

Current Recycling Trends in Ukraine

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Surprisingly, Ukraine is the only European country where almost 93% of household waste goes to landfills. **Admittedly, Ukraine has not managed to properly develop in this area so far.** However, this problem **also appears to be** relevant for a **number of states, such as** Romania, Bulgaria, Poland and some other EU countries, **where they still fail to reuse or utilize waste in an efficient and eco-friendly fashion. As a matter of fact, if one seeks for the correct and effective solution to the discussed alarming issue, one should thoroughly analyze the mistakes and success of others who have already leaped forward in terms of ecology and recycling. Evidently, it is impossible to question the value of** the experience of leading foreign companies devel-

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oping various technical means to meet the needs of humanity, technology suppliers and decision-makers. **In fact**, their success stories, proposals and **perspectives on the** current burning issues **may very well enable** Ukraine to **find the most correct and strategically wise starting point**.

According to various estimates, the volume of solid waste in Ukraine **exceeds** 11 million tons (excluding the temporarily occupied territories, the Autonomous Republic of Crimea and the city of Sevastopol), and the rate of waste generation **accounts for** an average of 250–300 kg per year per person.

To address this problem, **in 2016** the government began reforming the field of waste management. At the end of 2017, with the participation of international experts from **the** EU countries, the National Waste Management Strategy and the corresponding plan for its implementation were developed and approved. In early 2019, the government approved the Plan for the implementation of the National Waste Management Strategy and in parallel with the regional state administrations **commenced** preparing regional waste management plans — investment plans for each region of Ukraine.

Thus, the European Union in the Plan for the implementation of the national waste management strategy assigns a significant role to public procurement for the development of the circular economy, which is largely due to their annual volume (**14% of GDP in the EU**). In the countries of the Organization for Economic Cooperation and Development, on average, the total volume of public procurement reaches about 20% of GDP and 15% in countries that are not **the** members of this organization. According to **particular calculations**, public procurement accounts for **approximately** one-fifth of **the** world GDP. In Ukraine, **the statistics** are also significant — almost 13% of GDP. Given such **considerable** volumes, **there is every likelihood that procurement will be able to favour** transformational changes in the market.

In the market, one of the largest fractions of consumers is represented by public customers. Therefore, applying their purchasing power, they can select products that will contribute to the goals of the circular economy and, consequently, sustainable consumption and environmental protection. They can stimulate a critical mass of demand for greener goods, which, otherwise, **would encounter a multitude of difficulties entering the market.** Thus, procurement **can be regarded as** a powerful stimulus for eco-innovation. Compared to other mechanisms to stimulate sustainable development, public procurement is a transparent tool based on the principle of fair competition, so that customers can choose the most advantageous offer.

For example, in the Netherlands, 32 municipalities and 2 provinces have set a goal of achieving 50% of circular procurement by 2025. One of the means of gradual introduction of circular procurement in Ukraine is the development of standard specifications for certain categories of goods that have a high potential for reuse, extension or recycling **in order** to ensure the convenience of customers in organizing such procurement.

Circular procurement should play an important role in achieving the global Sustainable Development Goals by 2030 (which Ukraine has announced), including Objective 12 — responsible consumption and production particularly **aiming** the development of sustainable public procurement.

Such processes are often characterized by the concept **known as** “leasing society”. The introduction of the circularity criterion presupposes that circular purchases will be made according to it.

In Ukraine, it is advisable to implement planning principles in the development of circular procurement, in particular by setting a recommended percentage of procurement to which customers should strive, which is consistent with the practice of **the** EU member states to develop national plans for “green” procurement.

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Ukraine has concluded an Association Agreement with the EU, under which it has committed to increase waste recycling and **reusing** it in the economy. The **predominant objective** of the reforms implemented by Ukraine is to get rid of the dependence on exports of natural resources and goods with a low degree of processing. At the same time, such structural changes make it possible to overcome the influence of those productive forces that, by hindering society and citizens, seek to “freeze” the post-Soviet extensive economic model based on the exploitation of natural resources (fuel, iron ore and other minerals, forests, fertile soils, water **and others**). Responsible business realizes that, according to economic laws, **the prosperity of Ukraine is possible only in the event of its successful integration into** the international economic system and the European economic space.

