

The New National Action Plan for Waste Management 2016 to 2023 of the Republic of Turkey

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1. The country

The Republic of Turkey has 80.9 million inhabitants, an annual population growth of 1.6% and a mean life expectancy of 75.4 years. In 2017, Turkey had a gross domestic product (GDP) of just under 900 billion USD, making it seventeenth in the world, with a GDP adjusted for purchasing power ahead of South Korea, Spain, Saudi Arabia and Canada at 2 trillion USD. Similarly, the official annual per capita income was 11,000 USD, while the specific GDP, taking purchasing power into account, was 27,000 USD– ahead of Croatia, Romania and Bulgaria, and at a similar level as Latvia. The World Bank thus classifies Turkey as a middle-income country. The growth rate in 2015 was around 6.1 %, in 2016 around 3.2 %, in 2017 approximately 5.1 %, and was unexpectedly high at 7.4 % in the first quarter of 2018. The contribution to GDP of the services sector, the industrial sector, and the agriculture sector were 61.4 %, 31.8 % and 6.7 %, respectively. The state budget showed revenues of 173.9 billion USD and outflows of 190.4 billion USD in 2017, equivalent to a deficit of 2 % of GDP.

Exports of 157.3 billion USD (2017), mainly consisting of motor vehicles, petrochemicals and electronic products, went primarily to Germany (9.8 %), the United Kingdom (8.2 %), Iraq (5.4 %), Italy (5.3 %), the United States (4.7 %) and France (4.2 %). Goods worth USD 196.8 billion were imported during the same period (China 12.8 %, Germany 10.8 %, Russia 7.6 %, United States 5.5 % and Italy 5.2 % resulting in 2017 a foreign trade deficit of 39.9 billion USD. Oil and gas imports account for the largest share of the trade deficit, as only about 30 % of the energy needs can be covered by domestic resources. The total foreign debt amounts to a total of 429.6 billion USD (as of December 31, 2017), the national debt itself corresponds to only about 30 % of GDP. To cover the foreign trade deficit, the country remains dependent on foreign investment for the foreseeable future. The Turkish Lira fell from 0.27 USD in January 2018 to 0.21 USD in June 2018. During the same period, the central bank increased interest rates from 12.5 % to 17.7 %.

Globally, Turkey is in 12th position among donor countries in terms of development assistance.

UNDP forecasts a population of 85 million for 2023, which coincides with the 100th anniversary of the Republic of Turkey. This figure aligns with the 84.3 million inhabitants expected by the Turkish Statistical Office.

Since the parliamentary and presidential elections in June 2018, the presidential constitution has been in force in the country [2, 4, 5, 6].

2. Strategy of the National Waste Management Plan

The waste management action plan drawn up by the Turkish Ministry of Environment and Urban Affairs for the years 2016 to 2023, taking into account relevant international standards, national circumstances and priorities and the appropriate European Union regulatory framework, assumes that the national waste management strategy must meet the requirements of sustainability and integrative action. The hierarchy of avoidance of waste, recovery and disposal is considered as a high priority, so too the polluter pays principle regarding responsibilities and financing issues. In the frame of political and strategic considerations, the plan takes into account various activities such as avoidance of waste, collecting at source, separation, transportation, temporary storage, recovery, recycling, mechanical, biological and thermal treatment and final disposal.

With regard to the waste management policy pursued, it can be stated that in large agglomerations such as Istanbul, Ankara, Izmir and Kocaeli and in a special zone on the Black Sea, where landfills cannot be identified, thermal waste treatment is required. Within ten of Turkey's prosperous provinces, the construction of incineration plants is suggested as first choice but conditional on an annual throughput of at least 0.5 million tonnes.

Bio methanization is planned for the provinces where at least 100 t/day organic waste, including suitable agricultural and waste, can be collected separately and also for larger holiday resorts.

Composting is considered suitable with a separately collected quantity of at least 50 t/d of organic waste.

Other areas that, despite the evident need, are still without a controlled landfill, controlled landfilling must be realized.

The action plan also contains information on hazardous waste, special waste, hospital waste, packaging waste, used tires, accumulators and batteries, end-of-life cars, construction waste as well as excavated soil and so on, and more generally on the amount of relevant investments needed by 2023 [8].

