Chapter 4. Waste, materials management and circular economy

The Czech Republic has increased recovery and recycling, but has not yet succeeded in fully exploiting the raw material potential of its waste. This chapter gives an overview of trends in materials use and waste generation and of related policies. It reviews the effectiveness of the instruments used to encourage waste prevention, reduction and recycling, and to reduce landfilling. It identifies implementation gaps and opportunities in moving towards a circular economy.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

4.1. Introduction

The Czech Republic has enjoyed strong economic growth over the past 15 years, though recovery since the global crisis has been uneven and the level of GDP per capita remains below the OECD average. The Czech economy is export-oriented and characterised by intensive industrial and agricultural activities and the presence of foreign companies that drive growth. The country has relatively few natural resources and is highly dependent on imports for many strategic raw materials and commodities. Coherent and effective waste and materials management policies are thus vital.

The Czech Republic has come a long way since it first regulated waste management in 1991. It has well-developed and fairly complete policy and legal frameworks for waste and materials management, supported with quantitative targets, voluntary agreements and economic instruments. The country has progressed on the recommendations of the 2005 EPR and further aligned its policy framework with EU legislation.

But the pace of progress since 2005 has been insufficient to consolidate the advances made in the late 1990s and 2000s, and to seize the benefits of continued EU support. Implementation has been partial and not sufficiently co-ordinated. Most achievements were driven by EU requirements and funding. Several targets of the 2003-14 Waste Management Plan were met; others were not and were later considered too ambitious by the government (SAO, 2011). In areas such as landfilling, economic analysis of waste management and investments in recycling, improvement has been marginal. Waste is not yet managed in a cost-effective manner, and current measures to minimise the environmental impact of waste and materials management over their life-cycle are insufficient. Waste prevention, particularly in the business sector and further upstream in the value chain (design phase), and "upcycling" of waste into higher-value products have not received sufficient attention. Monitoring progress is hampered by the existence of two information systems that produce data that differ greatly in terms of definitions and surveying methods, and by the lack of information on the outcomes of public spending on waste and materials management.

The Czech Republic's performance in waste management, though improving, remains modest. This means essential steps need to be taken before circular economy approaches can be implemented. The potential for progress is good. The current Waste Management Plan contains measures which should help achieve a better performance over 2015-24 (MoE, 2014). The emphasis is on the value of waste as a resource, with the aim of reducing amounts going to final disposal, increasing recycling and reuse, and preventing waste generation. It will be important to effectively implement this plan and the associated Waste Prevention Programme, and to use synergies with the country's secondary raw materials policy and the eco-innovation and cleaner production programmes. This must be on a par with modernisation of Czech enterprises, effective alignment of measures and objectives across policies and ministries, and increased cooperation. Adoption of the new Waste Act, which is still pending, is crucial, as is the establishment of a reliable, transparent and fully integrated information system on waste and materials.

4.2. Trends in waste management and material consumption

4.2.1. The material basis of the Czech economy

The Czech Republic has relatively few natural resources and is highly dependent on imports for many strategic raw materials and commodities. Other than biological resources, the material resource base is composed of industrial minerals (such as kaolin, feldspar, bentonite and glass sand) and construction materials. The main domestic energy resources are brown coal and, to a lesser extent, hard coal and crude oil, but these are largely insufficient to satisfy demand. The country is almost completely dependent on imports of oil, natural gas and metallic minerals, as well as some industrial minerals, e.g. for fertiliser production. Imports accounted for around 33% of domestic material input and 47% of consumption in 2016, compared to 18% and 26%, respectively, in 2000.

Domestic material productivity (economic value generated per unit of material used) increased by 72% between 2000 and 2016, from USD 1.2/kg to USD 2/kg. The level attained is only half that of the EU average, but is comparable to those of EU countries with a similar economic structure. If raw materials embodied in international trade were accounted for, material productivity would be about 5% lower (Kovanda, 2013). Domestic material consumption (DMC)¹ per capita fell by 15%, partly because the 2008-09 financial crisis led to reduced economic output. The level remains high compared to the EU and OECD Europe averages, but is below the OECD average. The materials mix is characterised by high shares of fossil fuels (with coal dominant) and construction materials that dominate material inputs into the economy and DMC. (Figure 4.1).

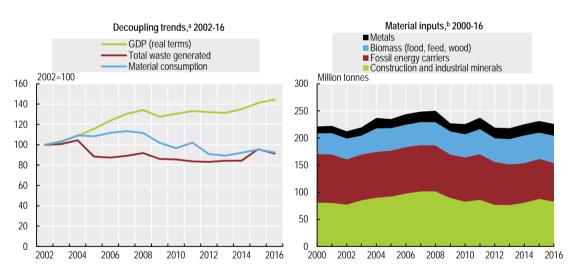


Figure 4.1. Waste generation and material consumption have been decoupled from economic growth

a) Total waste includes residue from treatment operations. Material consumption refers to domestic material consumption (i.e. domestic material extraction plus imports minus exports of materials and derived products).

b) Refers to domestic material extraction plus imports of materials and derived products.

Source: OECD (2017), "Material resources", OECD Environment Statistics (database); OECD (2017), OECD National Accounts Statistics (database); CZSO (2017), Generation, recovery and disposal of waste.

StatLink 5 http://dx.doi.org/10.1787/888933723435

Consumption of construction minerals grew to 2007, then decreased with the economic crisis. It is expected to rise again as construction activity, notably for railway

infrastructure, increases. Consumption of fossil fuels dropped by 22% over 2000-16, mainly due to a reduction of coal in the energy mix (CENIA, 2016).

About 11% of the materials used as inputs in the Czech economy end up as waste, of which about 77% are recovered for reuse, recycling and energy use (CZSO).

4.2.2. Trends in waste generation

Objective assessment of waste generation and treatment trends is hampered by the fact that two information systems with differing data sets coexist in the Czech Republic: the Waste Management Information System (WMIS) used by the Ministry of the Environment (MoE) to monitor implementation of national waste policies and the corresponding EU objectives; and the waste statistics managed by the Czech Statistical Office (CZSO), used for reporting to Eurostat and the OECD. This section uses data from both sources.

Total waste

Total waste generation was relatively stable between 2005 and 2014, though it slightly decreased during the economic crisis as construction activity slowed. In 2015, it increased by 13% due to a rebound in the construction sector, and 27 million tonnes of waste was generated, according to the CZSO (26 million tonnes in 2016), while the WMIS reports 37 million tonnes.

Waste from the construction sector represents 39% of the total in the CZSO statistics (2016 data), or 65% according to the WMIS (2015 data). It is followed in the CZSO data by manufacturing waste, municipal waste and waste from water supply, sewerage and waste treatment (Figure 4.2).

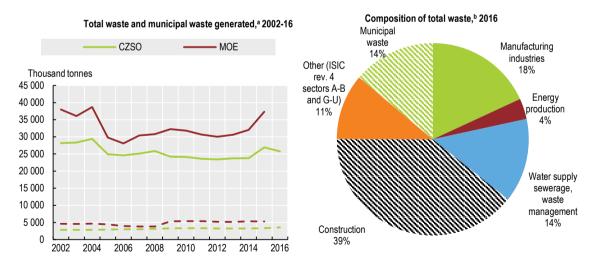


Figure 4.2. Levels of waste generated vary according to the data source used

a) Official statistics on waste, produced by the CZSO, are used to report under the EU Waste Statistics Regulation. The data refer to primary waste. Data from the WMIS of the MoE, are used to develop the country's WMP, monitor its implementation and report on EU waste policy objectives. The data include both primary and secondary waste. Dotted lines refer to municipal waste. b) CZSO data.

Source: CZSO (2017) Generation, recovery and disposal of waste ; MoE (2017), Country submission.

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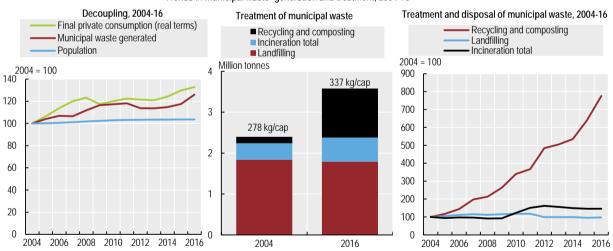
Efforts to recover and recycle waste are beginning to show results. The material recovery rate, which was quite low in the early 2000s, has increased significantly. It reached 77% (WMIS 86%) of the total amount to be managed in 2014, of which 38% was used as backfill. Landfilling remains the most common disposal method, but its share in total waste generation has significantly decreased (WMIS 10.3%, CZSO 17%). There is hardly any incineration without energy recovery. The new Waste Management Plan (WMP) encourages use of waste as an energy source, which was relatively stable over the review period and represented 5% (CZSO) of waste treated in 2014 (WMIS 3%).

Municipal waste

The generation of municipal waste grew by 26% over 2004-16, according to the CZSO (WMIS 13% over 2004-15). Municipal waste generated in 2015 totalled 3.3 million tonnes (CZSO) or 5.3 million tonnes (WMIS). The CZSO reported an amount generated per capita of 337 kg in 2016, much lower than the OECD average (520 kg) or the OECD Europe average (479 kg).

As landfilling decreased, material recovery² rose from a very low 6% to 34% in 2016 (WMIS 35.6% in 2015). This is one of the highest increases among EU countries. Nevertheless, half of municipal waste is still landfilled (CZSO 50%, WMIS 47.4%). This is much higher than the EU-27 average (38%) and includes a large share of biodegradable waste (about 40-50% WMIS). Recovery rates lag behind those of other OECD countries and are well below the 2020 EU recovery target of 50%.

Figure 4.3. Municipal waste has been growing, recycling has increased and landfilling is little changed



Trends in municipal waste^a generation and treatment, 2004-16

a) Household and similar waste collected by or for municipalities, originating mainly from households and small businesses. Includes bulky waste and separate collection.

