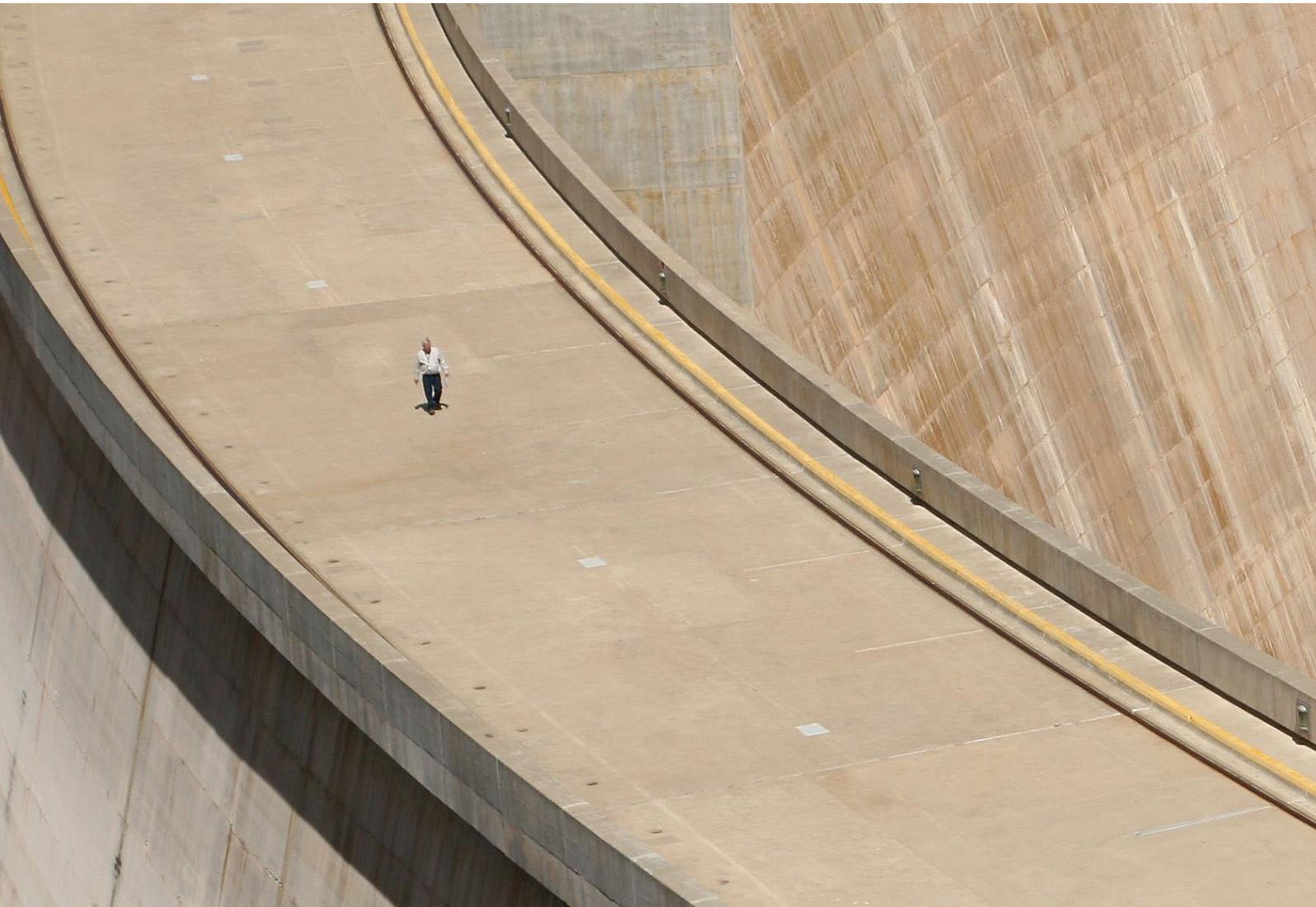


More from less — material resource efficiency in Europe
2015 overview of policies, instruments and targets in 32 countries



Turkey 

May 2016

This country profile is based on information collected by the NRC Özlem Durmuş (Ministry of Science, Industry and Technology) with the valuable contributions of Gülsevil Bahçeli (TurkStat), Belma Üstünişik (Ministry of Development), Fatma Nur Cebecioğlu, Gökşin Tekindor, A. Banu Gözet and Tuğçe Yüksel İrfanoğlu (Ministry of Environment and Urbanization. This document should not be seen as an official list of government priorities and is not necessarily an exhaustive list of all national material resource efficiency policies, objectives, targets or activities in place. The information is current as of June 2015.

This country profile was prepared as part of the 2015 EEA review of material resource efficiency policies, that aimed to collect, analyse and disseminate information about the development and implementation of material resource efficiency policies in EEA member and cooperating countries. The work resulted in the following outcomes:



32 short country profiles (this document) – self assessments prepared by countries, describing the current status of material resource efficiency policies including key strategies and action plans, policy objectives, instruments, targets and indicators, and the institutional setup. Countries were also invited to share reflections on the future direction of resource efficiency policies.

EEA report *More From Less – material resource efficiency in Europe* – prepared by the EEA and ETC/WMGE, the report analyses trends, similarities and differences in policy responses, showcases selected policy initiatives from the countries, and offers some considerations for the development of future policies.

