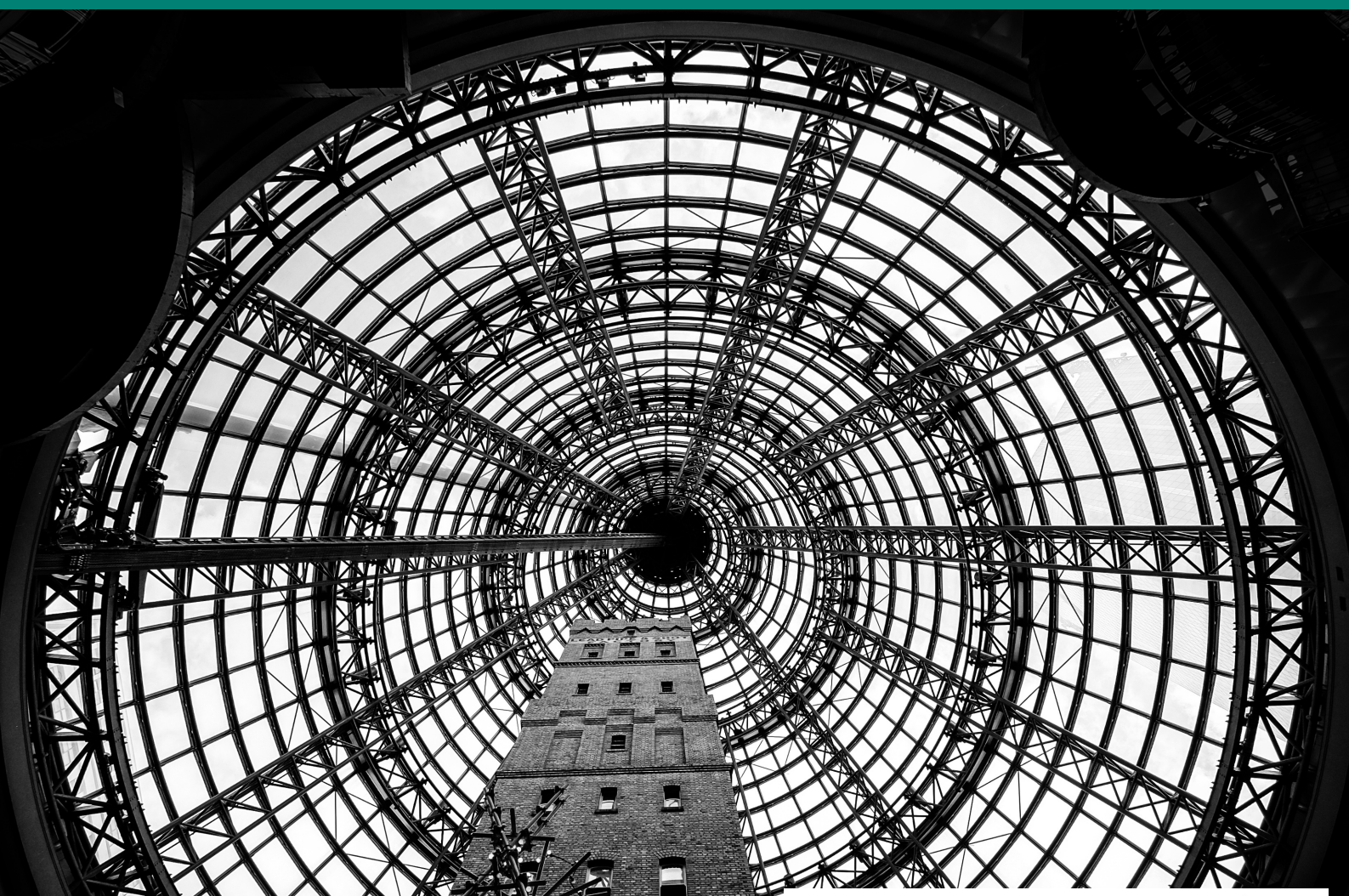


Resource efficiency and circular economy in Europe – even more from less

An overview of policies, approaches and targets of Turkey in 2018



European Environment Agency
European Topic Centre on Waste and
Materials in a Green Economy



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Acknowledgements

This country profile is based on information reported by the Eionet network and, in particular, the National Reference Centres on Resource Efficiency and Circular Economy. The information is current as of March 2019, when members of Eionet verified the content of this profile.



This country profile was prepared as part of the 2019 EEA review of material resource efficiency, circular economy and raw material supply policies, which aimed to collect, analyse, and disseminate information about experience with the development and implementation of these policies in EEA member and cooperating countries.

At the time of writing, a summary report is being finalised. The report reflects on trends, similarities and differences in policy responses, showcases selected policy initiatives from member countries and identifies possible considerations for the development of future policies.

These country profiles were compiled and finalised by members from the European Topic Centre on Waste and Materials in a Green Economy, namely Bart Ullstein, Bettina-Bahn Walkowiak, Jeroen Gillabel, Margareta Wahlström, Jutta-Laine Ylijoki, Dirk Nelen, Theo Geerken, Veronique Van Hoof and Evelien Dils. The responsible EEA project managers for the work were Pawel Kazmierczyk and Daniel Montalvo.

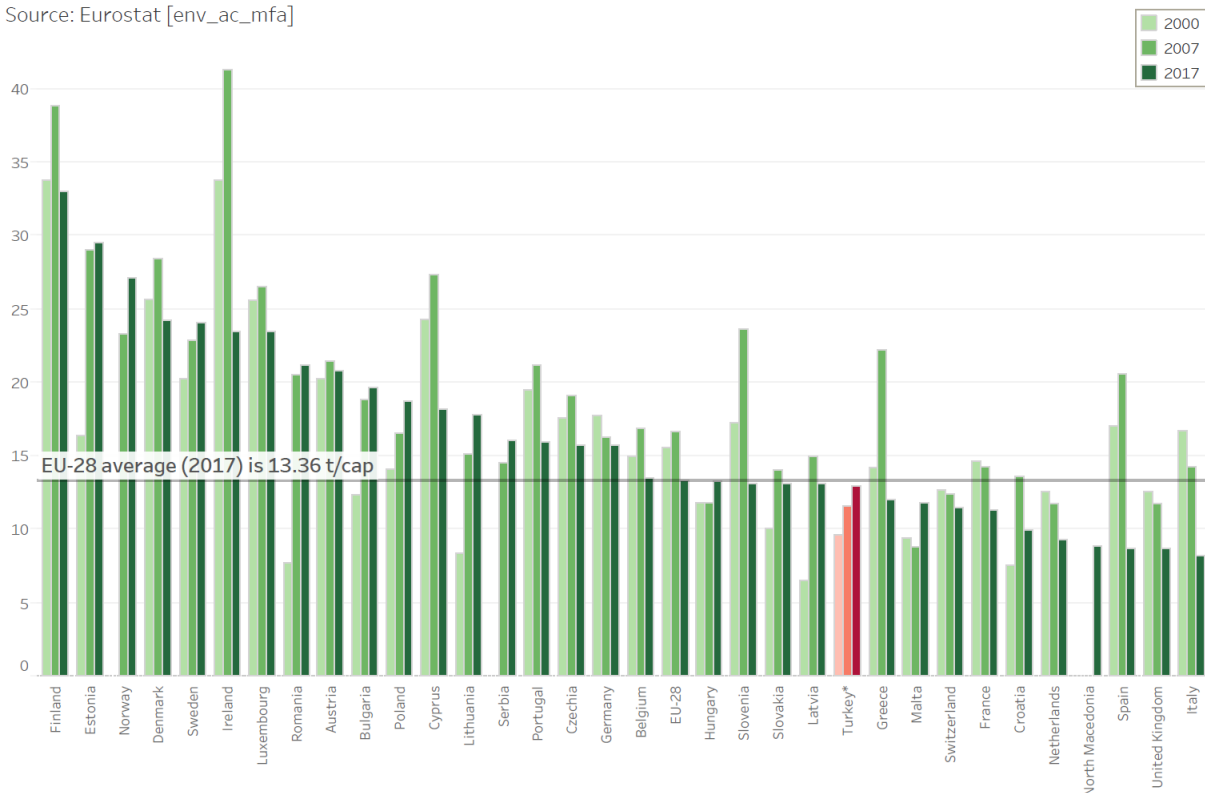
Turkey, facts and figures

Note: data in this section was sourced from Eurostat databases, except where noted otherwise. Some data for the figures of Turkey are only available up till 2016