Source: OECD (2017), "Municipal waste generation and treatment", OECD Environment Statistics (database); CZSO (2017) Generation, recovery and disposal of waste; OECD (2017), "OECD Economic Outlook No. 100 (Edition 2016/2)", OECD Economic Outlook: Statistics and Projections (database); OECD (2017), "Labour force statistics: population projections", OECD Employment and Labour Market Statistics (database).

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Hazardous waste

Hazardous waste generation has been fairly stable, with slight variations over time; hazardous materials represent about 4% of total waste. About 37% is recovered, 36% backfilled, 12% incinerated (of which 70% with energy recovery) and 6% landfilled (Eurostat, 2017).

4.3. Objectives and policies for waste and materials management

The Czech Republic has well-developed and fairly complete policy and legal frameworks for waste and materials management, supported with quantitative targets, voluntary agreements and economic instruments. Strategic objectives are defined according to EU law and policies, and in line with international commitments (e.g. the Basel Convention) and OECD Council Decisions.

Resource efficiency and the principles of a sustainable material economy and of a reduced environmental impact of material flows are enshrined in the State Environmental Policy, the National Strategy for Sustainable Development, the National Reform Programme (whose objectives include effective use of secondary raw materials, conversion of waste to resources and recycling) and the Ten Year Programme for Sustainable Consumption and Production.

4.3.1. Policy framework and objectives

Waste and materials management in the Czech Republic rests upon on a range of policies addressing issues related to waste, raw materials (primary and secondary), energy supply and chemicals management. The main objectives are preventing waste and moving towards a circular economy approach, minimising the negative health and environmental impact of waste management, maximising waste reuse and recovery, and ensuring raw material supply security, including replacement of primary natural resources with secondary raw materials.

The main policy documents are the WMP and Waste Prevention Programme (WPP), both mandatory under EU law; and the Raw Materials Policy (aimed at ensuring raw material security) and Secondary Raw Materials Policy (aimed at improving self-sufficiency in raw material resources by increasing use of recyclates and turning waste into resources in line with the EU Raw Materials Initiative and circular economy package).

They are complemented by the 2012-20 Biomass Action Plan, which assesses biomass use for energy purposes and provides a biowaste reduction framework and quality standards for composted material; and the 2012-40 State Energy Policy, which defines the country's energy-related objectives, including those concerning the use of waste as an energy source. The updated National Renewable Energy Action Plan assumes that energy from renewable sources will represent 14% of gross final energy consumption by 2020, slightly more than the related EU target.³

The Waste Management Plan

Each ten-year WMP specifies goals, measures and monitoring tools for national waste management, in line with EU law, and provides the basis for regional WMPs. The binding part of the national WMP is published as a government regulation, in compliance with the Waste Act. Its achievement is mandatory and applies to the national, regional and municipal levels. The 2003-13 WMP (revised in 2009, with its validity extended to

2014) included targets both in line with and going beyond EU law. The current WMP (2015-24) was developed over 2012-13 and adopted in December 2014,⁴ entering into force on 1 January 2015. Its aims include increasing reuse and recovery and reducing amounts landfilled. It also integrates waste prevention principles and the WPP objectives. Implementation is to be supported by an increase in the landfill fee and an obligation to collect biowaste separately, along with tools and strategies aimed at more efficient and environment-friendly waste management and further development of waste treatment capacity and infrastructure. Separate collection of biowaste was initiated in 2015 thanks to a 2014 amendment of the Waste Act. Increased landfill fees are yet to be implemented.

The WMP is supplemented with implementation programmes focused on specific waste streams and on waste from specific sectors. WMP implementation is reviewed annually in an assessment report published on the MoE website.⁵ Regional WMPs are established by each of the 14 regions, including the city of Prague. Every producer of over 1 000 tonnes a year of non-hazardous waste or more than 10 tonnes a year of hazardous waste, including municipalities, must also develop a WMP.

The Waste Prevention Programme

The country's first WPP, adopted in 2014, covers roughly the same ten years as the WMP, running to 2024. It contains measures concerning waste prevention in all sectors except agriculture: mining, manufacturing, training and education, public and private consumption, product design, etc. The objective is to reduce both the amount of waste produced and hazardous components that have a negative impact on the environment and health. The reuse of products and their preparation for reuse are considered prevention measures. Particular attention is given to selected waste streams, especially food waste and its progressive reduction along the food chain. Other targeted streams include hazardous waste, construction and demolition waste, textiles and waste from end-of-life products.

The objectives are to be achieved by improving information on waste prevention and creating a freely accessible information base, raising awareness among businesses and citizens and encouraging waste prevention measures, and developing related research and development (R&D). Proposed measures include introducing waste prevention topics in curricula and research; providing manufacturers with incentives to reduce waste and the use of primary resources, and to increase the use of secondary raw materials; developing and using innovative low-waste technology in industry; and extending product service life via repair shops, charities, etc. The WPP also promotes the use of voluntary instruments such as voluntary agreements, environmental management systems, environmental labelling systems and cleaner production systems.

The Raw Materials Policy

The Czech Republic has had a Raw Materials Policy since 1999. The current one, covering 2012-32, addresses energy and non-energy raw materials, ore and non-ore commodities, domestic and imported mineral raw materials, and minerals obtained from secondary sources through recycling or reprocessing. It has an environmental dimension, including environmental impact indicators.

The Secondary Raw Materials Policy, adopted in 2014, sets framework conditions for promoting the recovery and reprocessing of valuable raw materials from used products and waste, and for reducing the material and energy intensity of production. It identifies ten priority commodities and sources of secondary raw materials: metals, paper, plastics,

glass, construction materials, vehicles, electrical and electronic equipment, tyres and rubber, and batteries and accumulators. The selection criteria are the importance of the commodity for Czech industry (as a production input), the mass production of the secondary raw material, the potential for its use in the Czech Republic, and its significance. The document is to be updated as needed. Its 2015 action plan aims to support greater self-sufficiency in raw materials by replacing primary commodities with secondary raw materials. The government approved an updated action plan in May 2017.

4.3.2. Legal framework

The main law on waste management is the Waste Act,⁶ which is complemented by the Packaging Act.⁷ They are accompanied by 15 implementing decrees focusing on specific waste streams (e.g. sewage sludge, biowaste, end-of-life vehicles) and management aspects (e.g. transboundary movements, take-back systems, separate collection, waste catalogue). A new act on end-of-life products, covering waste electrical and electronic equipment (WEEE), batteries, tyres and end-of-life vehicles (ELVs), is being prepared.

Other legislation of importance to waste and materials management includes a 2010 government decision that provides a legal basis for green public procurement (GPP) and specifies environmental requirements applying to public procurement.⁸ It has recently been replaced by a broader Government Resolution⁹ on socially responsible public procurement, including environmental requirements.

The 2001 Waste Act defines the waste management hierarchy,¹⁰ emphasises prevention, includes the principles of producer responsibility and of environmental and health protection in waste handling, and sets rates for waste management and disposal fees. The act was amended in 2014¹¹ to introduce a ban on landfilling of unsorted mixed municipal waste and of recyclable and recoverable waste from 2024, and to expand the scope of separate collection of municipal waste from 2015, with mandatory separate collection of glass, paper, plastic, metal and biodegradable waste in all municipalities.

To support implementation of the 2015-24 WMP and fulfilment of EU targets,¹² a new Waste Act has been prepared. It emphasises the waste hierarchy and aims at increasing recycling and recovery, reducing landfilling and the use of primary raw materials, and preventing littering and illegal dumping. However, more than two years after the WMP was adopted, the new act is still pending, with passage now not expected before 2019. The provisions on economic instruments (charges and fees) supporting the landfill ban on unsorted mixed municipal waste have raised concerns from local authorities (which fear it will mean additional administrative burden and reduced revenue) as well as environmental non-government organisations (NGOs) and the Czech Waste Management Association (which argue against promotion of incineration that benefits energy companies). In the meantime, the amended 2001 act remains valid, though not fully consistent with the objectives of the current WMP.

The delay in adoption of a new act puts at risk the achievement of objectives concerning waste and materials management and reduces the time available for action. Adoption of the new Waste Act in 2018 seems indispensable if real progress is to be made. Other acts such as the new act on end-of-life products are also pending, awaiting the adoption of the new Waste Act and the EU Circular Economy Package. Speeding up the process should thus be a matter of priority for the government.

4.3.3. Institutional framework and governance

The central authority responsible for national waste management is the MoE. It has a general supervisory and monitoring role, develops the national WMP, acts as the focal point for the Basel Convention and submits bills to Parliament. The 14 regions, including the city of Prague, elaborate the regional WMPs and issue permits for waste management installations.

Compliance controls and enforcement are the responsibility of the Czech Environmental Inspectorate (CEI), which has ten territorial inspectorates and two branch offices. The CEI, established by the MoE as an autonomous state body, supervises waste management (through inspections, reviews, checks, investigations, etc.), imposes fines and proposes remediation measures. It also maintains a website with annual activity reports, statistics and a discussion forum for the public. The CEI collaborates with the MoE and other agencies, including the General Customs Directorate, the Trade Inspection Authority and the police, regarding domestic and transboundary waste shipments and imports of batteries and accumulators from non-EU countries.

The MIT co-ordinates policies on resource efficiency, including energy efficiency, and secondary raw materials. The MoE collaborates with the MIT on resource efficiency and drafting a new act on end-of-life products, and with the Technology Agency of the Czech Republic (TACR) to fund circular economy projects in the areas of waste management and resource efficiency, including nanotechnology projects. Other ministries with responsibilities related to waste management include the Ministry of Health, regarding issues related to public health protection in the area of waste management and to assessment of the hazardous properties of waste; and the Ministry of Agriculture, on aspects related to the use of sewage sludge and dredged sediment in agriculture.

Horizontal co-ordination is ensured through the Waste Management Board, an MoE advisory body composed of leading experts from all government departments and NGOs; and through the MIT Secondary Raw Materials Policy as defined in its action plan and the Waste Act.