The EEA report *More from less – material resource efficiency in Europe* and the 32 country profiles are available at: <http://www.eea.europa.eu/resource-efficiency>

For information about trends and policies on municipal waste management in the participating countries, please visit: <http://www.eea.europa.eu/publications/managing-municipal-solid-waste>

Information about EU Member States' waste prevention programmes can be found at: <http://www.eea.europa.eu/publications/waste-prevention-in-europe-2015>

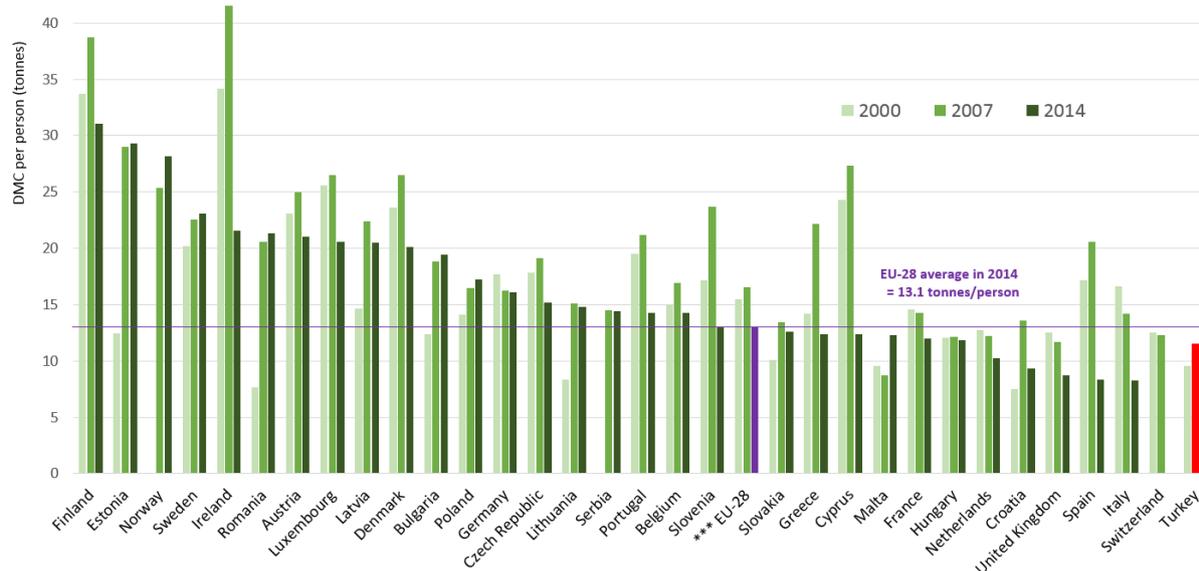
For information on climate- and energy-related policies, including those on energy efficiency, in the participating countries, please visit: <http://www.eea.europa.eu/themes/climate/ghg-country-profiles>

Turkey, facts and figures

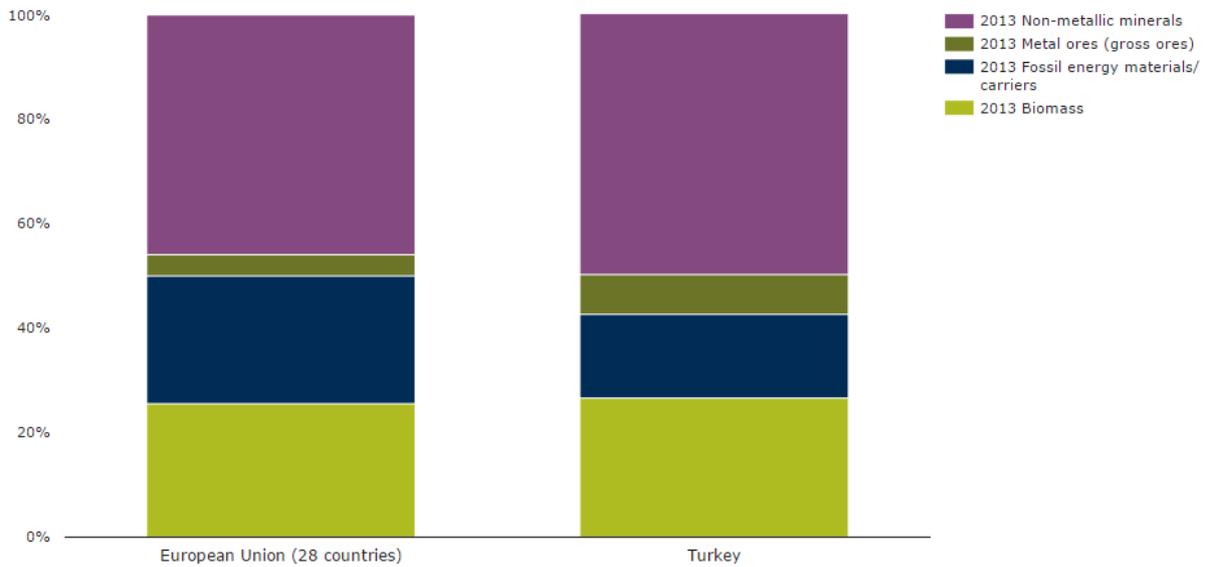
Source: Eurostat, except for total GDP, sourced from International Selected Indicators published by the Turkish Statistical Institute

	<p>GDP: USD 799 billion (current prices, 2014)</p>
	<p>Per person GDP: EUR 14,600 (in purchasing power standard) (53 % of EU-28 average per person in 2014)</p>
	<p>Use of materials*): 906 million tonnes DMC (equivalent to 13.7 % of EU-28 total in 2013) 11.9 tonnes DMC/person (91 % of EU-28 average per person in 2013)</p>
	<p>Structure of the economy: agriculture: 8.2 % industry: 26.9 % services: 64.4 % (2014 est.)</p>
	<p>Surface area: 783,600 square kilometres (equivalent to 17.6 % of EU-28 total)</p>
	<p>Population: 77.2 million (equivalent to 15.2 % of EU-28 total)</p>
	<p><i>* figures for 2014 not available, 2013 used instead</i></p>