	<p>GDP: EUR 753.9 billion</p> <p>Per capita GDP: EUR 9,447 Euro (purchasing power standard)</p> <p>Use of materials (domestic material consumption (DMC)) 1,022.6 million tonnes DMC 12.9 tonnes DMC/capita</p> <p>Structure of the economy: agriculture: 6.9 % industry: 32.9 % services: 60.2 %</p> <p>Surface area: 783.6 thousand square kilometres (km²)</p> <p>Population: 79.8 million</p>
	

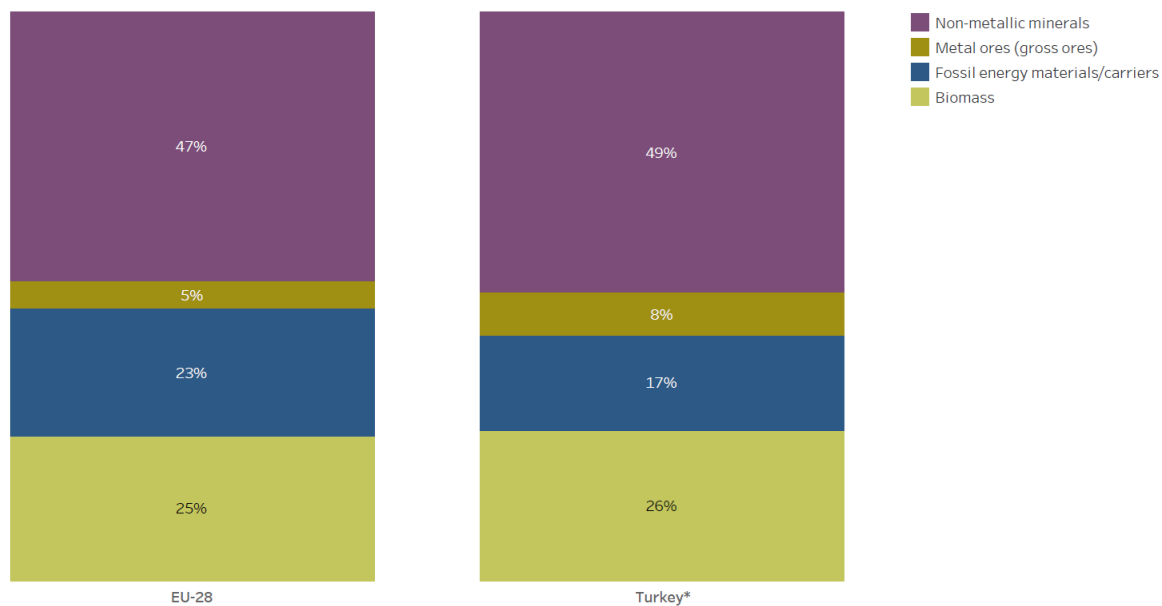
Use of materials (DMC) per person in Europe, 2000, 2007 and 2017, tonnes DMC per capita.

Source: Eurostat [env_ac_mfa]



EU-28 & Turkey*. Domestic Material Consumption by material category, 2017.

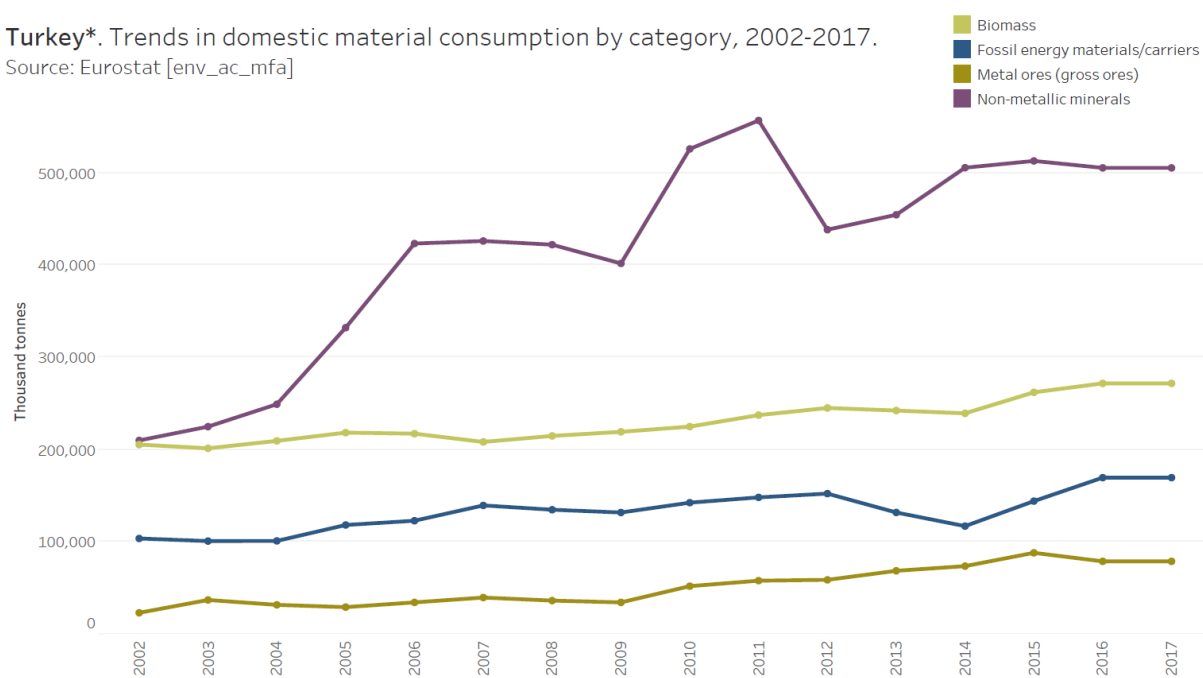
Source: Eurostat [env_ac_mfa]



Note: The domestic material consumption categories 'other products' and 'waste for final treatment and disposal' are excluded from the figure.

Turkey*. Trends in domestic material consumption by category, 2002-2017.

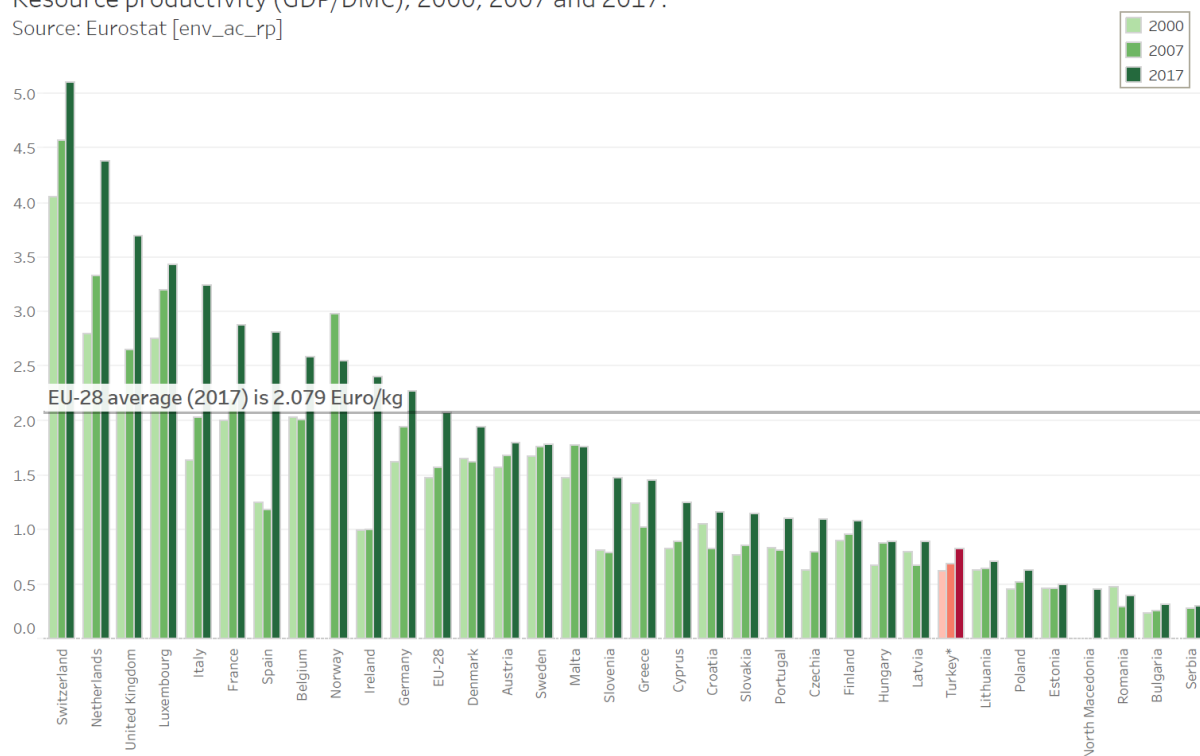
Source: Eurostat [env_ac_mfa]



Note: The domestic material consumption categories 'other products' and 'waste for final treatment and disposal' are excluded from the figure.