Since 2006, practical implementation has been the responsibility of the 6 258 municipalities and their environmental offices and inspectorates. Municipalities are considered waste producers and are responsible for managing municipal waste¹³ on their territory. They can fulfil their obligations directly through municipal waste services, or by subcontracting the service to the private sector. Some municipalities have extended powers concerning waste management inherited from the former district authorities.

Czech municipalities have considerable autonomy. They are much smaller than the EU average; indeed, many are too small to deliver high-quality public service. Thus, around 90% of municipalities are involved in some form of inter-municipal co-operation, which is promoted by bodies such as the Union of Czech Towns and Municipalities. Co-operation is often ad hoc and relationship dependent, however, and does not necessarily occur where fragmentation is worst (OECD, 2011, 2006). Inefficiency and a lack of capacity to absorb and implement new policies may result. Encouraging more efficient inter-municipal co-operation to provide higher quality services is particularly important in waste and materials management. Approaches might include establishing inter-municipal organisations for joint provision of services and providing targeted training and harmonised guidance through the MoE. In France, for example, inter-municipal co-operation is common, and municipal waste is generally managed through

dedicated inter-municipal associations (*syndicats intercommunaux*) set up by several municipalities to save costs and gain efficiency in service provision.

4.3.4. Expenditure and financing

Gross expenditure on the operation of waste management services (internal current expenditure) grew over the review period, especially between 2005 and 2011, when it doubled. About 60% of the national operational expenditure for environmental protection goes to waste management. Investment (capital expenditure) almost tripled (+146%), with growth particularly visible in the public sector (+183%), where it supported improvement in waste management services and in treatment and recovery installations (e.g. separate collection, civic amenity sites, waste-to-energy facilities, biowaste processing).

Financial support for investment mainly comes from EU funds and the State Environmental Fund (SEF). The later takes the form of grants and interest-free or low-interest loans. EU funding comes from the structural and investment funds: in the Operational Programme "Environment" for waste-related projects and the Operational Programme "Enterprise and Innovations for Competitiveness" for those related to technological change and use of secondary raw materials. Operational expenditure for waste collection and transport is from the national and local budgets. Funds are regularly transferred from the national budget to the SEF and local budgets.

In the past many waste-related projects thus benefited from EU funding or even depended on it. Over 2007-13, a cumulated total of CZK 14 billion expenditure for waste management projects under the Operational Programme "Environment" came from EU funds. There is little information about the outcomes of these projects, however, or the extent to which they contributed to achieving the WMP objectives. According to the Supreme Audit Office (SAO), the macro-level indicators that the MoE uses to monitor progress are not suitable for evaluating the benefits of individual projects, and final project evaluations by the SEF are carried out with considerable delays. (SAO, 2017).

While EU funding will continue, it will be reduced and more targeted. Public funding of waste infrastructure will need to be prioritised in line with the WMP and secondary raw materials action plan, and the country will have to find other ways to fund needed infrastructure and technology development. This presupposes a good overview of existing capacities and of the funds needed to achieve the WMP objectives and related EU targets.

Little information on the economic performance of Czech waste management or the actual cost of waste management services is available. No regular evaluations are made of the outcomes of public support for investment, the performance of economic instruments or the cost-effectiveness of municipal waste management services (Chapter 3. ; SAO, 2017). The development of specific indicators to measure performance and effectiveness, including at project level, should be considered. A system of benchmarking of costs, as envisaged in the WMP, would help improve local authorities' performance in providing waste management services. Such a system would need to build on a harmonised cost accounting framework and indicators and be supported by training and guidance from the government.

4.3.5. International co-operation and outreach

The Czech Republic has been a party to the Basel Convention since 1993 and, as an EU country, is bound by the 2006 regulation on waste shipments implementing the Basel

Convention at EU level.¹⁴ It is also a party to the Rotterdam Convention (ratified in 2000) and the Stockholm Convention on chemical substances and environmental risks.

Bilateral ties with neighbouring countries take place particularly in the framework of the Czech-German Joint Commission on the Environment, the Czech-Polish Intergovernmental Commission for Cross-border Co-operation, and with countries of the Visegrád Group (V4).¹⁵ Regular, well-established relationships with Slovakia are part of a 1992 co-operation agreement on environmental protection. An example of concrete co-operation on waste management is the composting of Czech biowaste in Poland.

Over the 2000s, the Czech Republic benefitted from 15 twinning projects with EU partner countries, including projects on upgrading of its waste management system and infrastructure. In recent years, bilateral co-operation has included exchanging experience with Sweden on waste management, among other areas. Since 2015, co-operation with Austria, which for several years was troubled, mainly due to diverging views on nuclear energy from 2009, has been improving in many fields, including waste management, and bilateral meetings of the two countries' environment ministers have been reconvened.

Co-operation among V4 countries builds on regular meetings and contacts at all levels: heads of state, prime ministers, ministers and experts. An annual V4 environment ministers' meeting has been held since 1993. V4 countries co-ordinate their positions with relevant EU legislative and strategic proposals. The International Visegrád Fund was established in 1999 to support co-operation in culture, science, research and education, student exchanges, cross-border co-operation and tourism promotion. During the Czech Republic's presidency in 2015-16, topics addressed included the circular economy and changes in EU waste legislation.

4.4. Information and policy instruments for waste and materials management

4.4.1. The information base

Information on waste

The Czech Republic's two information systems for waste generation and treatment are the Waste Management Information System, managed by the Czech Environmental Information Agency (CENIA) on behalf of the MoE; and the waste statistics managed by the CZSO (Box 4.1). Their data differ in terms of definitions, reporting boundaries and surveying methods. This leads to duplication and gaps, as well as uncertainty in monitoring policy implementation, and is a waste of public money. Frequent breaks in time series further exacerbate the monitoring difficulties. Targets and objectives with a base year earlier than 2002, for example, cannot be monitored reliably.

The discrepancies between the data of the two systems are major, particularly as regards specific waste streams and treatment methods, but also national totals. The WMIS reports a total of 37.3 million tonnes of waste generated, of which 5.3 million tonnes is municipal waste; the CZSO reports 26.9 million tonnes generated, including 3.3 million tonnes of municipal waste. This complicates third party assessment of Czech waste policies. The discrepancies also affect waste treatment capacity planning and lead to controversy, such as that concerning the planned expansion of waste-to-energy capacity.

Availability of reliable information on waste and materials is critical for improving waste and materials management in the Czech Republic. According to the MoE, the discrepancies in the reported indicators are due to differences in the waste classifications used in EU legislation: the List of Waste used for the Waste Framework Directive and the statistical nomenclature used for the Waste Statistics Regulation. However, the root cause lies in a lack of co-operation between the institutions, which led progressively to the parallel development of two separate surveying processes, two data quality assurance processes and two databases, which are structured and managed differently.

The two systems need to be reviewed so they can be aligned and a harmonised information base established. Ultimately the underlying data should be fully integrated and based on a single well-structured survey and reporting process, with proper institutional arrangements for managing the information system. A unified, multipurpose information system could serve as a central data repository to both support the development and monitoring of national and subnational waste management and provide a basis for the production of official statistics and international reporting. It should be developed on the basis of the mandatory survey underlying the WMIS, in co-operation with main users, including the MoE, CZSO and CEI, and in consultation with other stakeholders, such as the Ministry of Industry and Trade (MIT) and local authorities.

The difficulties associated with the existence of two competing information systems are well known, and have been highlighted by the European Commission. Measures to address them are included in the national WMP, and in 2016, the two systems agreed to co-operate on reviewing and consolidating the information base, and to initiate an indepth audit of the WMIS. An auditors group was set up, consisting of representatives of the MoE, CENIA, CZSO, Government Office and MIT, as well as Eurostat and independent experts. But practical work has been slow, partly due to the vested interests of several stakeholders.

Implementation of the current systems' 2016 co-operation agreement is an essential first step for establishing a unified system. It should be speeded up, and supported with a provision in the new Waste Act. New information needs and reporting requirements could be added progressively (e.g. secondary raw materials, extended producer responsibility, waste prevention in industry, costs and financing). The revised system will need to be easily accessible to the main producers and users of the information to enable coherent monitoring of progress at all levels. Its data will need to be collected and structured in such a way that they can ultimately be used as a basis for official statistics.

In the short term, the scope, definition and terminology of the derived indicators need to be reviewed and harmonised so as to avoid confusion among users. This concerns, for example, the inclusion or exclusion of secondary waste, the extent to which householdlike waste from businesses is included in municipal waste, and the numerators and denominators used for calculating recycling and recovery ratios.

There are a few other weaknesses as well. Waste reduction efforts in the business sector are insufficiently monitored. Economic information on waste management is not produced systematically and is incomplete. This hampers evaluation of waste management cost-effectiveness, particularly at the municipal level. Specific indicators are needed to monitor the outcomes of public spending on waste and materials management at the national, local and project levels.

Information on material flows

Material flow accounts are produced at macro level (economy-wide flows) by the CZSO and updated annually. They are complemented by research estimates of material footprints by the Charles University Environment Centre. But the results are not integrated

with waste statistics (key indicators are used for national waste and materials management policies). It is thus not easy to get a complete picture of material flows through the economy and how they relate to waste streams and recycling efforts. The Czech Republic could make better use of the data produced if they were harmonised and integrated.

Industry should be encouraged to integrate such information in corporate reporting, integrated performance assessments and financial statements, and to establish material flow cost accounts so as to better understand the environmental and financial consequences of material and energy use practices and identify opportunities for efficiency improvements.