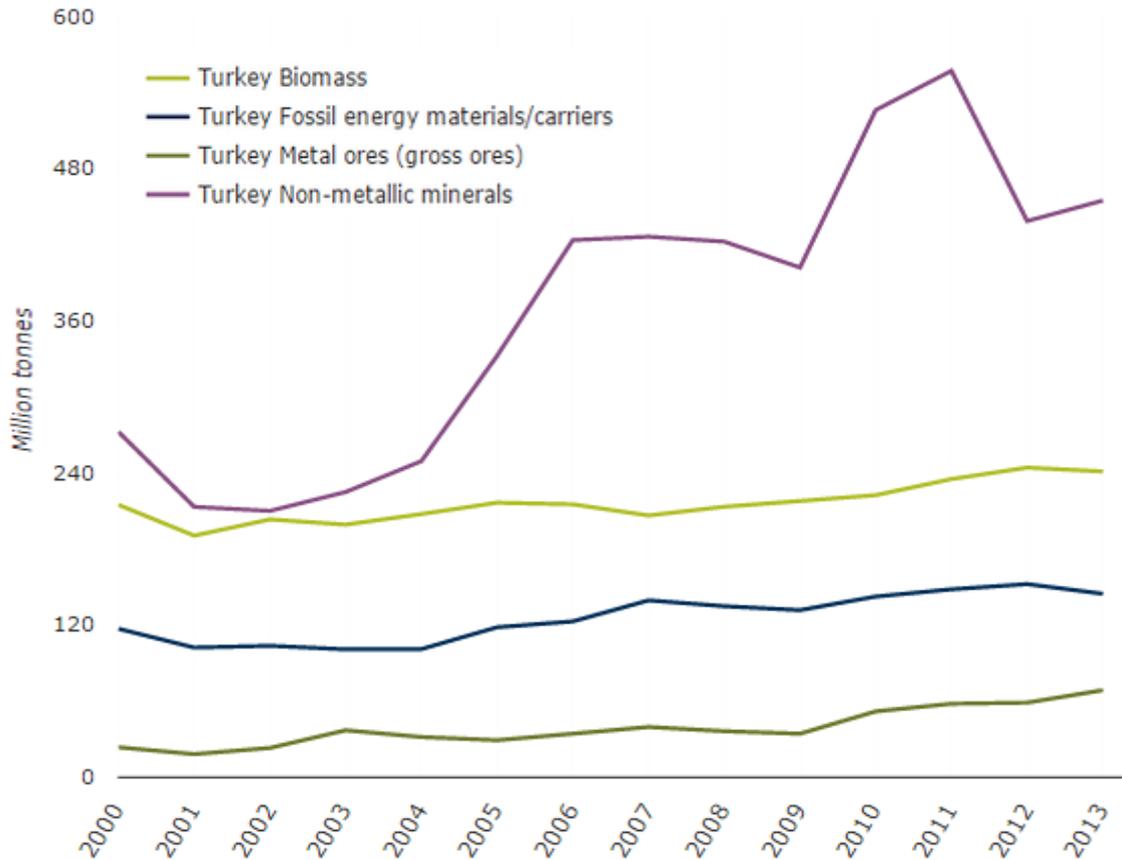
Use of materials (DMC) per person, participating countries and EU-28
(2000, 2007 and 2014)



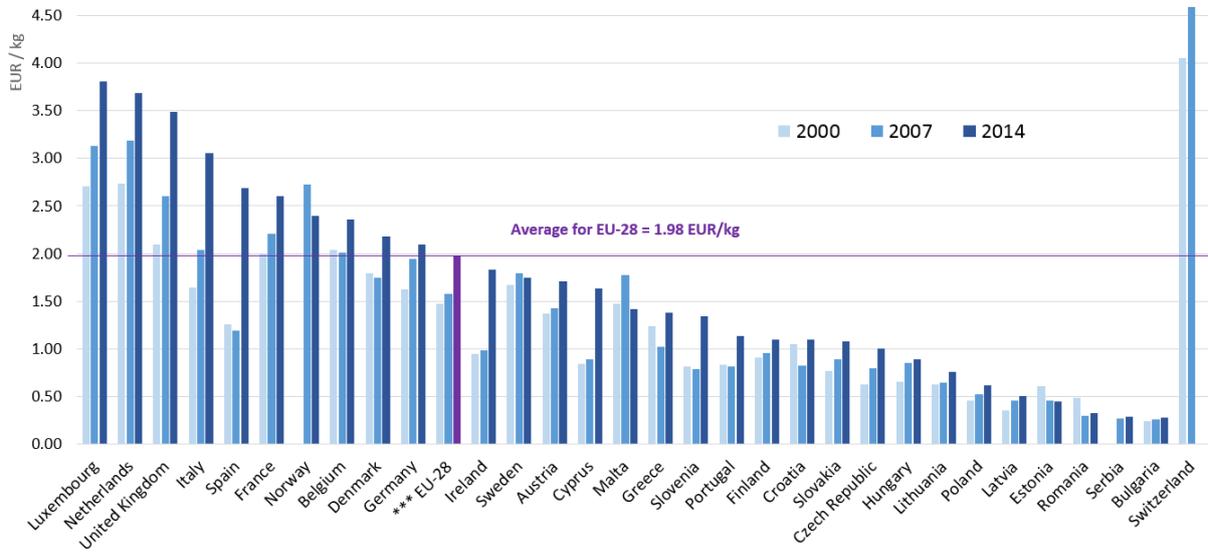
Domestic material consumption by category, EU-28 average and Turkey (2013)



