9,14	13 %	6,22	15 %
Household products	9,37	14 %	5,85	14 %

*) Category includes liquid containers, lids, specialty items, bags and boxes (due to specific product coding it is not possible to separate)

The data in Tables 2.2 and 2.3 show that the production of plastic goods in Ukraine had a steady growth dynamics, but in 2022, due to the hostilities on the territory of the country, it significantly decreased. Many plastic goods manufacturing companies were located in the east and south of the country, and in February 2022 they were forced to stop production or relocate.

The second factor that affected the market volumes was raw materials. Ukraine used to buy plastic for processing mainly from Russia and Belarus. With the outbreak of the war, there was a change of suppliers and organization of deliveries from the EU; this took time and affected the price of raw materials and the cost of logistics.

2.2 Main types of plastic goods imported to Ukraine

Total imports of plastic products to Ukraine exceed domestic production and account for more than 60% of the market

Table 2.4 summarizes the volume and dynamics of imports of plastic products in the period 2019-2022.¹²

Table 2.4.

Import of main categories of plastic goods to Ukraine 2019-2022.

	2019	2020	2021	2022
Import, thousand tons	77,71	74,12	86,48	71,90
Growth rate, %		-5 %	17 %	-17 %

Import volumes of plastic products to Ukraine had positive dynamics up to and including 2021, but in 2022 decreased to the volumes of 2017-2018. The main reason for this was the beginning of hostilities and the decrease in imports in the first months of the full-scale invasion due to the uncertainty of the situation in the country, problems with supplies from abroad, reduced demand due to migration of the population from the country and temporary suspension of activities of consuming industries, and stoppage of supplies from aggressor countries.

For many years, the largest countries importing plastic goods to Ukraine were Poland and China (total imports amounted to about 33%), as well as Russia and Belarus (their share of imports amounted to 20-25%).

¹² Economic Statistics / Foreign Economic Activity. - https://www.ukrstat.gov.ua/operativ/menu/menu_u/zed.htm; Pro-consulting company assessment

The main changes in the import market for plastic products occurred in 2022. Poland started importing more products from China and about 50% of products imported to Ukraine from Poland of Chinese origin. The outbreak of war stopped imports of plastic products from Russia and Belarus, replacing them with larger volumes from existing channels or creating channels with the closest countries (imports from Romania and Hungary increased).

The main categories of plastic products imported into Ukraine include packaging products (boxes, crates; bags, sacks; containers for liquids; lids; special equipment), construction products, tableware and household products. The bulk of Ukrainian imports are containers for liquids, construction products and lids.

In 2019-2022, the largest exporting countries of packaging goods were Poland, Germany, Belarus, Spain, China, Israel, Canada, Hungary, Romania, Turkey, Lithuania, Italy, France, and until 2022, also Russia and Belarus. The largest volumes of construction products were imported from Poland, China, Germany, and until 2022 - from Russia and Belarus; tableware - from China, Turkey, Poland, Italy, Germany, and until 2022 - from Russia; household products - from Poland, China, Turkey, Germany and Italy.

2.3 Main types of plastic goods exported from Ukraine

Before the war, more than 75% of plastic products were exported from Ukraine, but in 2022, the share of plastic products exports fell by more than half. In addition, exports of plastic products did not have stable dynamics.

Table 2.5 summarizes the volume and dynamics of exports of plastic products in the period 2019-2022.¹³

Table 2.5.

Exports of main categories of plastic goods from Ukraine in 2019-2022.

	2019	2020	2021	2022
Export, thousand tons	45,15	42,47	49,76	19,35
Growth rate, %		-6 %	17 %	-61%

The first drop in exports in 2019-2020 was due to increased market demand for biodegradable and environmental goods, and the number of companies producing them in Ukraine was limited.

The second drop was triggered by the war, with many producers suspending operations or reducing volumes due to their location in the east of the country, but after April 2022 most companies continued production. Re-exports from Europe to Asia were large, accounting for almost 30% of all export shipments.

The main categories of plastic products exported from Ukraine include packaging products (boxes, crates; bags, sacks; containers for liquids; lids; special equipment), construction products, tableware and household products.

¹³ Economic Statistics / Foreign Economic Activity. - https://www.ukrstat.gov.ua/operativ/menu/menu_u/zed.htm; Pro-consulting company assessment

In 2019-2022, the largest importing countries for packaging goods were Poland, Germany,

Romania, Moldova, Georgia and Latvia, and by 2022 also Russia and Belarus. The largest volumes of construction products were exported to Poland, Romania and Moldova, and by 2022 to Russia; tableware - to Poland and Moldova, and by 2022 also to Russia and Belarus; household products - to Poland, and by 2022 also to Russia and Belarus.