Other data and information

An inventory of hazardous waste facilities and a database on closed and abandoned mining waste facilities that pose serious environmental and health risks are maintained by the Czech Geological Survey¹⁶ on behalf of the MoE. Budget and accounting information from all levels of the administration is publicly available on the information portal "MONITOR" of the Ministry of Finance.¹⁷

Information on environmental technology is available from ENVIBASE, the Czech environmental technology database, administered by the MoE. ENVIBASE contains a list of Czech companies, organisations and institutions providing environmental technology services, including for waste management. But there has been no official monitoring of eco-innovation since 2013, nor of green public procurement since 2012.

Box 4.1. Czech information systems on waste: management information and official statistics

The Waste Management Information System

The Waste Management Information System was set up to support the development and implementation of national and regional WMPs. WMIS data are used to monitor waste management policies, project waste trends, identify infrastructure needs and plan related investment. They are also used to report on implementation of EU waste directives. In addition, the CEI uses WMIS data to check compliance in the business sector (at the facility level), and the European Commission uses them to determine financial support under the operational programmes of the EU structural and investment funds.

The WMIS builds on data from a mandatory annual survey of all waste generators and processors, i.e. waste management firms, businesses and local authorities (about 31 000 respondents, including 5 000 municipalities). The data are collected by type of waste, according to the EU List of Waste, at the facility, company and municipal levels. Direct reporting is mandatory for all entities generating more than 100 kg of hazardous waste or 100 tonnes of non-hazardous waste in a given year. For waste producers below these thresholds, records (waste type, amounts, business ID of the generator, location, etc.) are kept by the entity managing the waste and processed by municipalities with extended powers.¹⁸

The WMIS uses the definitions of waste and waste producers provided in the Waste Act and related regulations (in line with EU waste management legislation) that differ from those used in international statistical work.

- The Waste Act considers municipalities to be the producers of all waste generated on their territory, in accordance with Chapter 20 of the EU List of Waste. This makes the definition of municipal waste broader than in many other OECD countries, as it covers all kinds of waste, including mixed unsorted municipal waste, waste collected under the extended producer responsibility system even when directly delivered by citizens to waste collectors and scrap traders, some hazardous waste, waste collected from public areas and from small businesses, as well as items such as contaminated soil and other waste from remediation of landfill sites on the municipal territory.
- To support infrastructure planning and investment decisions, the data cover both primary and secondary waste that has to be managed within the country. This may lead to double counting when calculating national totals, which generally represent amounts to be managed rather than amounts generated.

Official waste statistics

The other information system comprises the waste statistics produced by the CZSO, which are used to produce national statistical reports and to report to the OECD and Eurostat, in line with EU statistical regulations. They build on annual sample surveys of some 1 500 municipalities and around 6 500 businesses selected from the Statistical Business Register. Sample surveys are used so as not to overburden respondents already completing the mandatory annual WMIS survey. Direct use of the WMIS database has so far not been possible. Respondents are selected according to statistical

criteria. Since 2009, the survey has included a core part, updated annually and covering the most significant waste generators and processors, and a sample part administered on a rotating basis to one-third of other businesses every three years. Data for the businesses not surveyed in a given year are based on previous updates.

These waste statistics use the definitions and classifications provided in the EU regulation on waste statistics, and the surveys are in line with those used in the OECD and United Nations Statistics Division questionnaires on waste. They distinguish between primary and secondary waste, and are structured by material, industry (NACE codes) and type of treatment.

4.4.2. Policy instruments

The Czech Republic employs a range of policy instruments to encourage waste reduction, reuse and recycling. They include separate collection requirements and mandatory recycling targets for recyclable materials in line with EU law, voluntary agreements for waste reduction and recycling by businesses, economic instruments such as volume-based municipal charging (pay as you throw system), a deposit-refund system for beer bottles, extended producer responsibility and take-back systems for selected waste streams. Most of these instruments apply to the end-of-life stage. They are complemented by demand-based instruments, including GPP, and information instruments such as ecolabels, awareness-raising campaigns and training.

Targets

Objectives and quantitative targets play an important role. Mandatory targets are set for waste treatment and disposal rates, and for recycling of packaging materials, consumer electronics, ELVs, etc., in line with EU directives and international commitments. The WMIS monitors their achievement.

The country reached most of its quantitative targets during the review period. Some targets in the 2003-13 WMP were not achieved and later judged too ambitious by the MoE (SAO, 2011). They include the targets for waste recovery (55% recovery of all waste by 2012, 50% recovery of municipal waste by 2010). The EU target on landfilling of biodegradable municipal waste (no more than half of 1995 amounts landfilled by 2013) was also not met.

The objectives and targets in the 2015-24 WMP mainly aim at meeting EU requirements and catching up in areas where performance has been modest. They relate to diversion of biodegradable municipal waste from landfills, municipal waste recycling and reduction of amounts landfilled, combined with a ban on landfilling of unsorted mixed municipal waste and recyclable and recoverable waste, by 2024.

Economic instruments

The use of economic instruments is well established but has so far not been very effective as regards waste management. The mix of instruments is unbalanced, relying heavily on financial support rather than other financial incentives.

The main instruments include a pay as you throw (PAYT) system for collection of mixed household waste, which, together with free separate collection of recyclable waste, could be instrumental in reducing waste going to final disposal; fees for landfilling and for operation of municipal waste management systems; a financial reserve for landfill recovery and decontamination, to be created by landfill operators;¹⁹ a deposit-refund system for beverage containers; and fines for non-compliance. A reduced rate of VAT is applied to municipal waste disposal services (OECD, 2013).

The current instruments do not create the right incentives to follow the waste hierarchy. Municipal waste fees are too low to spur waste reduction and recycling and to cover the cost of service provision. PAYT systems for collection of mixed household waste are in place in only 15% of municipalities.

Other waste-related fees include those charged for ELV collection, processing, recovery and disposal, and for packaging materials under the Packaging Act. To reduce plastic bag consumption, a ban on provision of free plastic bags in shops was introduced in January 2018. Shops have to charge a fee per bag equal to at least the cost of providing the bag to the customer.

Financial support (subsidies) is provided from the SEF and EU funds for recovery operations and from the state budget for waste transport and collection. Tax exemptions are granted for selected commodities and activities. Other financial support measures include grants and loans from the MIT for R&D, support programmes for businesses by the Czech-Moravian Guarantee and Development Bank and grants for remediation of environmental damage.

Investment in waste treatment and recycling facilities, in recycling technology and in R&D for clean production and eco-innovation benefits from government subsidies and EU funding in the form of grants and low-interest loans.

Voluntary instruments

The basic voluntary instruments are part of national programmes on the EU Eco-Management and Audit Scheme (EMAS), cleaner production and environmental labelling. The instrument in widest use is environmental management certification (ISO 14001 or EMAS). Special certification for waste management companies goes beyond the international ISO 9001, 14001 and EMAS standards and aims at improving waste management quality. Voluntary agreements with business sectors exist, but mostly focus on energy, climate and air related issues.

Information tools

The government uses various tools to inform the public about waste management issues and raise awareness about the importance of waste reduction and recycling and environmentally sound management. Information campaigns are used to stimulate separate collection and recycling of selected waste streams. Examples include series of seminars organised by the MoE to promote separate collection of biowaste (BIOTOUR 2015) and PAYT systems in municipalities (PAYT TOUR 2017). Waste prevention and recycling are integrated into school curricula. The MoE issues manuals to inform and guide, including on transboundary waste movements, on food waste prevention for canteens, restaurants and retailers, on construction waste, and on waste management have been promoted as part of an action plan on environmental education and awareness for 2010-12, with an outlook to 2015, and as part of a new 2016-25 programme for environmental education and environmental awareness. The Czech Republic has two environmental labelling programmes for consumer products. The official "environment-friendly product/service" ecolabel of the National Programme for Labelling Environment-Friendly Products is administered by CENIA on behalf of the MoE. Launched in 1994, it was extended to services in 2004, starting with tourist accommodation. The second label is the EU Ecolabel, introduced in 2004 when the Czech Republic joined the EU. The criteria in both cases are basically the same, but product categories differ. There are 72 licence holders in the national programme and 16 in the EU programme. Manufacturers also make self-declared environmental claims and environmental declarations for products.

Businesses are encouraged in several ways to exchange information and experience. Since 2014, the MoE has organised an annual conference on waste prevention at which enterprises can exchange experience on waste recycling and prevention, technology and circular economy approaches. In 2016, the MIT launched a contest called Turning Waste into Resources to promote recycling and the use of secondary raw materials. It aims to raise interest by focusing on enterprises using secondary materials, waste or recycled materials to replace raw material inputs; construction firms recycling their waste and using secondary raw materials; municipalities and other public bodies incorporating recycled waste and secondary raw materials in public tenders for new playgrounds, bike paths, roads, etc.; and students and primary and secondary schools.

4.5. Promoting recycling and waste reduction

Recycling and recovery are promoted mainly through separate collection of municipal waste and extended producer responsibility take-back obligations. The product take-back systems and extended producer responsibility for packaging function well. Recycling targets apply to designated waste streams and products, in line with EU law. They will be further supported by a landfill ban on mixed municipal waste as of 2024 and a progressive increase in the landfill tax for recyclable and recoverable waste.

When the Czech Republic joined the EU in 2004, it negotiated a transition period up to 2005 for reaching mandatory targets concerning the recycling of plastics and packaging waste. It achieved those targets and has since expanded the scope of its recycling measures. The overall recovery and reuse rate is relatively high (77% CZSO; 86% WMIS), but includes backfill and other low-value recovery. European Commission assessments found that waste management options such as reuse and recycling were underexploited. There is thus good potential for further improvement. In particular, the Czech Republic could be more ambitious in promoting high-value recycling.

4.5.1. Separate collection and recycling of municipal waste

Recycling of waste from households and small businesses is encouraged by free separate collection of selected materials and the extended producer responsibility system, associated with the PAYT system (volume-based fees) for collection of mixed household waste. Industry co-operates with municipalities in ensuring the take-back of packaging and selected products through separate collection.