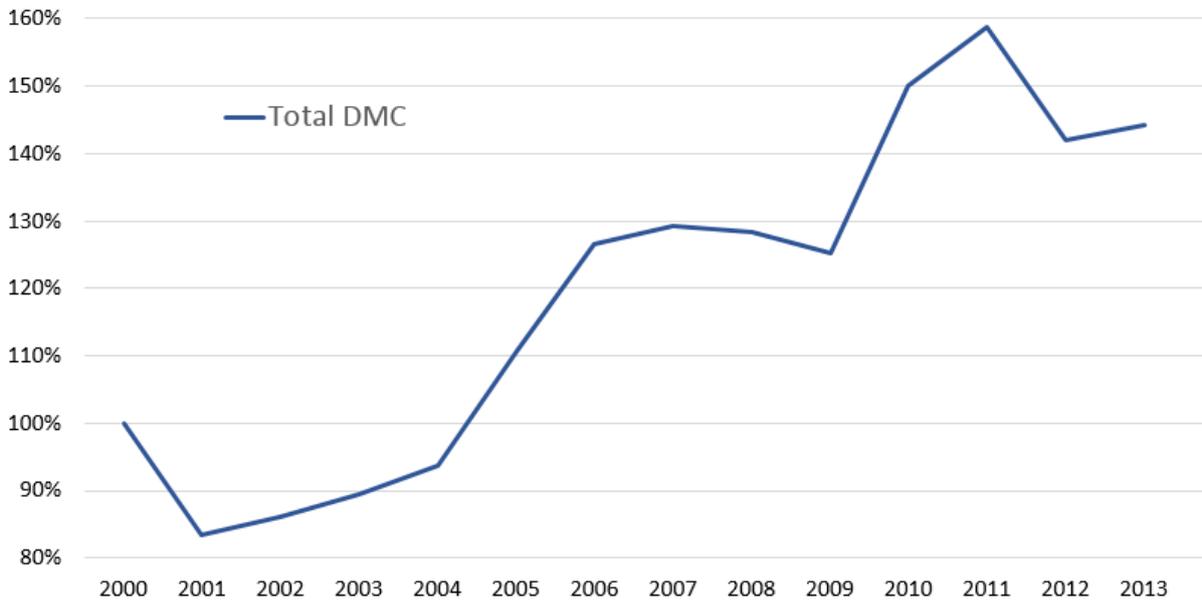
Trends in material consumption, Turkey by category (2000–2013)



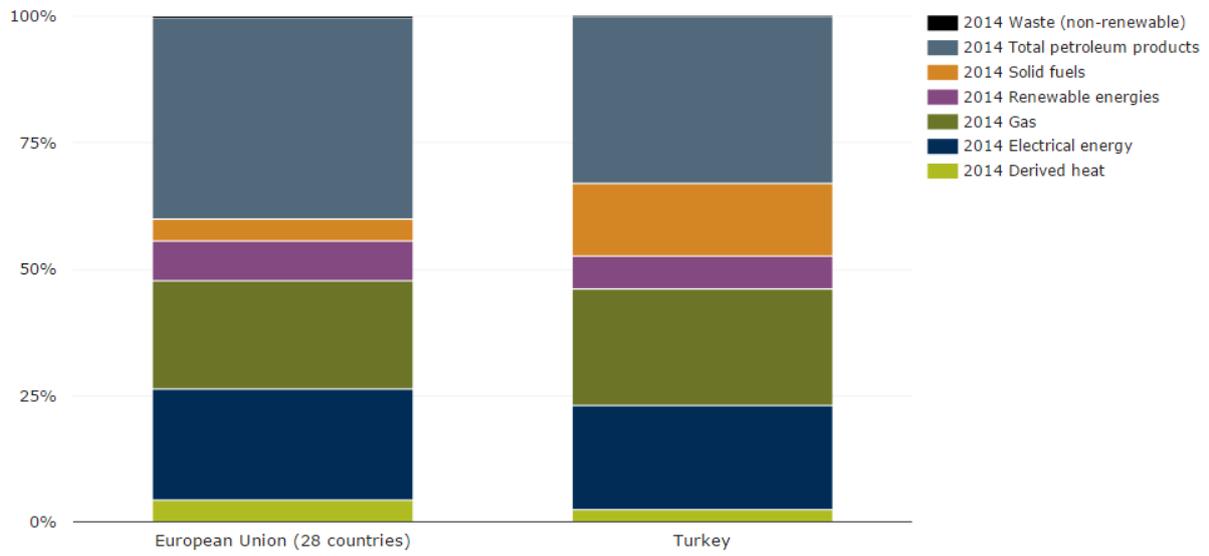
**Resource productivity (GDP/DMC), participating countries and EU-28
 (2000, 2007 and 2014)**



Total DMC productivity trends, Turkey (2000–2013)



Share of final energy consumption by fuel type, EU-28 and Turkey (2014)



Introduction

Turkey does not have a dedicated material resource efficiency policy. The topic is addressed in a number of other policies, notably the 10th Development Plan

Scope of material resource efficiency

Definitions used for *resource efficiency* differ depending on the scope and function of the work or the policy document. Resource efficiency is defined and used interchangeably either with a narrow focus or a broader focus. When narrow focused is used, only raw materials are included, whereas raw materials, energy, water and land are all covered when a broader focus is used. Other terms are also in use, such as *energy efficiency* and *water efficiency* when specific natural resources need to be distinguished and emphasised.