The Council of the European Union has approved a directive banning the EU from manufacturing certain disposable plastic products for which there is an alternative. It is noted that this is the final stage of the procedure for the adoption of the relevant directive, which was previously voted **for** by the European Parliament. One of the main objectives of this directive **lies in reducing** the amount of plastic waste generated by society. Under the new **regulations**, plastic plates, cutlery, drinking tubes, balloon holders and disposable cotton swabs will be banned **from** 2021.

According to the directive, by 2029, 9 out of 10 used plastic bottles should be collected as sorted waste. Plastic bottles available for sale must also contain at least a quarter of recyclable material by 2025, and 30% by 2030. **Additionally, prosecuting plastic producers and involving the tobacco industry in reimbursement for cigarette butts disposal appears to be a logical and rational following step in accomplishing the set tasks.**

One can distinguish **several** traditional ways of waste management. The first

Type of waste	Processing rate in Ukraine today	The goal by 2030	
		According to the National Strategy	According to Directive 94/62 / EC
Waste in general	12-14%	65%	70%
Glass	15-18%	75%	75%
Paper	22-25%	75%	85%
Metals	1%	75%	80%
Aluminum	3-5%	75%	60%
Plastic	10-12%	60%	55%
Tree	3-5%	65%	30%

and oldest is a burial. This method is **rather** an anti-environmental option. Toxic infiltration waters are formed, while methane enters the atmosphere, **causing** the formation and **exacerbation** of the greenhouse effect. In total, there are 6,000 official landfills in Ukraine, and more than 35,000 unofficial landfills. **Overall**, only 53% of garbage is sent to legal landfills in Ukraine **while remaining** 44% rots in illegal landfills. Legal landfills cover an area of nearly 10 thousand hectares, landfills — approximately 2 thousand hectares. Their total area is 12 thousand hectares (one and a half times more than the area of Chernihiv). The area of Ukraine is about 60 million hectares. The number of overloaded landfills **reaches** 256 units (4.2%), and 984 units (16%) **fail to** meet environmental safety standards. **One must conclude that, unfortunately, certification, as well as reclamation of landfills, is carried out improperly.** *Since 1991, the landfill in need of certification, in 2018, actually certified 157 units (requires certification of 30 % of landfills of their total number). Of the 543 landfills in need of reclamation, 74 were actually reclaimed. (7.7% need reclamation).* The **demand** for the construction of new landfills **exceeds** 421 units. **Owing to** the improper system of solid waste management in settlements, mainly in the private sector, 26.6 thou-

sand unauthorized landfills are occupied annually, **taking up** an area of 0.75 thousand hectares.

The second method is incineration. When **one burns** solid waste, **one** can reduce its volume and **obtain** some energy. However, factories pollute the atmosphere, and ash provides for disposal. Of the 5 incinerators in Ukraine, there is a recycling centre in Kyiv — the Energia plant, which can:

- dispose of about 250 thousand tons of solid waste per year;
- produce up to 220 thousand gcal of heat.

Hence, in terms of the level of solid waste incineration in different countries, Denmark and Switzerland occupy leading positions (Fig. 5.4) — 80% is burned to obtain the necessary energy. They are followed by Japan — 70%, Belgium and Sweden reaching 50%, Austria, Italy and France — 40%, Britain and the United States — 17%, and, **ultimately**, Ukraine — 3%. In particular, Table 5.4 shows that the share of incinerated and disposed waste in the total amount of generated waste as of 2018 **constituted** 29.7%. The target set for 2020 is 35%.

In Ukraine, there are officially 5,455 landfills ~~and landfills~~ with a total area of over 8.5 thousand hectares. In addition, there **exists** information about more than 2,000 illegal landfills.

Most landfills are full, which causes a **critical** need for recycling. In Kyiv, recycling waste, namely incineration, is **performed** by the Energia plant. Yet, it **urgently requires modernization** since the volumes it is able to process are insuf-

(1) Recognizing the shortage, in the 1990s Japan developed its current comprehensive recycling programs. Japanese waste management also relies heavily on waste-to-energy (WTE), the sometimes-controversial practice of burning garbage to generate power and reduce landfill use. While Japan is not the only country to use WTE extensively, it is certainly a leader in the practice: 2011 estimates located 70 percent of the world's WTE plants in Japan, burning about 75 percent of the country's waste. (<https://recyclist.co/blog/travelogue-of-trash-recycling-in-japan/>)

ficient to significantly affect the situation **in** the capital's landfills.