Separate collection has been expanding since the mid-2000s and is well established for packaging waste, paper, plastics, glass and hazardous fractions of municipal waste, in accordance with the 2001 Waste Act. Separate collection of metal and biowaste became mandatory in all municipalities in 2015. Deposit-refund systems for glass bottles have existed since 1950 but their role is decreasing; they currently apply only to beer bottles.

Separate collection of biowaste, while not yet well developed, has progressed rapidly since becoming mandatory in 2015.

To minimise the cost, recyclable fractions are collected through deposits at containers and civic amenity sites, and through take-back systems rather than through door-to-door collection:

- The country has a well-developed and relatively dense network of civic amenity sites where citizens can deposit special waste such as furniture, other bulky waste, hazardous waste and WEEE.
- The container network for collecting packaging waste is accessible and very dense; the number of containers reached 304 000 in 2017 and the average distance to the nearest collection point is about 100 metres. As a result, the amounts of packaging waste collected for recycling and recycled have grown significantly. Most containers are for paper and cardboard, glass and plastic. Containers are also available for textiles and WEEE.
- Metals are generally collected at recycling centres and by scrap metal traders; separate collection in specific containers plays a minor role.

The cost of separate collection through voluntary deposits is about EUR 6 per person per year, below the EU average. The total cost of municipal waste collection, including sorting and treatment, is less than EUR 100/tonne. In municipalities that do not apply the PAYT system, households pay an annual waste fee to cover collection, transport, sorting and disposal. The fee changes every year according to the amount of waste generated, but rarely covers the full cost.

Despite these promising developments and the good results for packaging waste, there is much room for further progress and efficiency gains. The recovery rate, at 30% (CZSO) or 35.6% (WMIS), is notable but low. The recovery target of 50% of municipal waste by 2010 set in the 2003-13 WMP was not met. Landfilling remains common. The share of biowaste in mixed household waste remains high (about 40-50%) and composting rates are low.

4.5.2. Municipal waste fees and charging systems

Municipal waste fees

Municipalities can apply one of three types of fee on waste management:

- A local fee (under the Act on Local Fees, as amended by the Waste Act) paid by households for waste collection services, including transport, sorting, recovery and disposal. The fee has to reflect the cost to the municipality, but is capped at EUR 10 (CZK 250) per person per year for separately collected waste, plus EUR 10 for unsorted mixed waste.
- An optional fee (under the Waste Act) that can be used with a PAYT system. It is set at a level that covers the cost of the waste management system and is not capped. It is often based on the number and volume of waste containers.
- A contractual fee set on the basis of a contract between the municipality and the inhabitant or the producer of waste similar to municipal waste. It is not capped.

The fees are calculated on the basis of the costs to municipalities, but rarely cover them. Most municipalities use the fixed local fee, which is easier to manage and is based on the number of persons in a household. Only 15% of the funds collected reflect the number

and volume of containers or collection frequency (IEEP, 2009). As a result, municipalities still cover 30% of waste management costs from their budget, on average.

Volume-based fees for municipal waste (pay as you throw system)

Reduction of municipal waste and its diversion from landfilling are encouraged through a PAYT system applied to unsorted mixed municipal waste. The fee depends on the amount collected. The method for monitoring amounts varies by municipality. Some weigh the waste collected by trucks, others estimate the weight based on collection frequency or container size. The system, however, is in place in only 10% to 15% of municipalities, mainly small and medium-sized.

The charging system thus gives households little incentive to separate recyclable components and reduce the amount of mixed waste they generate. Municipalities should be encouraged to increase waste fees to a level that ensures full cost recovery and is connected to actual waste generation. Priority should be given to PAYT systems that link fees to the weight or volume of waste collected. Combined with free separate collection, PAYT could play an important role in further reducing the amount of waste landfilled. The use of such systems should be expanded to all areas and made obligatory. The pending new Waste Act provides for revision of municipal waste fees, with the possibility of exemptions for social reasons.

4.5.3. Extended producer responsibility

The 2001 Waste Act includes the principle of producer responsibility and obliges manufacturers and importers of designated products to take the products back at the end of their service life and ensure proper recovery. Besides packaging materials, take-back obligations for producers and importers have been in place since February 2002 for products such as oil, galvanic cells and batteries, electric accumulators, fluorescent tubes and tyres, and since January 2003 for household refrigerators. Targets and deadlines for the collection and recovery of these products have been set. The Czech Republic meets current EU requirements for packaging and packaging waste, WEEE, batteries and accumulators.

A bill on end-of-life products, further strengthening the extended producer responsibility system and expanding it to WEEE, batteries, tyres and ELVs, is pending the adoption of the new Waste Act and the EU Circular Economy package.

The system in place allows for individual or collective producer responsibility. The takeback systems are managed either by individual producers/importers or by associations set up for the purpose under agreements with the MoE such as a 2001 agreement with the Czech association of producers and importers of portable batteries. The sole producer responsibility organisation, EKO-KOM, deals with packaging waste. In 2015, a collective system for tyres was introduced.

Packaging waste

The extended producer responsibility system for packaging is relatively mature and includes a well-performing deposit system (containers) for household packaging waste. When manufacturers or importers do not comply with the packaging law, retailers and distributors are held responsible for take-back obligations. This gives retailers a strong incentive to ensure that suppliers comply with the law and has proved to be a very efficient anti-free-riding measure (Monier et al., 2014).

The system is managed by the producer responsibility organisation EKO-KOM, founded in 1997 by producers and importers of packaging materials, followed by a voluntary agreement between the MoE and the packaging industry in 1999. Since 2000, a producer responsibility system based on the Green Dot system²⁰ has been in effect.

Producers, importers and retailers can join the EKO-KOM system, which fulfils their collection duties mainly through municipal separate collection. More than 20 000 companies participate in the EKO-KOM system, representing more than 80% of the Czech packaging market, as well as more than 6 000 municipalities, representing 99% of the Czech population. EKO-KOM also co-operates with waste management operators to collect packaging waste from industry and retail. EKO-KOM collects producer contributions of EUR 12-240 per tonne of packaging put on the market. The contributions depend on the packaging material and type. For municipal retail packaging waste, the producer fees cover all collection, sorting and reprocessing costs. For industrial packaging only recovery costs are covered. Companies and municipalities are regularly audited: every three years for big companies, every five years for medium-sized companies. In case of non-compliance, the CEI is asked to impose fines.

The system covers all types of packaging. The containers for separate collection of postconsumption packaging are owned by the municipalities, EKO-KOM and waste management companies. EKO-KOM co-finances the municipal collection system on the basis of a calculated average cost, applied to all municipalities. This represents about 71% of EKO-KOM's expenditure. The remaining 29% is allocated to standardised contributions for waste sorting and recover (16%), communications (4%), auditing member companies and municipalities (3%), statistical records (3%), administrative tasks (2%) and state payments (1%). The overall cost for separate collection and recycling of packaging waste is about EUR 5 per inhabitant, which is much lower than in many other EU countries. The recycling targets are differentiated by material in line with EU requirements, but set at a slighter higher rate for glass, paper and plastics (75% for glass and paper, 45% for plastic). They are reviewed periodically.

The system performs well and enabled the Czech Republic to meet the EU recycling objectives for packaging. EKO-KOM estimates that 70% of Czech inhabitants sort their waste. This is encouraged by systematic awareness campaigns, education programmes for children and technical support for local authorities. In 2016, more than 3 million tonnes of packaging were introduced in the market by EKO-KOM members, and almost 0.8 million tonnes of packaging waste were reused and recycled. The overall recycling rate was 77%.

Batteries and accumulators

A voluntary agreement between the MoE and producers and importers of portable batteries, signed in 2001, set up a collective management system for used batteries and accumulators, including batteries removed from WEEE some of which previously escaped the battery take-back obligations. Currently, two such systems exist. They are efficient and expanding, and enabled the Czech Republic to meet the EU recycling and recovery objectives for 2012 in advance (a collection rate of 25%). The achievement of the 2016 targets for collection of portable batteries and accumulators (a rate of 45%) was considered more difficult and supported by information campaigns among end users (in 2015 the collection rate achieved was 36.3%).

Waste electric and electronic equipment

Take-back services for electrical equipment are provided by several collective management systems. The Czech Republic meets the EU requirements for minimum WEEE collection efficiency, but questions remain as to whether it can meet the new 65% target for separate collection of WEEE by 2021.

The 16 systems for WEEE currently operating across the country are all company driven and authorised by the MoE. Their cost-effectiveness is hard to determine. The number of systems, their autonomy and the lack of co-ordination among them make it difficult for the MoE to monitor their performances and financial flows. A consolidation of the 16 systems, associated with regular monitoring and an appropriate clearing mechanism, is urgently needed. It should be complemented with a competition assessment to identify how market forces can be further strengthened. A proposal to create a national WEEE co-ordination centre under the proposed new act on end-of-life products was rejected in 2016 by the companies involved. Current plans are for a co-ordination mechanism under the lead of the MoE in co-operation with the MIT.

4.5.4. End-of-life vehicles

Management system

ELVs are collected at dedicated locations, with the consent of regional authorities. Operators of authorised treatment facilities have to accept the vehicles free of charge, ensure efficient removal of hazardous components and achieve a certain degree of recycling of materials from the vehicle (ecological disposal). The SEF provide maximum financial compensation of CZK 700 per vehicle, depending on the type and quantity of components recovered after dismantling. ELV facilities can use the International Dismantling Information System²¹ to access car manufacturers' information on the types of vehicles put on the market, their components and the way to dismantle them.

The country has a high number of collection points and treatment facilities for wrecked cars (587 treatment facilities were registered by early 2018). This may lead to inefficiency in the system, to supervision and monitoring difficulties and to problems with the quality of end-of-life processing. The number of processed ELVs is monitored through the Car Wrecks Module of the WMIS, into which operators of processing facilities and companies enter data directly. The EU targets for the recovery and recycling of ELVs (a 95% recovery with a minimum of 85% recycling, valid from 1 January 2015) were met with a recovery rate of 95.4% and a recycling rate of 90.3% in 2016.