3. PLASTIC WASTE MANAGEMENT IN UKRAINE

3.1 Volume of plastic waste generated in Ukraine in 2019-2023.

The main source of open data on plastic waste generation and treatment in Ukraine is statistical information of the State Statistics Service of Ukraine, namely the available annual data «Generation and treatment of waste of hazard classes I-III by waste category by material», «Generation and treatment of waste of hazard classes I-IV by waste category by material»

National Classifier of Ukraine «Classification of Economic Activities DK 009:2010» / KVED-2010 (as amended on 04.01.2023)¹⁴ defines the following hierarchy of plastic waste management:

ITC 2010	DK 009:2010 list of sections
Section E Water supply; sewerage, waste management	
	Section 38 Collection, treatment and disposal of waste; recovery of materials
	Group 38.1 Waste collection
	Group 38.2 Waste treatment and disposal
	Group 38.3 Remanufacturing of materials

Table 3.1 summarizes the generation and treatment of hazard class I-III plastic waste in 2019-2023.

Table 3.1.

Annual generation and treatment of plastic waste of hazard classes I-III for 2019-2023.*

2023			
Volume of generated waste, thousand tons	Volume of recovered waste, thousand tons	Volume of incinerated waste, thousand tons	Volume of waste disposed to landfills, thousand tons
2,6	2,4	-	0,0
2022			

14 <https://zakon.rada.gov.ua/rada/show/vb457609-10#top>

Volume of generated waste, thousand tons	Volume of utilized waste, thousand tons	Volume of incinerated waste, thousand tons	The volume of waste disposed of to designated sites and facilities, thousand tons
1	2	3	4
2,5	0,0	0,3	-
2021			
1	2	3	4
2,9	0,1	0,1	-
2020			
1	2	3	4
2,4	0,1	0,2	0,0
2019			
1	2	3	4
4,0	0,9	0,1	0,0

Table 3.2 summarizes the generation and treatment of hazard class I-IV plastic waste in 2019-2023.

Table 3.2.

Annual generation and treatment of plastic waste of hazard classes I-IV for 2019-2023*

2023			
Volume of generated waste, thousand tons	Volume of recovered waste, thousand tons	Volume of incinerated waste, thousand tons	Volume of waste disposed to landfills, thousand tons
37,4	11,6	0,3	0,8
2022			
Volume of generated waste, thousand tons	Volume of utilized waste, thousand tons	Volume of incinerated waste, thousand tons	Volume of wastes disposed to specially designated places and facilities, thousand tons
1	2	3	4
63,0	10,9	0,7	0,4
2021			
1	2	3	4
56,7	13,6	0,2	1,1
2020			
1	2	3	4

40,8	15,1	0,3	3,2
2019			
1	2	3	4
4,0	0,9	0,1	0,0

*) Data in Tables 3.1 and 3.2 are given without taking into account the territories temporarily occupied by the Russian Federation and part of the territories where hostilities are (were) conducted.

The information was formed on the basis of reports actually submitted by enterprises (reporting rate was 90.8% in 2023; 87.3% in 2022). The data can be specified.

3.2 Foreign trade in plastic waste in 2019-2023.

Annual official data on export-import of waste plastics are presented in open sources of the State Statistics Service of Ukraine¹⁵ by codes of the Ukrainian classification of goods of foreign economic activity, developed on the basis of the Harmonized Commodity Description and Coding System and the EU Combined Nomenclature.

Table 3.3 presents information on the volume of Ukraine's foreign trade in plastic waste in 2019-2023, namely waste, trimmings and scrap from polymers of ethylene, styrene, vinyl chloride and propylene.

Table 3.3.

Foreign trade in waste plastics in 2019-2023.

UKT VED code and product name	Exports		Import	
	Quantity, tons	Cost, thousand USD	Quantity, tons	Cost, thousand USD
2019				
3915000000 Plastic waste, trimmings and scrap:	1158,60	446,4	63714,3	21066,1
3915100000 - ethylene polymers	92,3	7,5	28504,7	6191,6
3915200000 - styrene polymers	-	-	3219,8	2670,8
3915300000 - vinyl chloride polymers	42,0	20,8	316,3	120,3
3915900000 - other plastics	1024,2	418,1	31673,5	12083,5
2020				

3915000000 Plastic waste, trimmings and scrap:	2278,3	819,9	39503,3	12627,5
3915100000 - ethylene polymers	13,2	7,9	21210,5	4017,0
3915200000 - styrene polymers	46,2	116,8	4161,3	3146,4
3915300000 - vinyl chloride polymers	143,4	68,6	214,0	44,1
3915900000 - other plastics	2075,5	626,7	13917,5	5419,9
3915901100 - propylene polymers	969,0	161,1	689,6	163,3
3915908000 - others	1106,6	465,5	13227,9	5256,5
2021				
3915000000 Plastic waste, trimmings and scrap:	3630,1	1157,7	60543,0	24124,2
3915100000 - ethylene polymers	520,0	219,4	27570,1	8657,2
3915200000 - styrene polymers	-	-	1776,4	2112,1
3915300000 - vinyl chloride polymers	224,4	56,3	737,2	306,2
3915900000 - other plastics	2885,7	882,0	30459,3	13048,8
3915901100 - propylene polymers	2346,0	414,1	970,5	221,4
3915908000 - others	539,7	467,9	29488,8	12827,4
2022				
3915000000 Plastic waste, trimmings and scrap:	2337,0	1595,6	19032,9	7581,7