Resource productivity (GDP/DMC), 2000, 2007 and 2017.

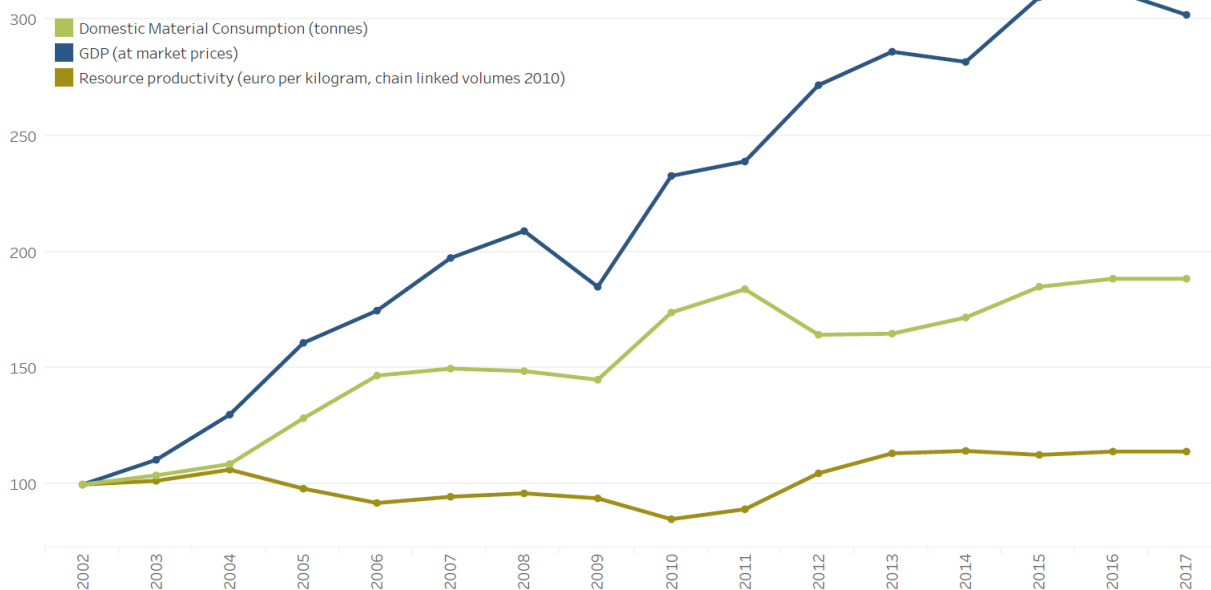
Source: Eurostat [env_ac_rp]



Note: GDP expressed in chain linked volumes 2010.

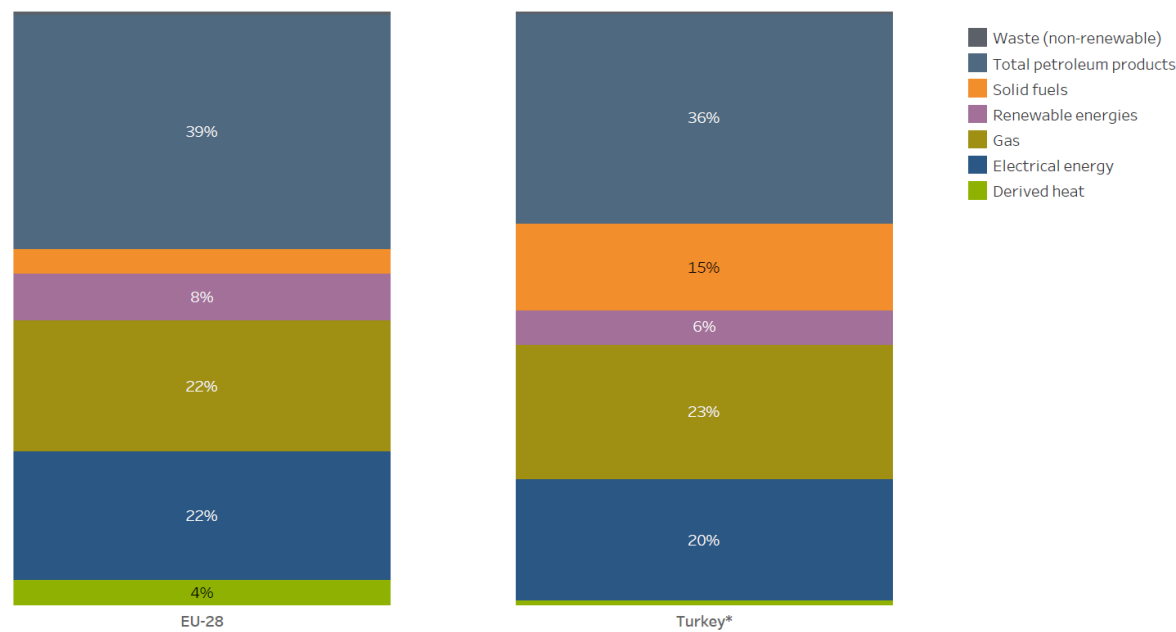
Turkey*. GDP, DMC and resource productivity trends, 2002-2017, index 2002=100.

Source: Eurostat [env_ac_mfa], [env_ac_rp] & [nama_10_gdp]



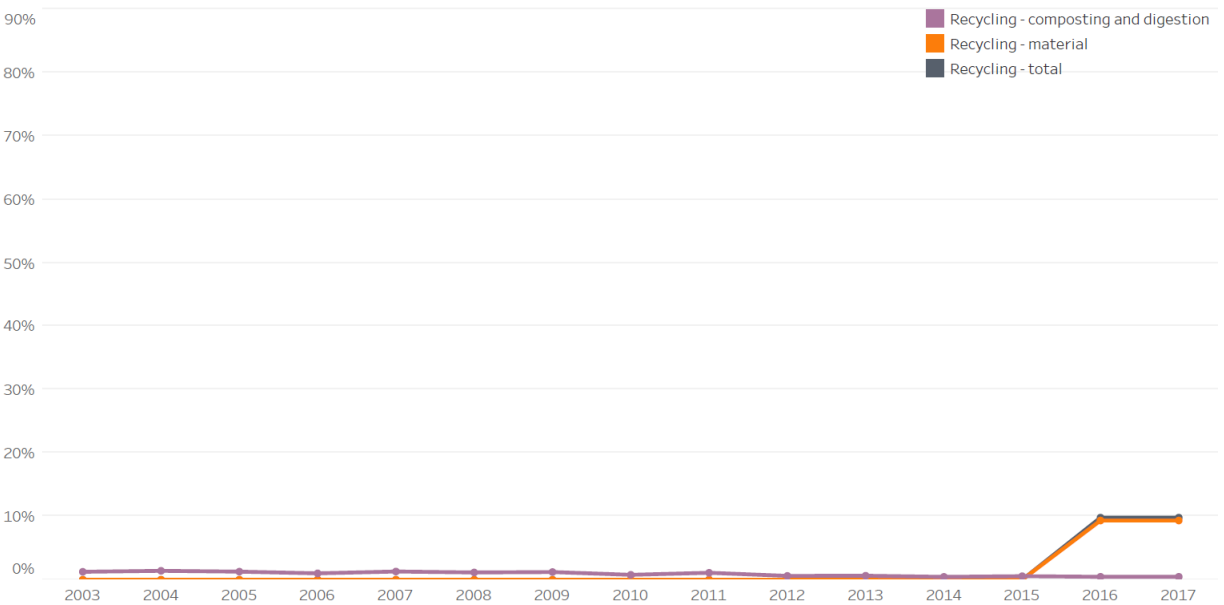
EU-28 & Turkey*. Primary energy consumption by energy product, 2016.