The most famous project for the construction of a modern waste processing plant is the Lviv project. Back in 2016, the mayor of Lviv promised to build such an enterprise. However, the project is expected to be implemented **only** in 2023. By 2022, a waste processing plant should appear in Khmelnytsky. **Still**, according to our information, the construction has not begun yet. Approximately in 2025, another waste processing plant is bound to be erected near Poltava. <https://www.unn.com.ua/uk/news/1926102-pershiy-v-ukrayini-smittyepererobniy-zavod-yak-vin-pratsyuvatime-ta-scho-viroblyatime>

The following Tetra Pak packaging processing plants operate in Ukraine:

- Zmiiv Paper Factory LLC, Kharkiv Region (capacity allows **disposing** of more than 1000 tons of waste per month);
- MPP “Rada”, Kyiv region (partially valid).

Alternative fuel (RDF) or solid secondary fuel is a fuel derived from waste residues. RDF contains high-calorie waste components, such as plastic, paper, cardboard, textiles, rubber, leather, wood **and others**. The caloric content of RDF is 15 ± 19 MJ / kg; the size of the RDF grain is $\sim 20\text{--}25$ mm.; the content of hazardous components in the fuel is strictly controlled and does not exceed the permissible norms. RDF can be used as the main or additional fuel in the furnaces of cement plants, CHP, metallurgical furnaces.

The expediency of using RDF / SRF is determined by: logistics, distance from the fuel producer to the cement plant.

The complexity of using RDF / SRF **is caused by:**

- a lack of relevant legislation in Ukraine;
- Uncertainty of conditions of fuel transfer (sale) to cement plants.

The ecological component of the inclusive circular economy in Ukraine is effectively represented by the electric car market. Interestingly, electric car ownership

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in Ukraine continues to accelerate, making it one of the fastest growing markets in Europe. Ukraine is among the 12 best European countries in terms of the total number of electric cars. The country is also among the top five European countries in terms of the number of electric vehicles in the first seven months of 2019 and the total number of electric vehicles in the first seven months of 2019. More than 90 per cent were **private** cars, and the rest were commercial **ones**. **Essentially**, there are currently about 15,500 electric vehicles in the country. Most of these vehicles remain second-hand **ones** imported from the United States. Much of the country's existing charging stations are too weak to reliably charge the larger-capacity batteries of new electric vehicles **within** a reasonable time. **Therefore**, businesses and consumers are **eagerly** looking for incentives to grow the market. A number of legislative incentives have already penetrated the parliament:

- abolition of customs duties and value added taxes on PO,
- reduction of the car insurance rate by 10%,
- green license plates and specialized lanes,
- parking areas for electric vehicles,
- fines for internal combustion vehicles parked in them.

According to the Federation of Employers of the automotive industry, Nissan Leaf remained the most popular electric car in Ukraine in 2019, controlling half of the market. The relatively cheap vehicle, which is largely imported from the United States, is a favourite of EV seekers and **constitutes** a quarter of electric cars **purchased** by Ukrainians. Vehicles **exploited for** one year and less account for 7 and 6% of the market, respectively.

However, imports of new cars and more expensive market segments are growing slowly:

- Nissan Leaf

- Tesla Model S 12.4%
- e-Golf VOLKSWAGEN
- BMW i3 with 6%
- FIAT 500e

In summary, we can identify three key conclusions about the registration of electric vehicles:

- More electric cars are registered than hybrids.
- The second and third places in the models of electric cars are now occupied by representatives of TESLA, in total every fifth registered clean electric car of this brand.
- In terms of the total number of registrations of “green” cars, Lviv region in 2019 is ahead of Kharkiv region for the second time in a row.

The directions of the state policy for formation of the circular economic environment are represented. And one of them is the introduction of so-called fiscal shifts. The procedure for collecting the environmental tax in 2020 has not changed and is still regulated by Articles 240 – 250 of Section VIII of the Tax Code of Ukraine (hereinafter - TCU). At the same time, in 2019 there were changes in the definition of taxpayers who pay environmental tax in terms of liabilities for emissions of carbon dioxide into the air by stationary sources of pollution and the size of the rates of this tax, as well as mandatory payment of separate environmental taxpayers Annex 1 to the Declaration, in respect of commitments for Carbon Dioxide Emissions under code 19011000.

The green tax on companies that have a negative impact on the environment in Ukraine has been levied since 2011. **In other words**, businesses that emit pollutants into the atmosphere, discharge wastewater, dispose of waste (except for companies that dispose of waste as a secondary raw material) and generate radioactive waste **are forced to reimburse** it. Enterprises dealing with radioactive

waste generated as a result of the Chernobyl disaster are exempt from paying the green tax.