3915100000 - ethylene polymers	159,8	142,8	10355,0	3316,2
3915200000 - styrene polymers	101,2	20,2	358,3	366,1
3915300000 - polymers vinyl chloride	40,1	4,6	865,4	329,6
3915900000 - other plastics	2035,9	1427,9	7454,2	3569,9
3915901100 - propylene polymers	1089,0	523,1	1028,4	365,1
3915908000 - others	946,9	904,8	6425,8	3204,8
2023				
3915000000 Plastic waste, trimmings and scrap:	875,6	515,6	22597,0	7340,5
3915100000 - ethylene polymers	26,7	8,8	17002,4	5280,1
3915200000 - styrene polymers	-	-	123,9	125,7
3915300000 - vinyl chloride polymers	-	-	1100,7	408,7
3915900000 - other plastics	848,9	506,8	4370,1	1526,0
3915901100 - propylene polymers	593,7	269,5	3863,1	1304,4
3915908000 - others	255,2	237,3	507,0	221,7

Analysis of the data in Table 3.3 shows that for the period 2019-2023, imports of the above-mentioned plastic waste to Ukraine exceeded their exports by times.

Summary of official data on export-import of plastic waste in 2019-2020 from «Generation and treatment of hazard class I-IV waste by waste category by material» (Table 3.4) are available. **Table 3.4.**

Export-import volumes of plastic waste in 2019-2020.

Year	Volume of exported waste, thousand tons	Volume of imported waste, thousand tons
2019	0,4	2,8

2020	0,8	1,2
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*) Data are given without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, Sevastopol and part of the temporarily occupied territories in Donetsk and Luhansk regions. Sevastopol and part of the temporarily occupied territories in Donetsk and Luhansk regions.

Transboundary transportation of these plastic wastes is carried out on the basis of an opinion, the procedure for providing which is determined by the Resolution of the Cabinet of Ministers of Ukraine No. 1067 dated September 17, 2024.¹⁶

3.3 Management system for plastic waste in Ukraine, which is part of household waste

Waste management in Ukraine at the legislative level is defined as «a set of measures for collection, transportation, treatment (recovery, including sorting and disposal) of waste, including supervision of such operations and further care of waste disposal facilities»¹⁷.

According to Article 1 of the Law of Ukraine «On Waste Management», plastic waste is classified as household waste - mixed and/or separately collected waste from households and other sources, if this waste is similar in composition to household waste. According to expert estimates¹⁸ public consumption waste (municipal solid waste) accounts for about 85% of all plastic waste.

In Ukraine there are no systematic studies with official data on the morphological composition of household waste, and point studies are often contradictory in nature. However, based on the available data of studies to determine the morphological composition of household waste in Ukrainian settlements, the average morphological composition of these wastes is accepted - and the indicator of polymer waste is 11.5%.¹⁹

3.3.1 Recycling (recovery, including sorting) of plastic waste

According to the National Waste Management Plan until 2033, in Ukraine in 1440 settlements (not including information on temporarily occupied territories, eastern and southern regions of Ukraine, which due to military aggression by Russia were not able to provide full information) separate collection of household waste is being introduced, which in general covers about 30% of the country's population.

In populated areas, in particular villages and towns, it is common practice to use a single container for plastic collection. In urban areas, a two-container scheme with collection of the «dry fraction» of resource-valuable components and mixed waste or a three-container

16 <https://zakon.rada.gov.ua/laws/show/1067-2024-п#n116>

17 Law of Ukraine «On Waste Management» - <https://zakon.rada.gov.ua/laws/show/2320-20#Text>

18 Voloshina I.V. Recycling of garbage containing plastic (Review) // Teplofizika i Teploenergetika - 2019 - Vol. 41 - NO. 3 - P.90-98 - <https://ihe.nas.gov.ua/index.php/journal/article/view/357>

19 National Waste Management Plan until 2033, approved by the Cabinet of Ministers of Ukraine Order No. 1353-r of December 27, 2024. - <https://zakon.rada.gov.ua/laws/show/1353-2024-p#n15>

scheme with different variations of collection of plastic, paper, glass and metal waste is used. Now in Ukraine there are 34 lines for sorting household waste in 28 settlements, and sorting complexes are being actively built in 17 settlements.²⁰

The authors of the study²¹, taking into account a number of data on the morphological composition of polymer waste in Ukraine, determined their structure in the context of 2018-2019, which is mainly represented by polyethylene, polyethylene terephthalate, polyvinyl chloride, polypropylene and polystyrene.

In terms of categories of plastic products that mostly end up in the trash, these are mostly packaging waste, PET bottles and HDPE containers.

It is worth noting that not all types of plastic waste are accepted for recycling by recycling centers. Colored bottles (black, brown, white) are not accepted. The lack of labeling on the product can also serve as a refusal to accept it. Products marked with the number 7 are also not accepted for recycling.