Driving forces of material resource efficiency

- **Import dependency in intermediate goods:**

The share of imported intermediate goods in 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 in imports of intermediate goods is the main concern that drives 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.

- **Energy intensity and energy supply security:**

Turkey's energy consumption continues to grow and Turkey is one of the energy intensive economies compared to developed countries. According to International Energy Agency (IEA) and Eurostat data, energy intensity in Turkey is above the Organisation for Economic Co-operation and Development (OECD) and European Union (EU) averages. Also, import dependency in energy supply continues. In order to reduce energy intensity and energy supply dependency, improving efficiency and preventing wastage in all processes (from energy production to transmission, from distribution to end-use); and reducing energy intensity in both sectoral and macro levels are considered of crucial importance. Both the Energy Efficiency Law and the Energy Efficiency Strategy Document explicitly address energy efficiency in all sectors to mitigate the impact of import dependency and energy intensity.

- **Domestic savings and avoiding waste**

current level of domestic saving rate in Turkey is below 15 per cent and considered low in comparison to other countries with similar incomes and fast growing countries by the Programme for Increasing Domestic Savings and Avoiding Waste. Accordingly, the Programme identifies wastes, which correspond to the inefficient use of available resources as one of the leading factors for the decrease in domestic savings and the pressure on natural resources.

- **Pressure on environment and natural resources**

Economic growth, population growth, consumption and production patterns put pressure on environmental and natural resources. The 10th Development Plan addresses these pressures and highlights the need for enhancing planning, implementation, monitoring and supervising processes for environmental and natural resource management. The Plan also emphasises the need for removing overlapping authorities and strengthening the co-operation among institutions.

- **Water scarcity and increasing water demand:**

Turkey is listed among water scarce countries with approximately 1 500 cubic metres per person per year water potential in 2013. By 2030, the annual available water per person is expected to decrease to 1 100 cubic metres and Turkey might be exposed to water scarcity. Water tends to be insufficient to meet needs due to increasing demand, drought and pollution in catchments. Inadequate planning, monitoring, evaluation and supervision; lack of a common database and information flows; and weakness of inter-institutional co-ordination are the main problems of water resource management. In order to enhance efficiency of water management, under watershed-based integrated protection and controlled use principles, protection action plans have been prepared for all 25 river basins. Plans provide identification of and precautions against pressures and impacts resulting from domestic, industrial and agricultural uses.

Priority material resources, sectors, and consumption categories

Priority materials

Efficient use of land and water resources are considered a priority in the 10th Development Plan (Article 1043), overseeing the balance between protection and utilisation of natural resources. Energy resources are also highlighted in the Plan for sustaining energy supply security and improving energy efficiency.

Regarding the list of critical raw materials, determined by several countries and country groups, a programme will be initiated for exploration and production of raw materials in Turkey (especially rare earth elements) and a strategy will be developed to secure supply of raw materials that are essential and critical to the Turkish economy. Domestic exploration and production of raw materials

especially iron ore, marble and boron will be prioritised (10th Development Plan, Articles 806, 807 and 808).

Also, the Input Supply Strategy and Action Plan prioritises iron/steel, non-iron metals and raw materials as well as the intermediate goods for the plastic, petroleum chemicals and pharmaceuticals sectors for reducing import dependency.

Priority industries and economic sectors

Sectors with low levels of efficiency, high levels of resource consumption and high levels of import dependency are identified as priority sectors by the **Input Supply Strategy and Action Plan (2013-2015)**, namely:

- steel;
- mining; and
- chemical industries.

In terms of energy efficiency, priority is given to the industry, transport and the buildings sectors, by the **Programme for Improving Energy Efficiency**.

Agriculture is given the highest priority for water efficiency by the **Programme for Enhancing Efficiency of Water Use in Agriculture**, due to its large share in water use.

Several sub-sectors of manufacturing industry are also prioritised, based on their potential for eco-efficiency/cleaner production by **the National Eco-Efficiency/Cleaner Production Programme (2014-2017)**, which are:

- manufacture of food products;
- manufacture of textiles;
- manufacture of chemicals and chemical products;
- manufacture of other non-metallic mineral products;
- manufacture of basic metals;
- manufacture of motor vehicles, trailers and semi-trailers.

Priority consumption categories

A transition to more sustainable consumption patterns is targeted by the 10th Development Plan. Raising awareness in all parts of society (including consumers) about avoiding and minimising waste, recycling and more sustainable resource use is emphasised. Although not specific to consumption categories, changing consumer behaviour for the sake of economy and environment is highlighted in several relevant policy documents.

Policy framework

National strategies or action plans for material resource efficiency

Although not dedicated to natural resource efficiency, the 10th Development Plan provides the foundation for all relevant strategies, programmes and action plans that address natural resources (water, forestry, minerals and biodiversity) in Turkey, at regional, national and sectoral levels.