45% of the collected tax is addressed to local budgets while the remaining 55% goes to the state budget. The total amount of tax revenues **reaches circa** 140 million UAH. However, the use of funds in Ukraine **seems to be rather inefficient, and quite frequently environmental activities are not properly financed.** Only \$ 10.5 (out of 140 million) was allocated from the central budget **towards** environmental measures. In particular, \$ 6.9 million was allocated to combat the harmful effects of water. The remaining funds were spent on activities indirectly related to environmental issues. **Alarmingly**, the situation with household waste disposal remains disastrous. According to Ukrvtvorma (Ukrainian Production and Ecological Association for Storage and Use of Secondary Material Resources), last year only 6.6% of household waste was recycled and disposed of in Ukraine: 2.48% incinerated and only 4.18% of household waste was used for procurement of secondary raw materials and incinerators. The rest are still being transported to landfills, many of which **being** in a terrible state. For example, the only Kyiv landfill in the village of Pidhirtsi (Obukhiv district) has been operating for more than 30 years and, **without any exaggeration**, has been **greatly overloaded** for a long time. The landfill has accumulated almost 10 million tons of household waste: the height of the landfill has risen to 90 meters, equal to the height of a 27-storey building. The filtration lake also **represents an extreme danger** because **it is comprised of** a mixture of toxic liquids from the landfill mixed with rainwater. At the moment, the lake has accumulated about 1 million tons of filtrate. **Overall**, there are 5,500 landfills and dumps with a total area of 8.5 thousand hectares in Ukraine. About 10 million tons of garbage is buried there every year, including hazardous waste that is disposed of in landfills, as many areas simply do not have a separate waste collection system. The prob-

lem of oil waste disposal remains unresolved, much of which is burned in furnaces, polluting the environment with thousands of tons of hazardous substances (nitrogen oxides, sulfur dioxide, methane, formaldehyde, hydrogen chloride, carbon monoxide). According to market participants, up to 40% of oil waste is used for heating in Ukraine. Oil waste incineration is banned in Europe.

In Ukraine, there is virtually no system for separate collection of household waste, part of which is packaging waste. There is also no system in Ukraine for the management of hazardous waste and waste **consisting of** electrical equipment and batteries. In addition, 94% of household waste is disposed of in landfills. There are annual losses of secondary raw materials, and the main reason for this is the lack of relevant legislation. As a result, in our country only 12–14% of packaging waste and 3% of solid household waste are processed, and the import of waste paper is 250–350 thousand tons per year. **Furthermore**, it is estimated that each Ukrainian produces 300 kg of garbage annually. **Owing** to the lack of a proper mechanism for recycling garbage and waste in Ukraine, the number (**as well as the area**) of landfills is constantly increasing. **To rescue** the situation, approaches to waste recycling and pricing for these services **must be radically altered as soon as possible**. For Ukrainians, in order to start collecting waste separately, they must be provided with an incentive. For example, **supposing that** a producer pays for the entire product cycle, the consumer will only pay for his own unsorted waste that cannot be recycled. Therefore, the manufacturer, when designing the packaging and packaging the product in it, must understand that **they** must ultimately pay for the processing and disposal of this packaging.

To eradicate the discussed problematic situations in Ukraine, it is first necessary to introduce expanded producer responsibility — a financial and organizational mechanism to ensure the transition to a closed-loop economy: (a) expanded producer responsibility as an effective and economical tool for waste man-

agement; (b) the liability of the manufacturer and importer of the goods for the products even after they have been used; (c) responsibility for the introduction of separate collection, sorting and preparation of products for further processing or safe disposal.

Today, there **exist** several centres for creating a waste management strategy and different models for **diverse** types of waste are considered. However, **it appears to be quite challenging to assess and select the most effective one, as, for all intents and purposes, all three models may very well be successfully employed and bear fruit at the end of the day. Such a conclusion can be drawn taking into account the experience of their implementation in a multitude developed countries. Yet, one should realise that it is impossible to predict which will turn out to be more effective — extended liability or a combined model. In order for the model of extended producer responsibility to function in Ukraine, it is necessary to take a number of strategically important steps, such as spreading the practice of separate garbage collection among the country's population and adopting the bills on waste, which is bound to provide for the establishment of extended producer organizations.**

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