Source: Eurostat [nrg_100a]



Turkey*. Recycling of municipal waste, 2003-2017, as share of total waste treatment.

Source: Eurostat [env_wasmun]



Note: The amount of municipal waste treatment is reported for the treatment operations incineration (with and without energy recovery), recycling, composting and landfilling.

Policy framework

Driving forces for material resource efficiency and circular economy

- **Import dependency in intermediate goods**

Import dependency in intermediate goods is one of the main driving factors for resource efficiency and circular economy. The share of imported intermediate goods in Turkey's gross domestic product (GDP) increased from 13.6 per cent (10.1 per cent non-energy) in 2000, to 22.4 per cent (15.6 per cent non-energy) in 2011. The upward trend is the main concern driving the Programme for Reducing Import Dependency. Effective use of domestic natural resources and recycling of waste for the sake of the economy are some of the measures identified by the Programme.

- **Domestic savings and avoiding waste**

Increasing domestic savings and avoiding waste is another motivating factor that drives resource efficiency measures. The current domestic savings rate in Turkey is below 15 per cent and considered by the Programme for Increasing Domestic Savings and Avoiding Waste to be low compared to countries with similar incomes and those experiencing rapid growth. Accordingly, the Programme identifies wastes that correspond to inefficient use of available resources, as one of the leading factors for the decrease in domestic savings and the pressure on natural resources. The Tenth Development Plan, as well as many other national policy documents, aims to improve waste management through waste reduction, better separation at source, and improved collection, transportation, recycling and disposal systems.

- **Pressure on the environment and natural resources**

Economic growth, population growth, rapid industrial and technological development and changes in production and consumption patterns put pressure on the environment and natural resources. The Tenth Development Plan addresses these pressures and highlights the need for enhancing planning, implementation, monitoring and supervision processes for environmental and natural resource management. The Plan also emphasises the need for removing overlapping authorities and strengthening cooperation between institutions.

- **Meeting the targets, goals and objectives set by national policy**

Complying with national policy and meeting the targets and goals set by relevant policy documents are also amongst the main driving factors for resource efficiency.

- **International progress/trends**

Relevant international processes such as the 10-Year Framework of Programmes on Sustainable Consumption and Production and the UN Sustainable Development Goals (SDGs), as well as the EU harmonisation process (especially reaching recycling targets), contribute to national efforts.

Dedicated national strategies or roadmaps for material resource efficiency and a circular economy

Turkey has not adopted a dedicated national material resource efficiency/circular economy strategy, action plan or roadmap.

Overview of dedicated national or sectoral strategies for raw materials

The Input Supply Strategy and Action Plan (2017–2019) has been prepared by the Ministry of Economy and other relevant ministries¹.

¹https://www.ekonomi.gov.tr/portal/content/conn/UCM/path/Contribution%20Folders/web/%C4%B0hracat/%C4%B0D%C3%9CS/Gites/gites_raporu.pdf?lve&parentPage=ihracat& (Turkish)

The Iron, Steel and Non-Iron Metals Strategy and Action Plan (2012–2016) has been updated by the Ministry of Science, Industry and Technology and the new version for 2018–2021 is undergoing the approval process.

The Draft Ceramics Strategy and Action Plan (2018–2021) has been prepared and is undergoing the approval process.

Policies which include elements of material resource efficiency

Tenth Development Plan (2014–2018) and its relevant Priority Transformation Programmes²

- Programme for Enhancing Productivity in Manufacturing
- Programme for Reducing Import Dependency
- Programme for Increasing Domestic Savings and Avoiding Waste
- Programme for Energy Efficiency Improvement
- Programme for Enhancing Efficiency of Water Use in Agriculture

The Tenth Development Plan (2014–2018) is a milestone in advancing Turkish society to high levels of prosperity. One of the main axes of the Plan is sustainability, and the Plan is based on a human-centred development approach. One of the main objectives of the Plan is to accelerate the increase in welfare and ensure high and stable growth with a long-term perspective.

The main strategy for high and stable growth is developing the private-sector-led, open and competitive production structure. The main objective is to form a labour market in which decent job opportunities are provided to all segments of society, the skills of the labour force are upgraded and utilised effectively, gender equality and occupational health and safety conditions are ameliorated and flexicurity is embraced. For sustained, inclusive and sustainable economic growth, a green growth perspective is to be ensured through exploiting the potential of environmentally-friendly approaches in terms of new job opportunities, income sources, product and technology development in areas such as energy, industry, agriculture, transport, construction, services and urbanisation.

The Plan sets a specific objective to support sustainable consumption and production by encouraging environmentally-friendly products in public procurement.

In order to foster innovation and green manufacturing in domestic firms, public procurement is to be used as an effective tool. Practices towards improving environmental consciousness, especially protection of nature and support of sustainable consumption, has been promoted during the period 2014–2018. Environmental sensitivity and quality of life are to be improved through practices such as waste and emission reduction; energy, water and resource efficiency; recycling; prevention of noise and visual pollution; and the use of environment-friendly materials in line with sustainable urban approaches.

Developing greener production capacity through green technology and sustainable production are also objectives. The government of Turkey regards the new sustainable development agenda as a unique opportunity to advance its development objectives both at national and international levels.

Strategies and action plans

- Input Supply Strategy and Action Plan (2013–2015)³
- Productivity Strategy and Action Plan (2015–2018)
- Industry Strategy Paper (2015–2018)

²<http://www.mod.gov.tr/Pages/content.aspx?List=106b84f3%2D3a88%2D4a71%2Dbb9b%2D090a7bca5542&ID=5&Source=http%3A%2F%2Fwww%2Emod%2Egov%2Etr%2FPages%2FDevelopmentPlans%2Easpx&ContentTypeId=0x01006B34392831415F499C9D04E36A573089> (Turkish)

³ <http://www.resmigazete.gov.tr/eskiler/2012/12/20121225-28-1.pdf> (Turkish)

- National Eco-Efficiency/Cleaner Production Program (2014–2017)
- EU Integrated Environmental Approximation Strategy (2007–2023)
- National Recycling Strategy and Action Plan (2014–2017)⁴
- National Waste Management and Action Plan (2016–2023)⁵

The National Waste Management and Action Plan sets goals for local authorities in all 81 provinces towards an integrated waste management system, which will require more recovery, recycling and energy production from waste and accordingly limit the number of sanitary landfills needed as is aimed at in circular economies. The National Waste Management and Action Plan presents general plans in the waste management sector for municipal waste as well as packaging, medical and hazardous waste. This Plan, which functions as a roadmap for investment, also includes information regarding the location, time frame and required capacity of plants to be built. A national strategy is to be developed on the reduction of biodegradable waste disposed of in landfills. Regional waste management plans will also be prepared, taking into account waste management systems at the national level.

Laws and regulations

- The Environment Law, 1983⁶

The Environment Law was published in the Official Gazette of the Republic of Turkey on 11 August 1983. Its purpose is to protect and improve the environment, which is a common asset of all citizens; make better use of, and preserve land and natural resources in rural and urban areas; prevent water, land and air pollution by preserving the country's vegetative and livestock assets and natural and historical richness; organise all arrangements and precautions for improving and securing health, civilisation and the living conditions of present and future generations in conformity with economic and social development objectives, and based on certain legal and technical principles.

Under the Environment Law, in order to use natural resources and energy efficiently during all kinds of activities, it is essential to use environmentally compatible technologies that reduce the generation of wastes and recover them. Waste producers must take appropriate measures and employ technologies to minimise their waste. According to Article 11, it is essential to collect and recover waste at its source separately as the production and the hazards of the waste materials are reduced or prevented. The principles for all the above-mentioned issues are defined by the by-laws issued by relevant ministries. Both the regulations and the communiqués prepared by the ministry are binding, as listed below⁷.