Fees for second-hand cars

Since January 2009, a special emission tax has had to be paid for second-hand cars. The revenue feeds into the SEF, which allocates part of it to ELV processing in the form of a maximum CZK 700 contribution per vehicle processed in an environment-friendly way in a registered facility. This tax, administered by the MoE and Ministry of Transport, and collected by municipalities with extended competencies, was introduced as an incentive to renew the road vehicle fleet and support the collection and treatment of ELV. It applies to second-hand passenger cars and commercial vehicles weighing up to 3.5 tonnes.²² It is paid once, when an imported vehicle is first registered in the Czech Republic or when a vehicle already in the central vehicle register is first re-registered. Its rate is based on the limit values for exhaust emissions, in accordance with EU regulations. Vehicles meeting at least EURO 3 emission standards are exempt. The new act on end-of-life products will

restrict exemptions to EURO 4 and 5 vehicles, increase the rate and expand use of the revenue to ELV collection in the form of a subsidy to the car owner.

4.5.5. Construction/demolition waste

Particular attention is given to waste from the construction sector. Construction and demolition waste (CDW) accounts for more than half of all waste generated. The amounts generated have been growing since the early 2000s, with a slight decrease since 2010. Further increases are expected by 2020 due to current and planned construction activities (including excavated soils from contaminated sites).

The overall recovery rate of CDW is very high and already well beyond the EU target that sets a utilisation rate of 70% to be achieved by 2020. The rate increased from 56% in 2002 to 85% in 2005 and 97% in 2015 (according to the WMIS). About one-third of recovered CDW is used for backfill, and it is estimated that about 10% of building materials used come from recovered materials. This reveals a potential for more ambitious CDW management policies that ensure a greater share of high-quality recycled output and high-value use of recovered materials.

The current WMP proposes actions that would support such a move, and their implementation should be given priority. They include plans for mandatory use of recycled materials that meet construction standards in projects financed from public funds, and for a decree on asphalt mixtures. Also planned is an amendment of the law regulating technical conditions for building demolition to facilitate reuse or recycling of demolition waste. In January 2008, the MoE issued instructions for the management of construction, maintenance, refurbishment and demolition of buildings, including CDW. More recently, a guide on prevention of construction waste was developed for producers of construction materials, designers, investors, building contractors and the public. It lists construction materials containing hazardous substances and substances with negative effects on human and ecosystem health. CDW recycling is further encouraged by the Association for Recycling of Building Materials in the Czech Republic, which brings together major recyclers and experts from universities and research institutions.

However, the target for CDW recovery in the current WMP is the 70% EU target. This is all the more surprising as the targets set in the previous WMP were more ambitious (50% recovery by end 2005 and 75% by end 2012) and achieved in advance.

4.5.6. Waste-to-energy policy

For the Czech government, the use of waste as an energy source is an important element of a circular economy and is seen as a way to divert waste from landfills and to achieve renewable energy targets. The State Energy Policy considers waste a secondary energy source of domestic origin whose use should be promoted to limit import dependence. Waste is also considered a renewable energy source in the National Action Plan for Renewable Energy Sources under the MIT, and in the Biomass Action Plan 2012-20 under the Ministry of Agriculture.

Czech heating systems long relied on domestic bituminous coal and lignite as their primary fuel, but coal is now being progressively replaced by energy from waste. Since 2015, heat production from biogas is at least 70% derived from animal by-products, manure and biowaste, and receives government support, mainly in the form of green bonuses for small heat production plants (maximum capacity 500 kW).

Out of the 3.3 million to 5.3 million tonnes of municipal waste generated, around 12% is currently used for energy, mainly in incineration with energy recovery (WMIS). The new WMP envisages increasing the waste-to-energy capacity from the current 12% to 18% of total treatment by 2020 and 28% by 2024. CZSO data put the current share at 18% already. Unsorted mixed municipal waste, representing 54% to 62% of total municipal waste generated, contains over 50% biodegradable material that could be extracted for energy.

4.6. Encouraging waste prevention

Public action on waste prevention and reduction in the Czech Republic is fairly recent. It is promoted through the PAYT system for municipal waste, cleaner production programmes and eco-innovation, and other measures in the 2014 WPP and WMP. The WPP covers all waste except bulky waste, and all sectors except agriculture (which is covered by the Biomass Action Plan). The aim is to reduce both the amount of waste produced and the amount of harmful substances in materials and products (in line with EU law). Special attention is given to reduction and replacement of hazardous substances and materials in the construction industry. Composting of biodegradable waste by households (home composting) and municipalities is encouraged by technical means and awareness-raising campaigns. Research programmes and projects related to food waste prevention are also encouraged and supported.

4.6.1. Product policies and eco-design

The framework for eco-design is found in the EU Eco-Design Directive (2009/25/EC), covering 35 product groups, while the REACH and RoHS directives²³ provide the framework for reducing toxic content in products.

The outcomes of eco-design measures and reduction of toxic content in products do not seem to be well known. Little information is available on the effects of the REACH and RoHS directives on waste and materials management. Concrete measures and requirements for manufacturers concerning eco-design give priority to products' energy efficiency rather than material efficiency and component recyclability. This indicates that synergies with chemical policies could be strengthened, and that businesses could be given greater incentives and guidance on design for environment, including through the extended producer responsibility system.

The extended producer responsibility system of the Czech Republic encourages manufacturers to design and make products whose reuse, recycling and disposal at the end of their life are as cheap and easy as possible, and that contain few or no hazardous substances.²⁴ Final users must be informed about how and where to dispose of end-of-life products and be encouraged not to dispose of them in mixed municipal waste. In the case of packaging materials, the role of the system is now limited to provision of advice to manufacturers and importers. Given the modest performance of the Czech waste management system, the current aim is to reduce landfilling first. Other aims, such as waste prevention and eco-design, are of lower priority while recoverable materials are still being landfilled. This may change once the EU circular economy package is implemented in the Czech Republic. The package requires extended producer responsibility systems to take an active role in product design.

4.6.2. Businesses and cleaner production

The Czech Republic has long been active in the field of cleaner production, especially since restructuring and upgrading of industry after 1989 offered an opportunity to move from end-of-pipe to cleaner production technology. Principles of the National Programme for Cleaner Production, launched in 2000, are to be integrated in the work of all ministries. The MoE and Czech Centre for Innovation and Development (former Cleaner Production Centre) assess implementation of the programme.

Companies respecting certain conditions can get loans or subsidies from the MoE and MIT under the Programme Framework on Sustainable Consumption and Production and the Support Programme for Environmental Technologies, both of which include GPP elements. Voluntary cleaner production measures by businesses are supported by the SEF as part of its best available technology programme.

Under the Operational Programme "Environment" 2014-20, businesses, including small and medium-sized enterprises (SMEs), can obtain subsidies covering up to 85% of eligible project costs (co-financing is a prerequisite). Specific support for SMEs, aiming to improve waste management, recycling and prevention, includes bank loans for waste management projects (e.g. from Česká spořitelna and Unicredit Bank).

4.6.3. Innovation and technology development

Eco-innovation policies are guided by the 2009 update²⁵ of an eco-innovation support programme that does not yet reflect the orientation of the 2011 EU Eco-innovation Action Plan. Responsibility for eco-innovation is shared by several ministries, with TACR²⁶ playing a key role in providing access to government support for applied research and experimental development. Demand-side measures to promote eco-innovation include GPP, financial incentives and support for technology transfers.

Several projects supported by TACR focus on aspects of waste management and resource efficiency (e.g. reuse and recycling of specific waste streams, increased use of secondary raw materials, reduced resource consumption) that are of importance to a circular economy. Among these are R&D on construction materials' quality (recyclability, hazardous content) and recycling of construction and demolition waste; processing of biodegradable waste, including into fertiliser and reclamation substrates; use of waste residue from biogas plants; and reuse of recycled paper.

TACR's Epsilon Programme and the Environmental Technology Verification Programme support uptake and commercialisation of new and innovative technology.

- The Epsilon Programme supports projects that develop industrial applications using new technology and materials in energy, environment and transport. Unfortunately, little is known about developments in recent years; there has been no official monitoring of eco-innovation since 2013.
- The Czech Republic participates in the EU Environmental Technology Verification (ETV) programme, which helps companies put cutting-edge technology on the market.²⁷ The Czech verification body, the Czech Environment Management Centre, operates in two areas: materials, waste and resources, and water treatment and monitoring. The first technology verified, with a statement of verification granted in 2016, was aerobic fermentation for processing biowaste from farms and slaughterhouses, developed by AGRO-EKO Ltd.²⁸

According to an EU assessment (EC, 2016), the overall eco-innovation performance of the Czech Republic is close to the EU average, with a high level of involvement of companies in innovation concerning material and energy efficiency, but the level of outputs in terms of patents is rather low. While aspects of Czech science, technology and innovation are catching up with OECD standards, the system as a whole still lags (OECD, 2016). Progress is hampered by weaknesses in Czech innovation policies that equally apply to eco-innovation and the circular economy. For example:

- Despite increased R&D spending in recent years, results remain weak and doubts exist about the effectiveness and efficiency of the spending.
- Czech companies, many of them SMEs, lag behind foreign companies in innovation capacity.
- Foreign companies drive Czech economic growth and are the main factors in Czech companies' growth and output. This means strategic decisions on future investment are made outside the country and foreign companies' activities in the Czech Republic often focus on low value added products and services.
- Co-operation between academia and business is limited. This hampers the commercialisation of research results and their alignment with business needs.

4.7. Towards a circular economy?

The Czech Republic's rather modest performance in waste management means essential steps need to be taken before circular economy approaches can be implemented. But the potential for progress is good. The transition to a circular economy is a strategic objective of the current WMP. It emphasises the value of waste as a resource, with the aim of increasing recycling and reuse and preventing waste generation, and there are many synergies with the country's secondary raw materials policy and the eco-innovation and cleaner production programmes. Their implementation must be on a par with modernisation of Czech enterprises, effective alignment of measures and objectives across policies and ministries, and increased support to businesses that lead the way.