The Plan addresses natural resources in a more fundamental/wider perspective and sets the framework for more focused strategies, programmes and action plans. The Plan also sets several targets for natural resources through its Priority Transformation Programmes, namely: the Programme for Enhancing Productivity in Manufacturing, the Programme for Reducing Import Dependency, the Programme for Increasing Domestic Savings and Avoiding Waste, the Programme for Improving Energy Efficiency and the Program for Enhancing Water Efficiency in Agriculture

The 10th Development Plan was adopted by the General Assembly of Parliament and has been in effect since July 2013. The Plan covers the period 2014–2018 and is available at:

<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&ContentTypeld=0x01006B34392831415F499C9D04E36A573089>

10th Development Plan (2014–2018) and its relevant Priority Transformation Programmes:

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

Strategies and Action Plans:

- Input Supply Strategy and Action Plan (2013-2015)
<http://www.resmigazete.gov.tr/eskiler/2012/12/20121225-28-1.pdf>
- Productivity Strategy and Action Plan (2015–2018)
<http://vgm.sanayi.gov.tr/Files/Documents/vsep15-18-492015120647.pdf>
- National Eco-Efficiency/Cleaner Production Programme (2014-2017)
<http://www.temizuretim.gov.tr/Files/referansbelgeler/Eko-Verimlilik%20Program%C4%B1.pdf>

- EU Integrated Environmental Approximation Strategy (2007–2023)
- National Watershed Management Strategy (2014-2023)
<http://www.resmigazete.gov.tr/eskiler/2014/07/20140704-23.htm>
- Energy Efficiency Strategy Paper (2012–2023)
http://www.eie.gov.tr/verimlilik/document/Energy_Efficiency_Strategy_Paper.pdf
- National Recycling Strategy and Action Plan (2014–2017)
<http://www.resmigazete.gov.tr/eskiler/2014/12/20141230M1-12-1.pdf>

Laws and Regulations:

- Energy Efficiency Law (2007)
- By-law on Waste Management (2015)
- Regulation on Packaging and Packaging Waste (2011):

The circular economy and closing material loops

In order to close material loops and sustain a circular economy, resource efficiency is linked to waste policies through recycling and industrial symbiosis concepts.

The new By-Law on Waste Management defines and legally introduces the concepts, such as reuse of waste, by-products and extended producer responsibility promoting production and use of waste derived products. Recycling, reuse and recovery of waste has been emphasised by relevant policies in terms of reducing natural resource use and decreasing import dependency of raw materials. Recycling scrap metal (iron and steel) and special waste groups (waste oils, waste tyres, waste accumulators and packaging waste) are specifically highlighted by the National Recycling Strategy and Action Plan for the sake of both environment and economy.

Industrial symbiosis, on the other hand, has been promoted by the SME (Small and Medium Enterprises) Strategy and Action Plan (2015–2018) and the National Recycling Strategy and Action Plan (2014–2017) to ensure wastes or by-products of an industrial facility or company become the raw materials of another, with a particular focus on material and energy exchange. Increasing resource efficiency, adding value to waste and reducing costs are strategically targeted through industrial symbiosis policies and their implementation. In addition to these documents the Productivity Strategy and Action Plan (2015–2018) includes promoting and disseminating the implementation of industrial symbiosis studies.

General policy objectives for material resource efficiency

10th Development Plan (2014–2018)

The main goal is to increase environmental awareness and sensitivity, to protect the environment and improve its quality to ensure that present and future generations benefit from scarce natural resources, while continuing economic and social progress (Article 1031). Preservation and development of quantity and quality of water and land resources, and the development of a management structure that provides sustainable use of these resources, especially in the agricultural sector, are fundamental objectives (Article 1047). Also, improving energy efficiency and preventing wastage in all processes (energy production, transmission, distribution and, end use) and reducing energy intensity in both sectoral and macro levels are given crucial importance (Article 783).

Priority Transformation Programme for Improving Energy Efficiency

The Programme aims to improve energy efficiency in some chosen sectors and fields, disseminate existing practices, raise public awareness of good practice and contribute to demand side management through five main components:

- developing administrative and institutional capacity for energy efficiency;
- developing sustainable financial mechanisms for financing of energy efficiency studies and projects;
- increasing energy efficiency in industry;
- improving energy efficiency in buildings;
- improving energy efficiency in transport.

Priority Transformation Programme for Reducing Import Dependency

Programme aims to introduce the more effective utilisation of domestic natural resource potential by increasing the economic benefits of recyclable/recoverable and collectable-separable wastes, supporting efforts to increase the supply of domestic scrap and initiatives for scrap collection, separation and processing centres.

Priority Transformation Programme for Increasing Domestic Savings and Avoiding Waste

Component 2 of the Programme aims to reduce waste and promote more sustainable consumption through:

- identifying the extent of waste;
- the protection of consumer rights;
- popularizing conscious consumption;
- efficient market surveillance and supervision;
- getting children and families into the 'saving habit';

- the organisation of campaigns against waste;
- supporting rational consumption behaviour by eliminating cross-subsidies and non-commercial price cuts for goods produced by the public and private sectors.

Priority Transformation Programme for Enhancing Efficiency of Water Use in Agriculture

The programme aims to increase water efficiency in agriculture by the modernisation of irrigation systems, raising consciousness of water use and enforcing new political and financial instruments (i.e. water pricing according to regional constraints, water budgets for watersheds etc.)

Priority Transformation Programme and Action Plan for Enhancing Productivity in Manufacturing (2014–2018)

This aims to ensure that the more efficient use of non-energy inputs in production will be sustained through regulatory arrangements, financial instruments and research and development (R&D) studies (Policy 3.2)

Productivity Strategy and Action Plan (2015–2018)

This document identifies material resource efficiency as one of the main axes of productivity and aims to increase both material resource efficiency and energy efficiency through capacity building and awareness raising in manufacturing industry.