- By-law on Waste Management, 2015;
- By-law on the Control of Medical Waste, 2017;
- By-Law on Mining Waste, 2015;
- By-law on the Control of Packaging Waste, 2011;
- By-law on the Control of Waste Oils, 2008;
- By-law on the Control of Used Batteries and Accumulators ,2004;
- By-law on the Control of Waste Vegetable Oils, 2005;
- By-law on the Control of Excavated Earth, Construction and Demolition Waste, 2004;
- By-law on the Control of polychlorinated biphenyls (PCBs) and polycyclohexylenedimethylene terephthalates (PCTs), 2007;
- By-law on the Control of End-of-Life Tyres, 2006;
- By-Law on the Control of End-of-Life Vehicles (ELVs), 2009;
- By-Law on Control of Waste Electrical and Electronic Equipment (WEEE), 2012;
- By-Law on Landfilling of Waste, 2010;

⁴ <http://www.resmigazete.gov.tr/eskiler/2014/12/20141230M1-12-1.pdf> (Turkish)

⁵ <http://cygm.csb.gov.tr/ulusal-atik-yonetimi-ve-eylem-plani-2016-2023-hazirlandi.-haber-221234> (Turkish)

⁶ <http://www.lawsturkey.com/law/environment-law-2872> (English)

⁷ <https://www.csb.gov.tr/gm/cygm/index.php?Sayfa=sayfa&Tur=webmenu&Id=266> (Turkish)

- By-Law on Incineration of Waste, 2010.
- Communiqué on civic amenity centers;
- Communiqué on compost;
- Communiqué on mechanical biological treatment (MBT), Biodrying, Biyomethanisation Plants and Management of Fermented Products;
- Communiqué on some non-hazardous waste;
- Communiqué on waste derived fuel and alternated raw material⁸.

The Ministry of Environment and Urbanization (MoEU), General Directorate on Management of Environment, Waste Management Department, is responsible for the procedures and principles pertaining to the definition of the wastes along with their collection, commencing with their treatment, temporary and intermediate storing, recovery, reuse, transportation, disposal, control after disposal, export, transit passage, packaging, labelling, inspection and preparation for management.

Institutional setup and stakeholder engagement

Responsibility for resource efficiency is dispersed between various ministries and public institutions, namely:

- Ministry of Development;
- Ministry of Science, Industry and Technology;
- Directorate General for Productivity, accordance with the duties specified by the Law No: 649, supports cleaners production projects, develops indicators and statistics about productivity and cleaner production/eco-efficiency;
- Ministry of Energy and Natural Resources;
- Ministry of Environment and Urbanisation;
- Ministry of Forestry and Water Affairs.

A range of ministries function as the main actors due to the cross-cutting nature of resource efficiency topics. No specific ministry has been appointed as the coordinating body and coordination between the main actors is relatively poor. Uncertainties, inadequacies and overlaps in the duties, power and responsibilities of the different ministries need to be resolved.

Most of the plans, programmes and strategy papers are prepared using a participatory approach with contributions from public institutions and organisations, in addition to many representatives from all segments of society. Processes are designed to be as transparent and inclusive as possible.

Approaches to resource efficiency and circular economy policy evaluation

Regulatory impact analysis (RIA) has been prepared for packaging waste, WEEE and waste batteries and accumulators, and landfill directives, through relevant projects, namely: Strengthening Institutional Capacity for Environmental Management in Turkey (2014–2016), Capacity Building in the Field of Environment (2009–2012) and the Project for Supporting Turkey on Air Quality, Chemicals and Waste of the Ministry of Environment and Urbanization. Under the Capacity Building in the Field of Environment Project, a sectoral impact analysis (SIA) has also been prepared for waste batteries and accumulators for the period 2011–2030, by the Regional Environment Center (REC).

⁸ <https://www.csb.gov.tr/gm/cygm/index.php?Sayfa=sayfa&Tur=webmenu&Id=267> (Turkish)

Monitoring and targets

Targets for resource efficiency and circular economy

Reuse, recovery and recycling targets set by the By-Law on the Control of End of Life Vehicles (ELVs)

Article 16 – (1) Parts from ELVs are reused if they comply with environmental and vehicle safety standards. Parts which are not reused are recycled or recovered. These steps are taken in conformity with environmental requirements such as emission and noise controls. Financial operators follow these criteria:

a) reuse and recovery shall be 85 per cent by average weight per vehicle and year and reuse and recycling shall be a minimum of 80 per cent by average weight per vehicle and year for ELVs;

c) starting 1/1/2020, reuse and recovery shall be increased to a minimum of 95 per cent by average weight per vehicle and year and reuse and recycling shall be increased to a minimum of 85 per cent by average weight per vehicle and year for ELVs.

Recycling and recovery targets set by the By-Law on Control of Waste Electrical and Electronic Equipment (WEEE)

Article 16

- (1) EEE producers meet the recycling and recovery requirements of Tables 1 and 2. These rates are estimated by average weight.
- (2) Whole appliances shall not be taken into account for the calculation of the targets set out above.
- (3) The Ministry sets the recycling and recovery targets for the medical devices given in the tables on the basis of financial data, experience and the advice given by producers.

Table 1: Recycling targets for 2013 and 2018

Electrical and electronic equipment categories	2013	2018
	% by weight	
Large household appliances	65	75
Small household appliances	40	50
Information technology (IT) and telecommunications equipment	50	65
Consumer equipment	50	65
Lighting equipment	20	50
Gas discharge lamp	55	80
Electrical and electronic tools	40	50
Toys, leisure and sports equipment	40	50
Medical devices	–	–
Monitoring and control instruments	40	50
Automatic dispensers	65	75

Table 2: Recovery targets for 2013 and 2018

Electrical and electronic equipment categories	2013	2018
	% by weight	
Large household appliances	75	80
Small household appliances	55	70
IT and telecommunications equipment	60	75
Consumer equipment	60	75
Lighting equipment	50	70
Gas discharge lamp	70	80
Electrical and electronic tools	50	70
Toys, leisure and sports equipment	50	70
Medical devices	–	–
Monitoring and control instruments	50	70
Automatic dispensers	70	80

Recycling Targets set by the Regulation for Control of Packaging and Packaging Waste

In compliance with the 94/62/EC Packaging and Packaging Waste Directive, the Regulation for Control of Packaging and Packaging Waste sets annual recovery targets for glass, plastic, metal, paper/cardboard and wood.

Legislative targets for recycling of packaging waste according to Turkish law that respond to the EU Packaging Waste Directive are shown in Table 3:

Table 3: Targets for recycling of packaging waste in Turkey as % of generated material

	Glass	Plastic	Metal	Paper/cardboard	Wood
2005	32	32	30	20	-
2006	33	35	33	30	-
2007	35	35	35	35	-
2008	35	35	35	35	-
2009	36	36	36	36	-
2010	37	37	37	37	-
2011	38	38	38	38	-
2012	40	40	40	40	-
2013	42	42	42	42	5
2014	44	44	44	44	5
2015	48	48	48	48	5
2016	52	52	52	52	7
2017	54	54	54	54	9
2018	56	56	56	56	11
2019	58	58	58	58	13
2020	60	60	60	60	15

Indicators to monitor progress towards a resource-efficient circular economy

Turkey has used/compiled Eurostat-derived material flow accounting (MFA) indicators since 2009. TurkStat provides MFA data for domestic extraction, domestic processed output, direct material input (DMI) and domestic material consumption (DMC). Data for 1990–2015 are available at both the TurkStat⁹ and Eurostat¹⁰ websites.

Domestic Material Consumption measures the total amount of materials in tonnes used by the economy – defined as the annual quantity of raw materials extracted from the domestic territory, plus all physical imports and minus physical exports. It is considered the most important indicator for monitoring material resource efficiency since GDP divided by DMC is used as the headline indicator of resource productivity. Turkey also plans to compile raw material consumption (RMC) and material footprint data.

Complementary indicators such as water productivity, waste intensity and waste recovery rates are also in use. The Ministry of Science, Industry and Technology launched a new set of indicators in 2015 to monitor sustainable production trends in Turkish manufacturing. Sustainable production indicators are designed as the ratio of several environmental variables to the economic variable (value added at constant prices) to measure resource use (water) and pollution generation per unit of economic output. Indicators are also expected to show whether there has been any decoupling of water use and pollution generation from economic growth. Water productivity is defined as value added by economic activity divided by total water withdrawn by the main manufacturing sectors. The unit of measurement is the Turkish Lira at constant prices per cubic metre. Waste intensity is defined as the amount of total waste and hazardous waste generated by the main manufacturing sectors divided by value added by economic activity. The unit

⁹ <http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=16124> (biennial press release in English)

¹⁰ <http://ec.europa.eu/eurostat/web/environment/material-flows-and-resource-productivity/main-tables> (English)

of measurement is kilograms per Turkish Lira (at constant prices). The waste recovery rate is defined as total waste recovered as a percentage of total waste generated by the main manufacturing sectors. The indicators cover the main manufacturing sectors as defined by NACE Rev. 2. and are based on 2008–2014 TurkStat data¹¹.