4.7.1. Circular economy approaches

Circular economy initiatives and business models are promoted by business associations, such as the Czech Association for a Circular Economy, which brings together private waste and water management service providers, academics and other entities (<u>www.caobh.cz</u>); the EMPRESS platform, which promotes resource efficiency and sustainable production and consumption; and the Institute for a Circular Economy, which carries out education projects with schools, firms, local authorities, NGOs and others. Enterprises can also share experiences and good practices with recycling, waste prevention, new technology and circular economy approaches at the annual waste prevention conference organised by the MoE.

In practice, circular economy initiatives and circular business models are not yet well developed, but several businesses lead the way (Box 4.2). Many efforts focus on extended producer responsibility and energy-related aspects.

The Waste Management Board of the MoE is seen as an important body for discussing circular economy issues. It includes waste management experts from the government, industry associations, the chamber of commerce, research institutes and NGOs. But there is no institutional platform for broader co-operation to steer the transition to a circular economy and related investment choices. Transition to a circular economy requires a

platform where representatives of business, finance and other stakeholders can meet. It requires measures to address the cost gap between primary and secondary raw materials, more effective incentives for recycling and reuse and better information on the supply of secondary raw materials.

Box 4.2. Recycling and the circular economy

Businesses engaged in efforts that could further the circular economy in the Czech Republic include the following:

Kovohutě Příbram nástupnická a.s. combines waste processing with subsequent use of the resulting raw materials in the same facility. It purchases and processes electrical waste, discarded electrical appliances, waste containing lead, lead-acid car batteries, waste containing precious metals and waste from scrapped vehicles. The resulting secondary raw materials are used in the manufacture of products for construction, engineering, health care, the chemicals industry and electrical engineering.

Replast Produkt s.r.o. in Plzen develops and manufactures recycled PVC products, including traffic marking components, and floor boards for indoor and outdoor use in industry, agriculture and sporting events.

Transform a.s. in Lázně Bohdaneč treats and recycles sorted mixed plastics from municipal waste and industry to produce glass blocks, flower-bed pavements, fence planks, cable gutters, transport pallets, boards, planks, anti-noise screens and various bar profiles.

SILON s.r.o. in Planá nad Lužnicí produces high-quality polyester fibre (TESIL®) from recycled post-consumer PET bottles. The final products include polyester staples, PET straps and PET films. During manufacturing, the polyester fibres are further stretched to a thickness suitable for use in the textile industry. In 2008, TESIL® polyester fibre was awarded the European Union ecolabel and the Environmentally Friendly Product label for textiles.

4.7.2. Secondary raw materials

The country's potential for secondary raw materials is considered high. The Secondary Raw Materials Policy and its action plan on self-sufficiency encourage use of such materials in manufacturing and construction, along with circular economy principles. Planned measures include provision of financial support to businesses under the EU operational programmes and other support programmes, and the design of criteria for by-products and types of waste that are no longer considered waste under circular economy principles.

The Operational Programme "Enterprise and Innovations for Competitiveness" (2014-20) provides grants to support technological change, e.g. the use of innovative low-carbon technology in energy management and the use of secondary raw materials (under specific objective 3.4). These grants are particularly important for the many Czech enterprises that need to substantially upgrade their technological base but can't afford to stop production to do so. The grants support, for example, technology to extract secondary raw materials from waste and end-of-life products of quality suitable for further use in industrial production; technology for efficient extraction of valuable and rare secondary raw

materials from end-of-life products (particularly critical raw materials); and technology to produce innovative products from secondary raw materials.

These initiatives will need to be complemented with better information on the demand and supply of secondary raw materials in line with the Raw Materials Policy Action Plan (MIT, 2015).

4.7.3. Recycling markets

Markets for secondary raw materials are important for the Czech economy, whose primary raw material base is insufficient. Waste is seen as an important source of raw materials and its use is encouraged by recycling obligations and the Secondary Raw Materials Policy. The policy and its action plan on self-sufficiency also call for establishing a trading system for recycled and recyclable materials and products to support businesses. Markets for recycled products are further encouraged by the GPP system.

Markets for secondary raw materials

Secondary raw materials were originally expected to be traded on the Waste Commodity Exchange (WCE), a section of the Czech-Moravian Commodity Exchange in Kladno (CMCEK).²⁹ The WCE builds on a voluntary co-operation agreement between the CMCEK and the MoE, signed in 1996 and extended in 2002. The goal was to support markets for waste and secondary raw materials by using the principles of the commodity exchange and by ensuring transparency in transactions. The system never became operational, however. CMCEK is licensed by the MIT to trade industrial commodities as well as recyclable waste and secondary raw materials. In practice, however, trading is limited to energy (electricity and natural gas) and timber.

Trading in WEEE, waste batteries and accumulators and waste tyres is encouraged under the new draft act on end-of-life products, whose finalisation is pending. Further legal developments depend on the new Waste Act, also pending, and on the EU's Circular Economy package.

Recycling markets thus remain weak, and the potential of waste as a source of secondary raw materials is underachieved. The latter situation is partly due to the fluctuating nature of demand for secondary raw materials. During the economic crisis, demand plummeted, particularly for paper, glass and scrap iron, and some recycling companies went bankrupt. The government later adopted measures to strengthen the market for secondary raw materials, but unlike, for instance, Germany, it created no specific incentives favouring them. In a transition to a circular economy, effective integration of secondary raw materials in an appropriate commodity exchange such as the CMCEK could become a powerful tool.

Demand-side measures planned as part of the Secondary Raw Materials Policy also offer opportunities to strengthen recycling markets. They include a legal obligation to use a given amount of such materials and an obligation to favour products made from such materials in public procurement. The measures are to be supported with financial incentives targeted at businesses, including financial support to compensate for the higher costs connected with the use of secondary raw materials, financial support for eco-design and grants for innovative manufacturing technology and for commercialisation of products made from secondary raw materials. These measures are to be complemented by a public catalogue of available secondary raw materials (under the action plan on selfsufficiency in raw material resources) and regular publication of a specialised periodical on the secondary raw material market.

Green purchasing by the public sector

In the early 2000s, the Czech Republic became the first Eastern European country to develop a national action plan on green public procurement and socially responsible public procurement. In 2010, a government decision³⁰ regulated mandatory application of environmental requirements in procurement by central and local authorities. The GPP guidelines of the decision build on the European Commission Communication "Public Procurement for a Better Environment" and the GPP Toolkit. Though called "rules", they are an expression of political will rather than actual binding rules.

The rules stipulate criteria for purchasing specific products and services, giving priority to products carrying the Czech or EU ecolabel as well as others such as the German "Blue Angel" or the Nordic "Swan", and to products made from recycled materials. Other elements authorities need to consider in procurement decisions include environmental standards and certification (e.g. EMAS, ISO 14001), energy performance certificates, labels guaranteeing the use of a renewable source of energy in production and eco-efficiency throughout the product life cycle. For information and communication technology (ICT) and office furniture, detailed methodologies were adopted and implemented as a pilot. As the pilot results were inconclusive, it was decided not to make detailed methodologies binding, so as to keep some flexibility in their application and facilitate their updating as technologies and legislation evolve.

In March 2016, the Ministry of Labour and Social Affairs, in co-operation with the MoE and Ministry for Regional Development, launched a broader project, "Support of the Implementation and Development of Socially Responsible Public Procurement", including environmental requirements. The related Government Resolution,³¹ adopted in July 2017, abolishes the 2010 government decision that only covered environmental requirements. It includes "Guidelines for the Application of Responsible Public Procurement and Commissioning Applied by the Public Administration and Local Authorities" with environmental requirements concerning energy, water and raw materials consumption, waste generation, pollutant releases into the air, water and soil, and the carbon footprint. The extent to which the circularity of materials and products will be reflected in the guidelines is not yet clear. A website (<u>http://sovz.cz/en/</u>) serves as a platform for sharing experience and good practices.

The application of GPP rules is monitored by the MoE and related data have been released in the ministry's annual report. Unfortunately, little is known about the performance of the Czech GPP in recent years. Data collection was discontinued in 2012 and will resume once a new monitoring system under the new guidelines on responsible procurement will have been established. The latest data available indicate a share of GPP in total public procurement of 78% for ICT equipment and 56% for furniture in 2011.

Further progress will depend on overall progress in the public procurement system. Despite significant reforms since EU accession, the public procurement system is not yet in line with EU best practice. Audits have recognised some improvement in transparency and fairness, but revealed several systemic challenges that need to be addressed. The Czech administration has limited ability to use non-price criteria to evaluate bids and hence too many awards to the lowest bidder. Transparency is lacking, there are accountability issues and conflicts of interest, and public procurement legislation can be circumvented. The SAO identifies procurement as one of the areas with the highest risk

of non-observance of the principles of transparency, non-discrimination and equal treatment. (EC 2015b).

To be effective, implementation of the new flexible, non-binding guidelines for responsible procurement need to be well co-ordinated, regularly monitored and supported with proper training and capacity building. The establishment of a centralised procurement office would be useful.

4.8. Improving the effectiveness of waste treatment and disposal

4.8.1. Waste treatment and disposal

The Czech Republic is self-sufficient as regards landfilling and incineration, but its capacity for treatment and recovery needs to be expanded significantly in light of the planned landfill ban on mixed unsorted waste and the amount of municipal waste generated: 3.3 million tonnes (CZSO)/5.3 million tonnes (WMIS).