National Eco-Efficiency/Cleaner Production Programme (2014–2017)

One of the focus areas of the Programme is increasing resource efficiency through the reduction of resource use (raw materials, water, energy, etc.) throughout the whole life cycle of a product, preventing waste at source and encouraging the use of new production technologies.

Input Supply Strategy and Action Plan (2013-2015)

One of the main expectations of the document is the more efficient and effective use of domestic resources to reduce import dependency. The document also highlights the importance of recycling for reducing import dependency and supply security in all sectors, especially main metals and the automotive and chemical industries. Meeting the demand for the iron and steel scrap by domestic supply and the more efficient use of domestic mines are also emphasised.

National Recycling Strategy and Action Plan (2014-2017)

The Strategy and Action Plan aims to trigger economic opportunities and more efficient use of resources by recycling through its five main goals;

- developing consciousness of recycling in all parts of the society;

- improving the relevant legislation to support recycling;
- establishing the necessary infrastructure for the efficient recycling of wastes;
- providing financial support for recycling;
- establishing an efficient governance system through the registration of waste generation.

National Watershed Management Strategy (2014–2023)

The strategy aims sustainable management and use of river basins in Turkey by:

- -increasing water use efficiency and water savings;
- expanding irrigated areas and improving efficiency of irrigation systems.

EU Integrated Environmental Approximation Strategy (2007–2023)

The Strategy, prepared for compliance with the EU Acquis Communautaire, emphasises the rational use of natural resources in its vision statement and the sustainable use of natural resources in its fundamental principles. Promoting public and private institutions, as well as other users, for the efficient use of water and the efficient utilization of energy in households and industry are highlighted in the document.

By-Law on Waste Management (2015)

In compliance with the 2008/98/EC Waste Framework Directive, the By-Law promotes reduction, reuse, recycling and recovering of waste in order to minimise natural resource use and ensure the better management of waste. Targets specified in the 2008/98/EC Waste Framework Directive are partially adopted by the By-Law on Waste Management.

Regulation for Control of Packaging and Packaging Waste (2011)

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

Energy Efficiency Law (2007)

The Law sets principles and procedures for increasing and supporting energy efficiency and public awareness to encourage the use of renewable energy in energy generation, transmission, distribution and consumption in industrial facilities; buildings; electricity generation, transmission and distribution facilities; and transport.

Energy Efficiency Strategy Paper (2012–2023)

The main purpose of the Strategy is to determine a political framework supported with result-focused and concrete targets and to define the activities necessary for reaching targets together with the enterprises responsible for taking action and to work within a framework of a participatory approach with the public and private sectors and non-governmental organisations (NGOs).

Strategic purposes set by the Paper are as follows:

- to reduce energy intensity and energy losses in industrial and services sectors;
- to decrease energy demand and carbon emissions of buildings; to promote sustainable environment friendly buildings using renewable energy sources;
- to provide market transformation of energy efficient products;
- to increase efficiency in production, transmission and distribution of electricity to decrease energy losses and harmful environment emissions;
- to reduce unit fossil fuel consumption of motor vehicles, to increase share of sea, road and rail public transport, and to prevent unnecessary fuel consumption in urban transport;
- to use energy effectively and efficiently in the public sector;
- to strengthen institutional capacities and collaboration, to increase use of state-of-the-art technology and awareness activities and to develop financial mechanisms except public financial institutions.

Institutional setup and stakeholder involvement

Institutional set up for material resource efficiency policies

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

- Ministry of Development;
- Ministry of Science, Industry and Technology;
- Ministry of Energy and Natural Resources;
- Ministry of Environment and Urbanization;
- Ministry of Forestry and Water Affairs;
- Ministry of Economy;
- Ministry of Food, Agriculture and Livestock;
- Ministry of Transport, Maritime and Communication;
- Turkish Statistical Institute;
- Turkish Water Institute and Water Management Coordination Board.

Different ministries function as the main actors due to the cross-cutting nature of resource efficiency topics. No specific ministry has been appointed as the co-ordinating body and co-ordination

between the main actors is relatively poor. Uncertainties, inadequacies and overlaps in duties, power and responsibilities of different ministries need to be resolved.

Process to ensure stakeholder participation

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 the society. Processes are designed to be as transparent and inclusive as possible.

Suggestions for international support mechanisms to exchange experience

Online knowledge sharing platforms as well as bi-lateral programmes and projects are considered important for exchanging experience and the dissemination of knowledge between both policy makers and implementing parties (technical experts, producers, industry associations, etc.). Support mechanisms that enable hands-on experience of resource efficiency policies are considered the most important.

Policy instruments

Policy instruments commonly used for material resource efficiency

Regulatory instruments and financial instruments (including taxes, charges and incentives) are considered the most important to improve material resource efficiency. According to 10th Development Plan, improving financial sources for environmental investments, using these sources efficiently and strengthening the mechanisms that will ensure prevention through evaluating the impacts of projects and programmes that may have serious effect on environment, are needed. R&D and innovation on environmentally-friendly methods and technologies are also important, especially in terms of supporting economic growth (10th Development Plan, Article 1030).

Examples of good practice

As regards assessing the potential for resource efficiency potential, Ministry of Science, Industry and Technology is carrying out the **Potential Benefits of Resource Efficiency in Turkish Manufacturing Industry** project. This aims to demonstrate potential economic and environmental benefits that could be realised through more efficient and sustainable use of raw materials, energy and water in manufacturing industry. The project will quantify the potential savings in both monetary and

physical terms and at both sectoral and regional levels, together with analysing the potential environmental benefits that are linked to the quantified resource efficiency potential due to less resource use and prevented pollution. Work progresses and is planned to be finalized in March 2016.