TurkStat also plans to monitor progress towards a resource-efficient circular economy by using both UN global SDG indicators and related indicators from the EU SDG indicator set, thus tracking national indicators that will benefit from both regional and global monitoring.

Indicators related to a resource-efficient and circular economy

Indicator considered as identical to (i), similar to (s) or part of (p) a UN global SDG indicator as agreed by the United Nations Statistical Commission:

11.52. Recycling rate of municipal waste – **Sustainable Development Goal (SDG) 11.6.1 (p)**;

12.10. Generation of waste excluding major mineral wastes – **SDG 11.6.1 (s)**;

12.11. Recycling and landfill rate of waste excluding major mineral wastes – **SDG 12.5.1 (s)** ;

12.40. Resource productivity – **SDG 8.4.2-12.2.2 (s)**.

Other productivity indicators

07.30. Primary energy consumption; final energy consumption by sector;

07.32. Final per capita energy consumption in households;

07.33. Energy dependency;

07.35. Energy productivity – **SDG 7.3.1 (s)**.

Other related environmental indicators (including pollution)

06.41. Water exploitation index (WEI) – **SDG 6.4.2 (s)**.

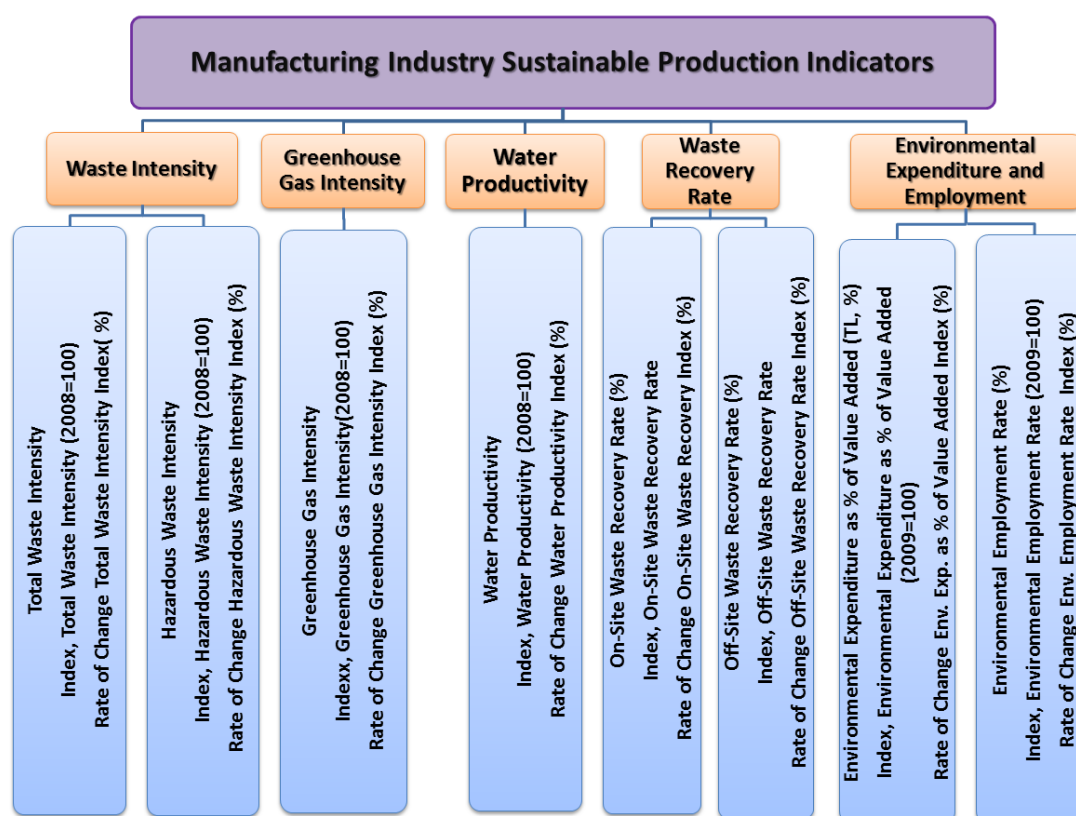
Manufacturing Industry Sustainable Production Indicators (MoSIT DGP)

The EU Directorate General for Productivity started publishing Manufacturing Industry Sustainable Production Indicators in February 2015, in line with its duties in the above-mentioned Law and the relevant goal and targets set out in the MoSIT Strategic Plan (2013–2017).

The Manufacturing Industry Sustainable Production Indicators aim to analyse the current situation and monitor developments over time in the manufacturing industry sub-sectors, from a sustainable production perspective and to provide a framework for national and international comparison.

The Indicators are produced for the manufacturing industry (Section C) and its sub-sections according to NACE Rev. 2 and published on a two-year basis. They consist of eight indicators in five main groups (Figure 1).

¹¹ <http://vi.sanayi.gov.tr/sug/> (Turkish)



Indicators and metadata are available also in English¹².

Resource efficiency, circular economy and the 2030 Sustainable Development Goals

The main initiative related to the goals of resource efficiency, the circular economy and the SDGs in Turkey will be coordinated by the Ministry of Development – National Sustainable Development Commission (NSDC), with other policy makers, TurkStat, academia and other stakeholders assessing the situation in Turkey and the achievement of goals.

Pursuant to the monitoring and evaluation framework, TurkStat is considering three vital sources for sustainable development data.

1. Main source: SDG global-level indicators (see section on Indicators to monitor progress towards a resource-efficient circular economy for detailed related indicators).
2. Complementary source: data from other policy-making institutions, which will reveal both SDG priority indicators and serve as a resource for defining additional national indicators for sustainability and related policy monitoring.
3. Complementary source: Eurostat's regional indicator set, serving as best practice and compiled with input from all stakeholders of the European Statistical System, will also help determine additional national sustainable development indicators.

Turkey's SDG framework is structured over two pillars: policy making and data-production monitoring, respectively the responsibility of the Ministry of Development and TurkStat.

As the Ministry of Development coordinates the policy-making pillar, it views the SDGs as one of the main inputs to the vision of the upcoming 11th Development Plan 2019–2023. To provide an integrated perspective on Turkey's diversified institutional structure, the NSDC was established under the Ministry of Development in 2004; the Ministry plans to strengthen and widen its scope. In addition, the High Planning

¹² <http://vi.sanayi.gov.tr/sug/En/default.aspx> (English)

Council and Economic Coordination Council have been playing a key role in coordination, monitoring and assessment of sustainable development.

The Ministry of Development has closely followed the international SDG process, including the Open Working Group and intergovernmental negotiations on SDGs. From the very outset of the implementation phase of the SDGs, the Ministry has worked in close cooperation with all stakeholders to position of the country.

Within the Ministry, a Task Force composed of relevant experts has been assigned to integrate the SDGs into public policy documents at all levels, including national and regional plans, annual programmes, and sectoral strategies. Turkey's Development Plan sets out all macro-level national policies and priorities. The Plan leads society to achieve higher levels of prosperity and sets long-term objectives and priorities beyond short-term approaches.

The 2030 Agenda for Sustainable Development, having the SDGs at its core, closely reflects the objectives of Turkey and its national and international endeavours. As was broadly discussed in the previous section, the Tenth Development Plan of Turkey covers almost all 17 SDGs, some directly and others indirectly.

Under the Plan, as a first step towards integrating the SDGs into national policies, a stocktaking analysis is to determine the current status of Turkey in terms of the SDGs. This study will be completed under the coordination of the Ministry of Development with the help of other line ministries, the private sector, academia and non-governmental organizations. It will detect the shortcomings of the country and identify priority areas for putting it on a sustainable development pathway.