Products made of polyvinyl chloride and only white color can be accepted for recycling by companies producing metal-plastic windows, as this is their main raw material. Normal collection points may refuse to accept such waste.

There are no recycling restrictions for other types of polymer waste.²²

According to the State Statistics Service of Ukraine, in the period 2019-2023, the volume of recovered/recycled waste plastic amounted to 52.1 thousand tons, namely: 2019 г. - 0.9 thousand tons; 2020. - 15.1 thousand tons; 2021 - 13.6 thousand tons; 2022 - 10.9 thousand tons; 2023 - 11.6 thousand tons.

Today in Ukraine there are 94 enterprises engaged in waste recycling, among them 39 are recycling polymers, 19 are recycling plastic bottles from polyethylene terephthalate into secondary materials.

The capacity of enterprises in Ukraine for recycling of all types of plastics is more than 300 thousand tons per year, but only 180 thousand tons of plastic waste is sent for recycling. Therefore, their capacities are utilized by 50-70% due to the shortage of secondary raw materials in the domestic market, which is covered by imports. The obtained secondary raw materials are of rather low quality due to irresponsible management, primarily of packaging waste.

Three main factors influence the volume of recycling of polyethylene terephthalate bottles: the cost-effectiveness of the waste collection system, the availability of recycling capacity, and the market for the recycled product.

20 = https://konsort.com.ua/pererobka-smittya-v-ukrayini/?srsltidAfmBOorH283f4vY1RfdYCrpoP06gMGkkffmrSQUququTorbYi3_GsZsw7c2

21 Safranov T. A., Prikhodko V. Y., Mikhailenko V. I. Waste plastic materials: assessment of formation and handling in the regions of the North-West Black Sea coast // Ukrainian Hydrometeorological Journal - 2023 - № 31 - P.122-130 - <https://uhmj.org.ua/index.php/journal/article>

22 https://primapak.com.ua/ua/articles/pererabotka_i_sortirovka_plastika/

The market of polyethylene recycling is also developing in the country. Among its largest representatives is Biosphere Corporation²³.

3.3.2 Disposal (burial) of plastic waste

Today, the management of household waste in Ukraine, which includes plastic waste, is mainly based on low-level technologies, which are aimed at its predominant disposal in landfills.

The state of affairs with household waste landfills in Ukraine, where plastic waste is also disposed of, is given below according to the materials of the Reference on the state of the sphere of household waste management in Ukraine for 2023 from the Ministry of Development of Communities and Territories of Ukraine.²⁴

More than 44 million m⁽³⁾ of household waste, or more than 9 million tons, was generated in Ukrainian settlements in 2023, which is buried in 5.6 thousand dumps and landfills with a total area of more than 12 thousand hectares.

In 2023, about 10.35 % of household waste, including plastic waste, was recovered, of which: 1.6 % was incinerated, 8.75 % went to secondary raw material collection points and waste processing lines (including 1.25 % of household waste was composted), and 89.65 % of household waste, including plastic waste went to landfills and dumps.

In Ukraine, the number of overloaded landfills is 161 units (2.8%), and 713 units (12.6%) do not meet environmental safety standards.

Out of 1,247 dumps requiring passportization, 47 units were actually passportized in 2023 (21% of the total number of dumps require passportization). Out of 325 dumps requiring reclamation, 22 units were actually reclaimed. The need for construction of new landfills is 281 units.

Due to the inadequate system of household waste management in settlements, usually in the private sector, in the reporting year, 13,000 unauthorized dumps with an area of 0.47 thousand hectares were identified, of which 12,500 unauthorized dumps with an area of 0.41 thousand hectares were eliminated in 2023.

Due to military actions in Ukraine for 2022-2023, according to various estimates, accumulated from 600 thousand to 15 billion tons of construction waste from destruction, which includes waste products from polyvinyl chloride (window frames, doors, etc.) due to the destruction and destruction of houses and other structures, and therefore there are problems with the disposal of this type of plastic waste and increased overloading of landfills and dumps in the absence of measures to recycle waste products from polyvinyl chloride.²⁵

According to the State Statistics Service of Ukraine, in the period 2019-2023, the volume

23 https://uk.wikipedia.org/wiki/Корпорація_«Biosphere»

24 State of the sphere of household waste management in Ukraine for 2023. Reference of the Ministry of Development of Communities and Territories of Ukraine. - mtu.gov.ua

25 <https://pragmatika.media/pan-chy-propav-iak-peretvoryty-plastykovyj-apokalipsys-na-korysnyj-dlia-dovkillia-biznes/>

of plastic waste disposed to landfills and designated places and facilities amounted to 5.5 thousand tons, namely: 2019 г. - 0 thousand tons; 2020. - 3.2 thousand tons; 2021 - 1.1 thousand tons; 2022 - 0.4 thousand tons; 2023 - 0.8 thousand tons, but according to estimates, the data of the State Statistics Service of Ukraine do not reflect the full picture of plastic waste disposal

In order to reduce the load of plastic waste on landfills and to create a system of collection and recycling of packaging waste, the Cabinet of Ministers of Ukraine submitted to the Verkhovna Rada of Ukraine the draft Law of Ukraine «On Packaging and Packaging Waste» (reg. No. 10066 dated September 18, 2023). This draft law proposed to introduce at the legislative level the main European approaches and principles into Ukrainian legislation, in particular, the principle of extended producer responsibility, which would encourage producers of packaging and packaged goods to provide financial and technical support to local authorities in organizing separate collection of household waste and conducting educational and informational work with the population. But, unfortunately, the complex process of processing this bill is still ongoing.