In regards to financing, TSKB, Turkey's first privately-owned development bank, has been **promoting energy efficiency and renewable energy projects** through funds secured from international financial institutions such as the International Bank for Reconstruction and Development (IBRD), the International Finance Corporation (IFC), Kreditanstalt für Wiederaufbau (KfW), Agence Française de Développement (AFD) and the European Investment Bank (EIB). In the course of the past five years, 56 energy efficiency projects from 33 companies from various sectors, with credits amounting to USD 400 million, have been financed by TSKB. The savings foreseen from these projects amount to the heating needs of 210 000 houses with the total reduction of 1.2 million tonnes of carbon dioxide equivalent. Also, resource efficiency projects from 10 companies have been financed by TSKB, with credits amounting to USD 50 million.

In regards to **valuing natural resources**, a pilot study was carried out with the World Bank's assistance in the Bolu forest area to identify and quantify the forest products and services used. Using various methods, the study estimated the value of forest products and services including the direct use of timber, firewood and non-timber forest products including plants, honey, recreation, fodder for grazing, and hunting; their optionuse as a source of pharmaceuticals; their indirect use in watershed protection, carbon sequestration and soil erosion control, etc.; and the non-use of biodiversity. The economic valuation undertaken by the pilot study mainly relies on the following methods: market price, cost based method, standard value use, adjusted and unadjusted benefit transfers (Draft Report - Valuing Forest Products and Services in Turkey: A Pilot Study of Bolu Forest Area, World Bank, 2015).

Targets and indicators

Targets for material resource efficiency

Measurable targets set by **the Energy Efficiency Strategy Paper (2012-2023)**:

- At least 20 per cent decrease in energy intensity (energy consumed per unit of GDP) by 2023 (in comparison to the reference year 2011);
- At least 10 per cent decrease in energy intensity in each industrial sub-sector within 10 years of the publication of the document;
- At least one fourth of housing stock in 2010 shall be converted so that the buildings are sustainable (buildings providing secure and efficient ambient space medium with minimum effect on the environment from the use of energy and source energy, water and other natural resources effectively). To be completed by 2023;
- The total average cycle efficiency of coal thermal power plants around the country, including waste heat recovery, shall be increased more than 45 % by 2023;

- Annual energy consumption in the public enterprise buildings and facilities shall be decreased by 10 % by 2015 and by 20 % by 2023;
- The number of certified energy managers shall be increased up to at least 5 000 and the number of energy efficiency consultancy companies (EVD) experts in industrial sectors shall be increased up to 50 across the country by the end of 2015;
- The number of original designs and/or products, which would be commenced to be manufactured based on domestic R&D, shall be at least 50 by the year 2023 in the areas of energy efficiency and renewable energy resources.

Measurable targets set by the **National Watershed Management Strategy (2014–2023)**:

- Upgrading economically irrigable areas from 5.6 million hectares to 8.5 million hectares by 2023; completing sectoral water allocation planning by basin by 2020 and preparing and implementing river basin management plans for four selected river basins in 2015 and for all (a total of 25) by 2020.

Measurable targets set by the **By-Law on Water Loss and Leakage** (for drinking water supply systems):

- Water loss and leakage rates will be decreased to:
 - a maximum of 30 % in five years and a maximum 25 % for the following four years in metropolitan and provincial municipalities;
 - a maximum of 30 % in nine years and a maximum of 25 % for the following five years in other municipalities.

Measurable targets set by the **Regulation on Packaging and Packaging Waste (2011)**:

Annual recovery target by material (%)					
Year	Glass	Plastic	Metal	Paper/ cardboard	Wood
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 use of materials and resource efficiency:

Domestic material consumption (DMC) and other material flow accounting (MFA) indicators:

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). The data is available at both the TurkStat and Eurostat websites for 1990–2012:

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

http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do;jsessionid=DRsdyub-30MVMS4_xcLhbPbvSnyCNKTaxQZWOyqcxy2RifPIDa5!418452516

Domestic material consumption (DMC) measures the total amount of materials (in tonnes) used by an 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 as the most important indicator for monitoring material resource efficiency, since GDP divided by DMC is used as the headline indicator of resource productivity.

Water productivity, waste intensity and waste recovery rate:

Complementary indicators are also in use, such as water productivity, waste intensity and waste recovery rate. Ministry of Science, Industry and Technology launched a new set of indicators in 2015 to monitor sustainable production trends in Turkish manufacturing industry. 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 main sectors of manufacturing industry. 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 sectors of manufacturing industry, divided by value added by economic activity. The unit 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 sectors of manufacturing industry. Indicators cover main sectors of manufacturing industry, according to NACE Rev. 2. in 2 digit breakdown and are based on 2008–2012 TurkStat data. They are updated on a two-yearly basis and are available at: <http://vi.sanayi.gov.tr/sug/>

Value of natural resources and ecosystem services:

The Turkish Government also aims to carry out a valuation of natural resources and ecosystem services to facilitate informed policy-making and implementation processes. This issue is highlighted in Article 1037 of the 10th Development Plan. Key government agencies (namely the Ministry of

Development and the Ministry of Forestry and Water Affairs) are interested in the applications of natural capital accounting (NCA) in development planning, for example, estimating the economic values of water uses and applying them to water allocations among various consumption sectors. After being a member of WAVES Programme of World Bank in June 2014, the Forestry Directorate General has started work on an ecosystem valuation case study with the technical assistance of the World Bank.