Turkey is currently preparing the long-term vision of the 11th Development Plan. This provides the development perspective of the Plan by taking international and national trends in the development landscape into account and serves as the starting point for drafting the Plan itself. Key importance has already been attached to the SDGs in outlining the long-term vision of the Plan, paving the way to insert them into the 11th Development Plan itself.

Examples of innovative approaches and good practice

Examples of good practice and innovative approaches

Institutional and regulatory arrangements to support the transition towards a resource-efficient circular economy

Resource Efficiency Guidelines of the Ministry of Science, Industry and Technology (MoSIT)

In 2016, the MoSIT DG Productivity prepared and published two sectoral guidelines for resource efficiency, namely the Resource Efficiency Guide for Dairy Products and the Resource Efficiency Guide for Meat Products, with the aim of disseminating sustainable production methods to manufacturing industry in Turkey. These Guidelines present instructive information to encourage key resource efficiency practices and case studies for the aforementioned manufacturing sectors.

Currently within the scope of a new 19-month project, similar resource efficiency guides for eight main manufacturing sub-sectors are in preparation:

- - Finishing of textiles;
- - Manufacture of ceramic tiles and flags;
- - Manufacture of cement;
- - Manufacture of fertilisers and nitrogen compounds;
- - Other processing and preserving of fruit and vegetables;
- - Manufacture of flat glass;

- - Manufacture of cocoa, chocolate and sugar confectionery;
- - Manufacture of basic iron, steel and ferroalloys.

These guidelines focus broadly on the efficient use of raw material, energy and water. Waste minimisation and recovery measures are also covered with an emphasis on their contribution to overall resource efficiency potential¹³.

Sectoral Waste Guidelines of the Ministry of Environment and Urbanisation (MoEU)

Sectoral Waste Guidelines were prepared and published by the MoEU in 2016. These are not binding but advisory:

- Sectoral Waste Guideline for Wood, Wood Products and Furniture;
- Sectoral Guideline for Recycling of Waste Accumulators;
- Sectoral Guideline for Trans-boundary Movement of Waste;
- Sectoral Waste Guideline for Household Appliances;
- Sectoral Waste Guideline for Primary and Secondary Aluminum Production;
- Sectoral Waste Guideline for Dye Production;
- Sectoral Waste Guideline for Dying and Polishing;
- Sectoral Waste Guideline for Iron and Steel Industry;
- Sectoral Waste Guideline for Iron Casting;
- Sectoral Waste Guideline for Leather Sector;
- Sectoral Waste Guideline for Foundry Sector;
- Sectoral Guideline for Hazardous Waste in Households;
- Sectoral Waste Guideline for Galvanized Coating;
- Sectoral Waste Guideline for Pharmaceutical Industry;
- Sectoral Waste Guideline for the Metal Coating Sector;
- Sectoral Waste Guideline for the Metal Sector;
- Sectoral Waste Guideline for the Organic Plant Protection Products and Biocides Production;
- Sectoral Waste Guideline for the Auto Repair Shops;
- Sectoral Waste Guideline for the Automotive Industry;
- Sectoral Waste Guideline for the Petrochemicals;
- Sectoral Waste Guideline for the Petroleum Refining;
- Sectoral Waste Guideline for the Textiles and Garments Sector;
- Sectoral Waste Guideline for the Thermal Power Plants.

Zero Waste Project

The Zero Waste Project is aimed at managing waste and leaving future generations a clean and developed Turkey. Carried out by the MoEU, the Project will initially be implemented in public bodies and will be extended to cover the entire country.

The Zero Waste Project is to be implemented in phases at public institutions, airports, shopping malls, housing estates, universities, hospitals and large offices by 2018.

Innovative business models

Development of Turkey Green OIZ Framework Project (2016–2017)

The Ministry of Science, Industry and Technology (MoSIT), with the assistance of the World Bank Group, is carrying out a project to improve the green competitiveness potential for organised industrial zones (OIZs). The Project will develop a national Framework on Green OIZs and work with four of them to

¹³ www.temizuretim.gov.tr/Files/referansbelgeler/ETRehberi.pdf (Turkish) and www.temizuretim.gov.tr/Files/referansbelgeler/SutRehberi.pdf (Turkish)

implement it. The Framework will address areas that promote productivity, sustainability and competitiveness in the OIZs through a set of greener manufacturing interventions such as resource efficiency, green infrastructure and industrial symbioses.

In the scope of the Project, a set of recommendations has been proposed to rebrand the existing conventional OIZs to Green OIZs as well as establishing new Green OIZs in Turkey.

Moreover, technical analyses have been conducted to identify the most viable opportunities in eco-efficiency, cleaner production; green infrastructures, renewable energy, wastewater treatment/recycling, etc.; and circularity, for example, industrial symbiosis) within four selected OIZs – İzmir Atatürk OIZ, Bursa OIZ, Adana Hacı Sabancı OIZ and Ankara ASO 1 OIZ.

Feasibility Study on Industrial Symbiosis Implementation in OIZs (2014)¹⁴

In order to determine industrial symbiosis opportunities in Ankara OSTİM OIZ, a feasibility study was conducted by the Middle East Technical University, supported by the Small and Medium Sized Industry Development Organization (KOSGEB). The study revealed that through industrial symbiosis it is possible to achieve significant amounts of raw material and energy savings and a reduction in the carbon footprint. This study covered 812 manufacturing industry establishments having different economic activities, 27 industrial sectors within NACE, and waste types, European Waste Codes-EWC, in OSTİM OIZ. According to the data received from those establishments:

- 252 industrial symbiosis opportunities are available based on waste exchange;
- 84 establishments have waste exchange potential;
- there are from one to nine opportunities for each of these 84 establishments.

Pre-feasibility studies were later carried out for three industrial symbiosis opportunities:

- use of glass scraps in the manufacture of glass bricks;
- use of rubber wastes in the manufacture of construction materials;
- use of waste foundry sand in the production of ceramic sanitary products.

Financial support programmes

Solid Waste Program

The Solid Waste Programme, within the context of the 2017 Public Investment Programme, aims to finance and support municipalities' solid waste projects to minimise the environmental and health impacts of domestic waste by ensuring efficient waste management. The Programme will be implemented by the Ministry of Development and the Ministry of Environment and Urbanization.

The Programme covers investments for construction, project development and control of integrated waste management plants, Type II landfills, additional lots to existing Type II landfills, pre-treatment plants (mechanical separation/bio-drying/waste-derived fuels) and transfer stations.

Producer responsibility/supplier responsibility

Organisations authorised by the Ministry of Environment and Urbanisation for collection, transport and disposal of special waste groups.

1. Federation of the Tire Industry (**LASDER**), authorised for transport, temporary storage, recycling and disposal of **end-of-life tyres**.
2. Federation of Portable Battery Producers and Importers (**TAP**), authorised for collection and disposal of **waste batteries**.

¹⁴ http://www.cmo.org.tr/resimler/ekler/49911d69525484a_ek.doc?tipi=69&turu=H&sube=12 (Turkish)

3. **AKÜDER** (Federation of Accumulator Producers and Recyclers) and **TÜMAKÜDER** (Federation of All Accumulator Importers and Producers), authorised for transport, recycling and disposal of **waste accumulators**.
4. Federation of Petroleum Industry (**PETDER**), authorised for collection, transport, recycling and disposal of **waste oils**.
5. Foundation of Environmental Protection and Utilisation of Packaging Waste (**ÇEVKO**), **Consumer and Environment Education Foundation of Turkey (TÜKÇEV)**, Foundation of Turkish Plastics Industry for Research, Development and Education (**PAGÇEV**) and Federation of Waste Paper and Recyclers (**AGED**), founded and authorised for meeting the responsibilities for **packaging waste** management set by the relevant legislation.
6. Federation of Recycling and Management of waste electrical and electronic waste (WEEE) (**ELDAY**), Informatics Industry Association (**TÜBİSAD**) and the Turkish Lighting Luminaires Manufacturers Association (**AGİD**), founded and authorised for meeting the responsibilities for the management of **WEEE** – refrigerators, coolers, air conditioners, large household appliances, automats, televisions and monitors – set by the relevant legislation.

Extended producer responsibility

Article 18 of the By-Law on Waste Management covers issues regarding extended producer responsibility, Article 19 covers by-products and Article 20 covers preparing for reuse. The Communiqué on Refused Derived Fuels and Alternative Raw Materials also covers relevant issues.