3.3.3 Incineration of waste plastics

Article 1 of the Law of Ukraine «On Waste Management» defines thermal treatment of waste (incineration) as a technological process for thermal treatment of waste that complies with the rules of technical operation of the relevant installation.

According to the State Statistics Service of Ukraine, 1.6 thousand tons of plastic waste will be burned in the period 2019-2023, namely: 2019 г. - 0,1; 2020 г. - 0.3; 2021 - 0.2; 2022 - 0.7; 2023 - 0.3 thousand tons

The only incineration plant for burning solid domestic waste, which includes plastic, with a capacity of about 250 thousand tons per year is operating in Kiev.

Unliquid sorted household plastic waste, namely unlabeled plastics; multi-component packages consisting of different plastics and spraying; ketchup and mustard packages; vacuum packaging; all disposable plastic containers - trays, plastic dishes, etc., cannot be recycled and therefore are sent to specialized enterprises for incineration²⁶

3.3.4 Operation of the principle of extended producer responsibility

Article 1 of the Law of Ukraine «On Waste Management» defines **extended producer responsibility** as «a set of economic, financial, administrative and organizational measures to ensure that producers of certain types of products are responsible for managing the waste stage in the product life cycle».

In Article 10 of the above-mentioned Law of Ukraine, extended producer's liability is established by law for producers of products whose consumption/use also generates packaging waste.

26 <https://nowaste.com.ua/nelikvidni-plastuku/>

The National Waste Management Plan 2033 includes packaging waste as a waste from products subject to extended producer responsibility.

The situation in Ukraine in the field of packaging waste management is unsatisfactory, in particular in the area of ensuring packaging waste collection, treatment and recovery.

The lack of an effective system for collecting packaging waste annually leads to the loss of significant resource potential for the processing industry in the form of polymer waste, and as a consequence - the deterioration of the environmental situation.



Today in Ukraine, business entities are not responsible for packaging waste management, and therefore the dominant method of packaging waste management remains its removal and disposal in landfills and dumps.

The National Waste Management Plan until 2033 envisages a set of measures for the formation of state policy in the field of packaging waste management with the introduction of an extended producer responsibility scheme for packaging waste, which should cover the costs of its separate collection and management through a combination of revenues from the sale of resource-valuable components and contributions of product manufacturers to extended producer responsibility organizations.

4. LABELING OF PLASTIC PRODUCTS

Today mandatory labeling of plastic products in Ukraine is not yet fixed at the legislative level, but it is widely used on a voluntary basis with the use of two types of labeling.

Labeling of plastic materials and objects that are intended to come into contact with foodstuffs

	This labeling is accomplished by affixing to them a graphic sign or the word “for food contact” or a special designation for their use (e.g., “coffee maker,” “wine bottle,” “tablespoon,” etc.).
	To ensure that inedible plastic parts of active materials and objects and intelligent materials and objects or parts thereof are identified by the consumer, where such parts can be perceived as edible, such materials and objects shall be labeled whenever technically possible with a graphic sign or the words “Do not eat!”.

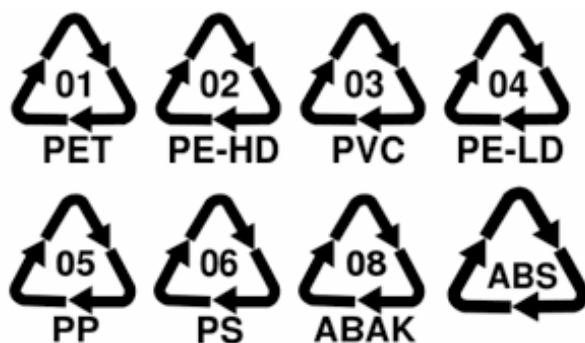
Labeling of plastic materials and objects intended for contact with food products at the legislative level is defined in the Law of Ukraine «On materials and objects intended for contact with food products» dated November 3, 2022. No. 2718-IX (as amended on

15.11.2024)²⁷, which finally enters into force on 19.11.2025 and the Order of the Ministry of Health of Ukraine dated 11.12.2023 No. 2104 «On Approval of Special Requirements for Plastic Materials and Objects Intended for Contact with Foodstuffs».²⁸ which is a legislative-normative act to the Law of Ukraine «On Materials and Objects Intended for Contact with Foodstuffs»; the Order comes into force together with the entry into force of this Law; the final date of entry into force is 19.11.2025.