3. Present status and projection

3.1. Municipal waste

According to statistical data, in 2014, the total amount of municipal waste (household waste plus waste similar to household waste) was about 27 million t/a. Of these, only 6 % were recycled, 64 % classified and 30 % illegally dumped.

Landfill gas recovery facilities already exist at 34 landfills. There are currently six composting plants and two bio-methanization plants where separately collected organic waste is treated, plus six mechanical-biological plants for mixed waste. Accordingly, of the total waste accumulation of 74,320 t/d, about 126 t/d are treated biologically, 4,250 t/d mechanically-biologically, 274 t/d thermally, and the remaining amount of 69,670 t/d are landfilled.

The amount of municipal waste is expected to increase to 30 million t/a in 2018 and to 33 million t/a in 2023. From today until 2023, the recycling rate is to be successively raised to 35 %, with the remaining waste to be landfilled in an controlled manner. The aim is, during the same period, to increase the amount of mechanically treated household waste to 11 % and the thermally treated amount to 8 %, while the deposit rate to decrease from today 88.7 % to 65 %.

Illegal dumps should be gradually rehabilitated. In the future construction waste and excavated soil are to be treated and increasingly reused. The efficiency of hazardous waste collection and recovery should be increased as soon as possible.

3.2. Used packaging

Currently, 4.2 million tonnes of packaging waste are collected per year, of which 2.4 million tonnes are collected by municipalities.

For 2023, it is planned to collect 4.6 million tonnes of packaging waste at the point of origin. The goal is to achieve a recycling rate of 60 % for glass, plastic, metal and paper/cardboard, and 15 % for wood.

3.3. Hazardous waste

In 2014, a volume of hazardous waste of 1.4 million t/a is estimated to have been produced; for 2023, this is projected to increase to 2.3 million t/a. At present, the largest share (513,101 t/a) is related to the metal industry. According to statistical data, 73 % of the declared total were recovered and 22 % were landfilled or incinerated.

In İzmir and in İzmit, two incineration plants with a total capacity of 42,678 t/a are in operation. In Bursa and Tekirdağ, two additional incineration plants (18,000 t/a and 47,200 t/a) are used only for industrial waste, while a degasification plant (100,000 t/a) exists in Ankara. Of the seventy-one cement plants in the country, thirty-five are licensed to accept certain types of hazardous waste. Also eight controlled industrial landfills are available.

The action plan requires the construction of three new incinerators for hazardous waste, not far from the relevant industrial centers in the regions Marmara, Aegean and Mediterranean.

3.4. Special waste and other waste

In 2014, the amounts of special waste were recorded as follows:

special waste	t/a
vegetable waste oils	15,200
waste oil	17,750
industrial oils	29,710
batteries	555
accumulators	61,300
used tires	120,425
electronic scrap	22,000
excavated soil plus construction waste	100 million
biomass from the forestry	4.8 million
agricultural biomass	15.4 million
scrap vehicles	11,998

Table 1:

Amounts of special waste 2014

It should be mentioned that in 2015, approximately 105,180 tonnes of scrap tires were recycled and 29,500 tonnes were incinerated at thirty-one licensed cement factories.

The battery volume marketed in 2014 amounted to 9,000 t/a. Of these, 555 t/a were separately captured and disposed of. Sixteen licensed facilities are available for the treatment of used batteries, where in 2015 about 71,444 tonnes were collected and 42,866 tonnes of lead were recovered.

Producers are responsible for collection, transport, recovery and disposal of industrial waste oils and motor oils. A private company is contracted to fulfil these tasks. This company already owns thirty-three facilities and, in 2014, was able to handle around 47,460 tonnes of such waste.

In 2014 the consumption of vegetable oil was estimated to be 1.7 million t/a, of which approximately 15,200 tonnes could be collected as waste oil.

Used vehicles were recycled to about 90 %. There are seven treatment plants and one-hundredandseventeen temporary scrap yards available.

Turkey has seventy-one licensed facilities that accept and recycle electronic waste. In 2015, they were able to absorb around 28,000 tonnes of such waste.

Due to the immense construction activity everywhere in the country, new facilities to treat landfill construction waste plus excavated soil have to be erected.