Article 18 of the By-Law on Waste Management, extended producer responsibility:

- 1) producers are responsible for taking the necessary precautions to minimise the environmental impacts and waste generation, reuse and proper recycling of waste after it is generated, starting from the design phase of the product;
- 2) extended producer responsibility covers electrical and electronic equipment (EEE), packaging, vehicles, batteries and accumulators. Producers or retailers:
 - a) cover the costs related to management of products that are returned to the producer or have reached end of life and are regarded as waste;
 - b) fulfil their responsibilities by choosing one or more of the methods determined by the Ministry;
 - c) ensure meeting of collection, reuse, recycle and recovery targets.
- 3) products under extended producer responsibility and principles for the management of waste related to these products are determined by the Ministry.

Education

Many research centres on cleaner/sustainable production have recently been established in several universities, such as:

- Boğaziçi University Sustainable Development and Cleaner Production Center (SDCPC)¹⁵;
- Hacettepe University Environmental Research and Application Center¹⁶;

National Eco-Efficiency Programme (2014–2017) (MoSIT DGP)

The general objective is to promote the implementation of cleaner production techniques by enterprises, which will consequently contribute to the sustainable development of Turkish industry and improvement of the international competitiveness of the country.

Objectives:

- raising awareness on cleaner production in enterprises;
- developing human resources, institutional capacity and cooperation among the stakeholders;

¹⁵ <http://www.sdcpc.boun.edu.tr/> (English)

¹⁶ <http://www.cuam.hacettepe.edu.tr/english/> (English)

- providing technical and financial assistance to enterprises;
- strengthening policy infrastructure.

Focus areas:

- increasing resource efficiency;
- reducing the environmental impacts of the products during life cycles;
- industrial symbiosis;
- development of cleaner technologies;
- reuse / recycling / recovery of wastes.

Manufacturing Industry Sustainable Production Indicators (MoSIT DGP)

The Directorate General for Productivity started publishing Manufacturing Industry Sustainable Production Indicators in February 2015, in line with its duties in the above-mentioned Law and the relevant goal and targets set out in the MoSIT Strategic Plan (2013–2017).

The Manufacturing Industry Sustainable Production Indicators aim to analyse the current situation and monitor developments over time in the manufacturing industry sub-sectors, from a sustainable production perspective and to provide a framework for national and international comparison.

The Indicators are produced for the manufacturing industry (Section C) and its sub-sections according to NACE Rev. 2 and published on a two-year basis. They consist of eight indicators in five main groups (see Figure 1 in section ‘Indicators to monitor progress towards a resource-efficient circular economy’).

Indicators and metadata are available also in English¹⁷.

Seeking synergies with other policy areas

An objective of the Ministry of Transport, Maritime Affairs and Communications is to ensure the widespread use of waste materials, industrial by-products and recycled materials in road construction for the highway sector by 2023. The reuse of damaged or old asphalt coatings within the road network are carried out by the General Directorate of Highways¹⁸.

The Ministry of Economy regulates and monitors the import of certain goods on grounds of public morality, public policy or public security; protection of health and life of humans, animals or plants or protection of industrial and commercial property; protection of the environment; consumer rights; and the import policies that are in force. These grounds also include a number of international agreements and conventions to which Turkey is a party.

To this end, within the context of the Turkish Import Regime, the Ministry introduces Import and Product Safety and Inspection Communiqués in which the procedures and documentation required during the import of certain goods are laid down.

- 2017/1 Communiqué on Imports: imports of fertilizers, Articles 22-26 and Imports of ozone depleting substances, Articles 29-33.
- Communiqué of Product Safety and Inspection No. 2017/3: this includes wastes whose import is controlled (Annex I) or prohibited (Annex II) in accordance with the European Waste Catalogue and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

¹⁷ <http://vi.sanayi.gov.tr/sug/En/default.aspx> (English)

¹⁸ [www.kgm.gov.tr/SiteCollectionDocuments/KGMdocuments/Kurumsal/StratejikPlan/strateji\(2017-2021\).pdf](http://www.kgm.gov.tr/SiteCollectionDocuments/KGMdocuments/Kurumsal/StratejikPlan/strateji(2017-2021).pdf) (Turkish)

- Communiqué of Product Safety and Inspection No.2017/6: Annex I of this Communiqué comprises the hazardous chemicals whose import is prohibited. For the importation of chemical products specific tariff lines, which are listed in the Annex I of this Communiqué, the importer shall receive the control certificate issued by the Ministry of the Environment and Urbanization.
- Communiqué of Product Safety and Inspection No.2017/7: for the importation of some solid fuels, which are listed in Annex I of this Communiqué, the importer shall receive the conformity document issued subsequent to physical control and sample analysis carried out by the Ministry of the Environment and Urbanization.
- Communiqué of Product Safety and Inspection No. (2015/23): for the importation of scrap metals listed in Annex I of this Communiqué, the importer shall receive a “metal scrap importer document” issued by the Ministry of the Environment and Urbanisation. The document is merely given to those firms licensed by the Ministry and that have scrap melting facilities. According to the Communiqué, the import of metal scraps should be done only through border customs authorities with a radiation detection system. Annex II of this Communiqué comprises the dangerous scraps whose import is prohibited.

The import and export of waste have been regulated by the Ministry of Environment and Urbanization, Directorate General of Environmental Impact Assessment, Permit and Inspection, Import and Export Permits Branch since 2013.

Resource efficiency and circular economy policy initiatives from subnational to local level

Regional plans prepared by development agencies on some aspects of resource efficiency

- The Bursa Eskisehir Bilecik Development Agency (BEBKA) prepared the 2014–2023 Bursa Eskisehir Bilecik Regional Plan to determine regional priorities by means of scientific methods and a participatory approach. The Plan suggests that the transition to sustainable production practices in the highly industrialised region will provide economic and ecological benefits and at the same time increase competitiveness. For this reason, the industrial symbiosis approach has been included in the Regional Plan as a means of ensuring the effective use of resources, sustainability of regional development and transition to a circular economy. BEBKA initiated a regional industrial symbiosis programme in 2014 to promote the efficient use of resources to ensure the sustainable development of the region. The main goal of the programme is to raise awareness and encourage the dissemination of industrial symbiosis applications in the region by determining existing potential and strategy through regional and sectoral analyses, carrying out feasibility studies, conducting communications activities, and implementing the planned work by creating an infrastructure for the sustainability of industrial symbiosis applications.
- The Kastamonu, Sinop, Çankırı Development Agency (KUZKA) prepared the 2014–2023 Kastamonu, Sinop, Çankırı Region Plan, which includes provisions regarding resource efficiency. One of the objectives of the Plan is efficient and effective use of natural resources, especially energy, water, forestry and land.

Other resources

Examples of policies which go beyond “material resources”

Land and soil

Turkey, as defined by the United Nations Convention to Combat Desertification, is a country with arid, semi-arid and semi-humid areas. Turkey is under threat of desertification and drought due to both its climate characteristics and its topographic structure.

Within the scope of the Turkey Basin Monitoring and Evaluation System Project (2013–2015) carried out with the cooperation of the General Directorate for Combating Desertification and Erosion and Turkey’s

Scientific and Technological Research Council (TUBITAK), desertification criteria and indicators specific to Turkey have been determined and a geographic desertification model has been created to determine the areas of high desertification risk. Turkey's Desertification Risk Map was produced from this model and will be periodically updated as the model is run.

After completion of the initial project, verification and calibration were initiated in 2016 to cover all of Turkey and will be concluded in 2019. Relevant institutions and organisations will subsequently use the results for formulating policy and implementing appropriate measures.

The Desertification Risk Map will be the basis for relevant institutions and organisations to take the action necessary to prevent economic losses caused by land degradation – such as measures to prevent land degradation and rehabilitate degraded areas – and to create or update their strategic and action plans. Turkey has taken a very important step towards combating desertification/land degradation by creating the national strategies and action plan to combat desertification and setting national targets for land degradation neutrality.

Green jobs

The International Labour Organization (ILO) has evaluated the transition to a green economy through business case studies and published the report Decent Work in the Green Economy: Business Cases from Turkey (2015)¹⁹.

¹⁹ http://www.ilo.org/global/topics/green-jobs/publications/WCMS_375698/lang--en/index.htm (English)

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