Labeling of plastic products by type of primary forms of plastics (raw materials)

To simplify the procedure of sorting waste plastic products before they are sent for recycling, special graphic signs (recycling codes) are used to indicate the type of plastic from which the product is made.

In Ukraine, many plastic products and goods are labeled in accordance with the international classification, namely a triangle formed by three twisted arrows with a number in the middle, which indicates the type of polymer:



In 2021, the Law of Ukraine «On Restricting the Circulation of Plastic Bags on the Territory of Ukraine» was adopted²⁹ which introduces in Ukraine certain provisions of Directive (EU) 2015/720 of the European Parliament and of the Council of April 29, 2015 amending Directive 94/62/EC on reducing the consumption of lightweight plastic bags³⁰. But this law needs to be improved regarding the labeling of plastic bags with the indication of their compostability and strengthening the enforcement of its norms.

In addition, at the legislative level, two draft resolutions of the Cabinet of Ministers of Ukraine were prepared in 2023, namely «Procedure for labeling plastic bags»³¹ and «Procedure for labeling biodegradable plastic bags»³², which include the norms of DSTU EN 13432:2015 Packaging. Requirements for packaging disposed by composting and biodegradation; DSTU EN 14995:2018 Plastics. Evaluation of biodegradability. Test procedures and specifications (EN 14995:2006, IDT), as well as norms of harmonized European standards; their adoption is expected.

27 <https://zakon.rada.gov.ua/laws/show/2718-20#Text>

28 <https://zakon.rada.gov.ua/laws/show/z2254-23#Text>

29 <https://zakon.rada.gov.ua/laws/show/1489-20#Text>

30 = <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015L0720>

31 <https://mepr.gov.ua/povidomlennya-pro-oprylyudnennya-proyektu-postanovy-kabinetu-ministriv-ukrayiny-pro-zatverdzhennya-poryadku-markuvannya-plastykovykh-paketiv-2/>

32 <https://sk.ua/uk/shho-maie-buti-v-poryadku-markuvannya-plastikovih-paketiv/>

It should be noted that, in general, there is no separate collection of plastic waste in accordance with the international classification, except for some initiatives on separate collection of household waste with separation of plastic waste by type of polymers.

There are quite a lot of materials about labeling of plastic products in accordance with the international classification on the websites of plastic goods manufacturers and in mass media publications, but Ukrainian consumers are not well oriented in this topic, and in the future it is necessary to carry out more awareness-raising work on this topic.

5. THE IMPACT OF PLASTIC ON HUMAN HEALTH

5.1 Attitudes / concerns of Ukrainian citizens towards the negative impact of plastic on human health

The issues of the negative impact of plastic on human health and the environment have been actively discussed in Ukrainian society for more than a decade. First of all, attention was drawn to the dangers of single-use plastic and criticism of its production rather than consumption³³

The chairman of the Zero Waste Society NGO³⁴ cites the opinion of many experts who claim that the rapid and powerful human reaction to the negative effects of plastic is due to microplastics.

To date, awareness of the negative impacts of plastic on human health and the environment, as well as tips to minimize them, have been active in the media, including social media and on the websites of civil society organizations, e.g.^{35,36,37}

Information about the impact of polymeric materials on human health and the environment are included in the textbooks created in accordance with the requirements of the State Standard of basic and complete general secondary education in the subject «Chemistry» and the current program for teaching chemistry at the standard level, approved by the Ministry of Education and Science of Ukraine.³⁸

The Center for Public Health of the Ministry of Health of Ukraine after the entry into force of the Law of Ukraine «On Restricting the Turnover of Plastic Bags on the Territory of Ukraine»³⁹ (December 10, 2021) prepared the material «Harm from plastic bags for the

33 <https://mistosite.org.ua/articles/vyrobliaty-menshe-iak-vriatuvaty-planetu-vid-plastyku>

34 <https://zwsociety.org/about/>

35 <https://ukraine-oss.com/chomu-plastyk-nebezpechnyj-dlya-zdorovya-lyudyny/>

36 <https://nowaste.com.ua/vpliv-plastik-na-zdorovia/>

37 <https://mistosite.org.ua/articles/vyrobliaty-menshe-iak-vriatuvaty-planetu-vid-plastyku>

38 https://uahistory.co/pidruchniki/savchin-chemistry-10-class-2018-standard-level/34.php#google_vignette

39 <https://zakon.rada.gov.ua/laws/show/1489-20#Text>

environment and human health and how to get rid of bag addiction»⁴⁰ .

This piece discusses the fact that scientists do not yet know the full extent of the negative impacts of plastic waste in order to assess possible scenarios of its impact on public health.

But at the same time, here are some proven facts about the harmful effects of any polyethylene on the human body:

- Lead is used in the production of polyethylene. This metal is extremely toxic. Its accumulation in the body causes the development of many diseases.
- Storing food in polyethylene is not beneficial. Food in a bag begins to spoil faster, mold develops. And when polyethylene is frozen, toxins are released from it. It is especially dangerous to heat semi-finished products in a package: it is proved that under the influence of high temperature formaldehyde, a toxic gas, is released from plastic. In addition, the colors from the labels on the packaging often contain toxins that are destructive to humans.
- Chemical adhesives are often used to join the seams of packaging. It can also have a detrimental effect on the food that is then consumed.