3.5. Hospital waste

The amount of hospital waste is estimated to rise from 91,044 tonnes in 2014 to 137,410 tonnes in 2023.

There are currently fifty-six sterilization plants and three special incinerators with a total capacity of 200,000 t/a in operation. This means, there is no need for new treatment capacities until 2023 and beyond [8].

4. Estimated investment needs and responsibilities

Achieving the waste management objectives requires significant investments, especially with regard to organization and new treatment facilities necessary. Table 2 shows the estimated investment requirements for various treatment plants of municipal solid waste.

Table 2: Estimated investment requirements for municipal solid waste

Area	capacity required	estimated investing requirements	
	t/d	EUR/t	million EUR
Used packaging	12,509	5-50	114,1 - 228,3
Biological plants	4,050	75-200	110,9 - 295,6
Mechanical-biological plants	7,250	100-150	264.6 - 396.9
Thermal treatment	8,046	300-450	881.0 - 1321.6
Controlled landfill	67,732	15-25	370,8 - 618,1
Total			1,741.5 - 2,860.5

Municipal waste management is financed by means of a so-called environmental clean-up tax. Its amount is directly linked to household water consumption and is currently 0.27 TRY/m³ for large cities, which is around 0.054 EUR/ m³ (June 2018), and in other cases 0.25 TRY/m³. Ten percent of this amount goes to the Ministry of Environment and Urban Affairs and ninety percent to the municipality. In this way, on average, about one-quarter of the actual relevant expenditure of the municipality is covered; the remainder must be covered by the general municipal budget. Since such an approach only partially fulfils the *polluter pays* principle, the current consideration is to establish a landfill charge and/or to increase the specific tax on measured water consumption [8].

It should also be mentioned that İller Bankası (Provincial Bank) is authorized to support municipalities meet their financing needs.

In the case of hazardous waste too, the principle of producer responsibility, supplemented by the responsibility of the marketer, is relevant.

5. The EU recycling law and comparison

In May 2018, the European Council adopted the revised Circular Economy Act Package. The Waste Framework Directive, the Packaging and Packaging Waste Directive, the Directive on Landfills and End-of-life Vehicles, on Batteries and Accumulators, including Waste Batteries and Used Batteries etc. have been amended. The requirements for the separate collection of material groups have been extended; used textiles were also included in the catalog, as well as the obligation to separate organic waste from 2024 onwards. The output-oriented recycling target for 2025 has been ambitiously set at 55 % and at 60 % for 2030. In addition, starting in 2035, not more than 10 % of municipal waste may be dumped. The new packaging directive prescribes, by the end of 2025, recycling rates of 50 % for plastics and aluminum, 70 % for ferrous metals, 70 % for glass, 25 % for wood and 75 % for paper plus cardboard. These recycling quotas will continuously rise until 2030.

It is to be expected that many of EU Member States, confronted with the new requirements will face implementation challenges, particularly those that until now have not been able to meet the previous requirements. Efforts must be increased significantly and waste management investments multiplied. It should be remembered, for example, that five of the EU Member States still directly landfill around 75 % of municipal waste, and that in ten European Union countries, the current landfill quota is over 50 % (EU average 24 %) [3, 7, 9].

The recycling rates varied in the Member States in 2016, reaching 7.1 % in Malta, 13.3 % in Romania, 17.0 % in Greece and 17.2 % in Cyprus, while in 18 countries it ranged from 20 % to 50 %; only five Member States achieved quantities more than 50 %.

in the past, the EU had considered that what was collected and sorted for recycling as recovered. Now, only waste that is actually recycled will be considered as recovered. This will make it even more difficult for many of the EU member states to fulfill the new EU regulations in the future. This also applies to Germany, where, for example, according to the old definition, a recycling quota of 66.1 % was achieved in 2016. On the other hand, the German Council for Sustainable Development considers a recovery rate of 41 % as a realistically achievable quota for Germany. [1]

Taking all these facts into account, Turkey can be certified as having a similar overall approach to waste management as the lower mid-field of EU Member States, and considering the relevant EU principles, including the waste hierarchy, that it is following an acceptable and realistic path toward an advanced solid waste management adapted to the circumstances of the country.

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