The increased production and use of plastic over the last 20 years has led to an increase in endocrine diseases from the chemicals it contains, these are the so-called endocrine disruptors.

Major endocrine disruptors include persistent organic pollutants, most of which are found in plastic or its breakdown products.

Scientific studies have found that increased birth defects in boys, early puberty in girls, infertility, reproductive health problems in men, cancer, obesity and neurobehavioral disorders have been linked to the effects of these substances.

Thus, the conclusions about the dangers of plastic exist not only in Ukrainian society, but are officially recognized at the state level with the adoption of certain steps to reduce the risks of its exposure.

5.2 Legislatively ensure the existence of sanitary protection zones for plastic production, incineration and waste processing facilities

Order of the Ministry of Health of Ukraine from 19.06.96 № 173 approved the State Sanitary Rules of planning and building of settlements (as amended on 07.03.2019)⁴¹ . Annex No. 4 of these Rules provides sanitary classification of enterprises, industries and facilities and the size of sanitary protection zones for them.

The following requirements have been defined for chemical and plastic production plants:

Class II. Sanitary protection zone 500 m

27. Production of polyethylene and polypropylene based on petroleum associated gas.

40 <https://www.phc.org.ua/news/shkoda-vid-plastikovikh-paketiv-dlya-dovkillya-ta-zdorovya-lyudey-i-yak-pozbutisya-paketnoi>

41 <https://zakon.rada.gov.ua/laws/show/z0379-96#Text>

29. Production of C,C-di-(chloromethyl)oxocyclobutane, polycarbonate, ethylene-propylene copolymers based on petroleum associated gases; polymers of higher polyolefins based on petroleum associated gases.

Class III. Sanitary protection zone 300 m

6. Production of plastic masses (carbolite, chlorvinyl, etc.).

17. Production of polystyrene and styrene copolymers.

The following requirements are specified for sanitary sewerage facilities and public utility installations:

Class II. Sanitary protection zone 500 m

2. Incineration and waste processing plants.

3. Municipal solid waste landfills.

4. Composting areas for solid waste and sewage from the community.

It should be noted that according to the data of monitoring studies of soils in the zone of influence of solid domestic waste landfills, which were conducted by the Center for Disease Control and Prevention of the Ministry of Health of Ukraine, there are significant contamination by harmful chemicals, including from the decomposition of plastics⁴²

For example, in 2017-2020, the number of samples with exceedances of harmful chemicals in soils ranged from 2.3% to 6.1%, and toxic chemicals ranged from 1.5% to 9.5%.

5.3 Availability of data on harmful emissions from the production of plastic and plastic goods

State statistical observation of emissions of pollutants and greenhouse gases into the atmospheric air is carried out by the State Statistics Service of Ukraine in the form No. 2-TP (air) (annual) «Report on emissions of pollutants and greenhouse gases into the atmospheric air from stationary sources of emissions».

The list of emission source categories for compiling Form No. 2-TP (air) (annual) includes the following emission sources associated with plastic and plastic goods manufacturing facilities and possible plastic waste management operations.⁴³

No. of emission source category	Name of emission source categories
019	Chemical industry
037	Production of chemical products
042	Other industrial production
051	composting

42 <https://www.phc.org.ua/news/shkoda-vid-plastikovikh-paketiv-dlya-dovkillya-ta-zdorovya-lyudey-i-yak-pozbutisya-paketnoi>

43 Methodological provisions of the state statistical monitoring of emissions of industrial substances and greenhouse gases into the atmosphere (2022). - <https://stat.gov.ua/uk/datasets/vykydy-zabrudnyuyuchykh-rechovyn-i-parnykovykh-haziv-v-atmosferne-povitrya>

053	Household waste incineration
054	Incineration of industrial waste, including hazardous waste and sewage sludge
055	Medical waste incineration
057	Open burning of waste
059	Other waste operations
060	Other stationary sources of emissions

In general, statistical observation covers emissions of sulphur dioxide, nitrogen dioxide, carbon monoxide, non-methane volatile organic compounds, polyaromatic hydrocarbons, hexachlorobenzene, dioxins and furans, ammonia, substances in the form of suspended solids greater than 2.5 microns and less than 10 microns, substances in the form of suspended solids 2.5 microns and less, as well as emissions of mercury, cadmium, lead, arsenic, chromium, copper, nickel, selenium, zinc.

There are no special difficulties in providing data on harmful emissions from the production of plastic and plastic goods, but, according to the Law of Ukraine «On Official Statistics» (as amended on 16.08.2022)⁴⁴, statistical information obtained from the results of the State Statistics Committee of Ukraine is disseminated **in a consolidated anonymized form**.

In addition, according to Article 30 of the Law of Ukraine «On Official Statistics», primary data on the state of the natural environment obtained by the state statistical authorities from respondents during the conduct of state statistical observation are provided at the request of users, except for restrictions established by law

RECOMMENDATIONS

on the results of the National Inventory of the main sources of plastic pollution in Ukraine

Manufacture of primary plastics

The volumes of annual production of primary forms of plastics in Ukraine before the full-scale invasion of Russia increased, but still about 70% of the needs in primary forms of plastics were covered by their import.

Modern challenges due to global trends and the situation in the country will bring new tasks for the industry in the near future.

In the recovery phase of the country, the demand for construction plastics; general consumer goods; specialty plastics in the health and catering sector; mechanical engineering and railroad track laying is forecast to grow strongly, and therefore the development of the industry requires the search for new solutions and their support at the state level with the

44 <https://zakon.rada.gov.ua/laws/show/2524-20#Text>

involvement of a wide range of specialists and manufacturers, other stakeholders.

There is a need to promote research and innovation that facilitates the transition to more environmentally sustainable solutions in the polymer industry. For example, the production of bioplastics can contribute to a low-carbon and circular economy by creating products that can be recycled/composted. But here, in addition to fully addressing the recyclability of bioplastics, further developments are needed to utilize land, biocides and water in the production of starch-containing plants to produce biobased plastics and address the problem of toxic additives in plastics.

Manufacture of plastic goods

In order to improve and bring national legislation on plastic goods management closer to the requirements of EU legislation, priority tasks may be:

1. Development and adoption by the Verkhovna Rada of Ukraine of the Draft Law of Ukraine “On Restriction of Production and Turnover of Single-Use Plastic Products on the Territory of Ukraine”.
2. Development and approval of a draft act of the Cabinet of Ministers of Ukraine on establishing requirements for labeling and design of packaging, restrictions on the use of hazardous substances in packaging.

It is suggested that producers of plastic products and the expert community identify the sectors of the economy where plastic use is most damaging to the environment and human health and suggest (if available) safer alternatives.

In the future, these developments, in the form of necessity criteria that determine the essentiality of the need for plastic use for specific sectors of the economy and the availability of safe alternatives, to recommend their adoption at the legislative level.

Plastic waste management

Household waste management in Ukraine, which includes plastic waste, is mainly based on low level technologies, which are aimed at its predominant disposal in landfills, in contrast to plastic waste management in EU countries.

Thus, according to the State Statistics Committee of Ukraine, in the period 2019-2023, the volume of disposed/buried plastic waste in landfills and specially designated places and facilities amounted to 5.5 thousand tons; the volume of incinerated plastic waste - 1.6 thousand tons; the volume of recovered/recycled plastic waste amounted to 52.1 thousand tons, but according to independent estimates, these data do not reflect the full picture of plastic waste management in the country.

In order to improve and bring the national legislation on plastic waste management closer to the requirements of the EU legislation, the priority tasks may be:

1. Adoption by the Verkhovna Rada of Ukraine of the prepared draft Law of Ukraine “On Packaging and Packaging Waste”.
2. Development and approval of draft acts of the Cabinet of Ministers of Ukraine on regional and local household waste management plans, which would include positions

on plastic waste management.

3. Development and approval of draft acts of the Cabinet of Ministers of Ukraine regarding the Procedure for functioning of the deposit system for packaging waste.

In order to improve the institutional framework and human resource capacity for plastic waste management, it is necessary to:

1. Assess the existing institutional and administrative capacity to implement legislation on plastic waste management, including an appropriate functional audit of the executive authorities at all levels to establish elements of the system of separate collection of household waste, including plastic waste.
2. Develop and implement plans to strengthen institutional and administrative capacity to implement elements of the system of separate collection of household waste, including plastic waste.
3. Develop and implement professional development programs, trainings/seminars for employees of executive authorities, local self-government bodies and economic entities on plastic waste management.

In order to formulate public policy and create infrastructure for packaging waste management, it is necessary to:

1. to ensure the functioning of the information system for plastic waste management, in particular to create a register of producers of products for which extended producer responsibility has been established and a register of extended producer responsibility organizations that contain relevant sections on packaging waste as defined in the Law of Ukraine “On Waste Management”.
2. Develop and approve national standards for packaging.
3. Ensure infrastructure is in place for collection, storage, preparation for reuse, recycling, other recovery of packaging waste.

To increase consumer awareness on plastic waste management, priority actions can be:

1. Preparation and approval of Methodological Recommendation of sustainable consumption, the development of which is in the work plans of the Ministry of Natural Resources of Ukraine.
2. organizing and carrying out information campaigns for consumers to raise awareness on the management of plastic waste and especially packaging waste.
3. organizing and conducting awareness-raising activities on the management of plastic waste and especially packaging waste in educational institutions at all levels of education (pre-school, general, secondary and tertiary).
4. Engage representatives of civil society organizations, media, social media, retailer networks, etc. to educate and advise consumers on sustainable plastic waste management.

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More information about the project:
www.hej-support/ecca-plastic



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