Landfilling

The share of landfilling is much higher than in other OECD countries. Despite better alternatives promoted in the WMP, and despite EU funding to finance other methods, the country still landfills more than half its municipal waste. The Czech Republic is among the EU countries with the largest implementation gap in this area. Among the failings identified by European Commission assessments are poor or non-existent waste prevention policies, a lack of incentives to divert waste from landfill and inadequate waste infrastructure. Weaknesses in monitoring of waste sent to landfill further lead to hazardous waste being landfilled, with the landfill risk fee being circumvented (SAO, 2013).

While the Czech Republic achieved the 2010 target of the EU Landfill Directive related to biodegradable municipal waste going to landfill (maximum 75% of the 1995 level), it missed the 2013 target of a further reduction to 50%. Whether it will make the 2020 target of 35% is unclear and depends on adoption of the pending new Waste Act.³² Separate collection of biowaste that became mandatory in 2015 is expected to help achieve the 2020 target, but will need to be supported with information and awareness raising campaigns and with an expansion of the capacities for composting and the production of biogas.

Incineration and energy recovery

The government promotes incineration with energy recovery, including as a way to divert waste from landfill. The country's four incinerators with energy recovery for mixed municipal waste have combined capacity of 777 kt per year (equivalent to 18% of the total generated, according to CZSO data; 12% according to the WMIS). They are located in very populous agglomerations that generate large amounts of waste. Three have been in operation since the early 2000s (Brno, Prague and Liberec), while the fourth (Chotíkov) is more recent. The Brno and Prague facilities are operated by companies that also carry out waste collection for the municipality.

Construction of many waste treatment installations depends heavily on public support, often from EU funds. Financial support has been essential in particular for waste-toenergy facilities, which are not economically viable under current market conditions. In the past, several projects for incinerators had to be stopped due to insufficient EU grants. Competition in the waste disposal sector is not regulated, and the Czech Office for the Protection of Competition finds it inefficient. The main competitors of incinerators are landfills, which offer the cheapest disposal method. Landfilling costs up to six times less than incineration. Incineration prices, determined by investment and operating costs and type of material, range from EUR 56 to EUR 108 per tonne. (OECD, 2013).

In recent years, energy and heat recovery from waste has been promoted by the government to contribute to renewables targets and divert waste from landfill. The WMP calls for further expansion of waste-to-energy facilities by 2024. Given the amount of investment involved in such infrastructure and the risk of creating a lock-in effect, it is important for long-term costs and benefits of alternative waste technology and infrastructure to be carefully examined, along with incineration capacity in neighbouring countries.

4.8.2. Economic instruments for waste disposal

The landfill tax for municipal waste is much lower than in other EU countries, and has so far not been effective economically or environmentally (Figure 4.4). Since 1998, it has consisted of:

- A basic component paid for all types of waste, with the revenue transferred to the municipality in whose territory the landfill is based.
- A risk component applied to hazardous waste, with the revenue transferred to the SEF.

The rates, specified in the Waste Act, were increased over 2004-09, but not since then. In 2016, the basic component amounted to EUR 19 per tonne of non-hazardous waste (about one-third of the average rate in other EU countries) and EUR 63 per tonne of hazardous waste. The fees are collected by the landfill operator, who transfers them to the beneficiaries. Exemptions are granted for waste deposited in landfills as technological material for backfilling, and municipal waste deposited in a landfill on the municipality's own territory.

With landfilling costing about EUR 19 per tonne, no other option can compete. For municipal authorities, which have little fiscal autonomy, landfilling provides regular and welcome revenue. There is thus no real incentive to divert waste from landfill and invest in alternative treatment methods.

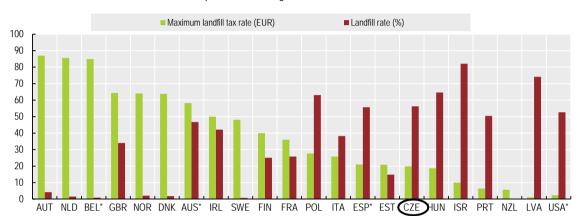
By contrast, the risk fee for hazardous waste is relatively high by EU standards. Thus, hazardous waste "owners" often circumvent it by declaring waste as technological material for landfill backfilling and landscaping, which is exempt from the risk fee. The SAO (2013) reported that most hazardous waste was landfilled almost free of charge. This means less revenue for the SEF and higher environmental risk. It also reveals weaknesses in monitoring of waste entering landfills, and in local implementation of national waste policies.

The WMP addresses these issues, and the draft of the new Waste Act includes revised landfill taxes, with a progressive and differentiated rate increase in line with the landfill ban on recoverable materials as of 2024. The rate for recoverable waste is expected to reach EUR 69 in 2023, while that for mixed non-recoverable waste will reach EUR 24 (Table 4.1). Revenue from the increased fees, other than a compensation fee for municipalities, is to be used to upgrade waste management under the WMP and to deal with waste of unknown origin.

The increased tax rates, however, are not yet in effect, since passage of the new act has been pending for two years. The delay is shortening the time available to effectively divert recyclable and combustible waste from landfill and limiting the funds available for developing alternative treatment facilities.

There is no tax or fee on municipal waste incineration. The introduction of such a tax should be considered as it is a useful instrument to follow the waste hierarchy and stimulate investments in recycling technologies and facilities. Experience in other EU countries could serve as a reference.

Figure 4.4. Landfilling of municipal waste is encouraged through low landfill taxes



Municipal waste landfilling and tax rates, 2013

Notes: *tax rates refer to Flanders for Belgium, to New South Wales for Australia, to Catalonia for Spain, and to New Jersey, North Carolina, Mississippi and Indiana for the United States. Landfill rate: Australia are 2015 data, Ireland are 2012 data. Source: OECD (2017), "Municipal waste", OECD Environment Statistics (database); OECD (2017), "Environmental policy instruments", OECD Environment Statistics (database).

StatLink msp http://dx.doi.org/10.1787/888933723492

Table 4.1. Increased landfill taxes are planned, but approval has been delayed

	2002-04	2005-06	2007-08	Since 2009	2020 planned*	2023 planned*
	(EUR/t)	(EUR/t)	(EUR/t)	(EUR/t)	(EUR/t)	(EUR/t)
Non-hazardous waste: municipal, other (basic fee)	7	11	15	19	_	_
Non-recyclable, non-recoverable waste					19	24
Recyclable, recoverable waste					50	69
Hazardous waste	115	137	174	230	74	74
Basic fee	41	45	52	63	—	—
Risk fee**	74	93	122	167	_	_

* Proposed in the draft Waste Act (under discussion, approval not expected before 2019).

** Hazardous waste declared as technical material for landfill backfilling and hazardous waste containing asbestos are exempt from the risk fee.

Source: MoE (2017), Country submission.

Recommendations on waste, materials management and circular economy

Improve the information base on waste and materials to support policy making

- Harmonise the national waste management information system and official statistics on waste and materials to create a consolidated, transparent integrated system that supports development, implementation and monitoring of national policies and international reporting. Ensure that a related provision is included in the new Waste Act.
- Encourage industry to use waste and materials flow information in combination with accounting data to establish material flow cost accounts so as to better understand the environmental and financial consequences of material and energy use practices and identify opportunities for efficiency improvements (e.g. production processes and product supply chains where material losses could be reduced).

Increase the environmental and economic efficiency of waste management

- Speed up the adoption of the new Waste Act, ensuring its approval no later than end of 2018.
- Review waste-related taxation in line with the waste hierarchy: gradually increase the landfill tax to a level high enough to divert waste from landfill; consider introducing a tax on incineration for reusable and recyclable waste; ensure municipal waste fees cover the full costs of service provision, and extend the pay as you throw system to all areas.
- Provide greater incentives to households to participate in separate collection by implementing door-to-door separate collection.
- Improve separate collection rates for WEEE and improve the cost-effectiveness, monitoring and transparency of extended producer responsibility for WEEE. Conduct a competition assessment to identify how market forces can be further strengthened.
- Enhance co-operation between government levels and find ways for more efficient inter-municipal co-operation on waste management by encouraging the creation of inter-municipal organisations.
- Encourage the use of harmonised cost accounting indicators as part of a broader system to assess municipalities' performance in providing waste services.

Promote waste prevention and circular business models

- Expand efforts early in the value chain to reduce waste generated and hazardous substances in recovered materials. Provide incentives and guidance to businesses on eco-design, including through the producer responsibility systems.
- Strengthen waste prevention in industry by fostering awareness among businesses of the economic and environmental benefits of a circular economy, and by creating incentives for the adoption of new technology and environmental management systems. Exploit the synergies between measures on cleaner production, eco-innovation, waste prevention and secondary raw materials by

establishing effective mechanisms for co-ordinating and monitoring the actions of all ministries involved.

- Strengthen markets for secondary raw materials and recycled goods by stimulating the upcycling of waste, including construction and demolition waste, into high-quality, high-value products, and by integrating secondary raw materials and recyclable waste in the appropriate commodity exchange.
- Strengthen the institutional framework to steer the transition to a circular economy and related investment choices, and set up a platform for broader co-operation where businesses, banks and other stakeholders can meet.

Notes

¹ DMC is the sum of domestic raw material extraction used by an economy and its physical trade balance (imports minus exports of raw materials and manufactured products).

² Including material recycling and composting.

³ Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources.

⁴ Government Regulation No. 352/2014 Coll. on the Waste Management Plan of the Czech Republic.

⁵ The latest such report is on the previous WMP. Available in Czech only, it is from 2010. However, the new WMP contains a more recent assessment of that plan. No assessment is yet available for the new WMP itself.

⁶ Act No. 185/2001 Coll.

⁷ Act No. 477/2001 Coll.

⁸ Government Decision No. 465/2010 – Rules for implementing of environmental requirements in public procurement of state and local administrations.

⁹ Resolution of the Government of the Czech Republic dated 24 July 2017, No. 531 on Guidelines for the Application of Responsible Public Procurement Commissioning Applied by the Public Administration and Local Authorities. <u>http://sovz.cz/wp-content/uploads/2017/11/resolution-no.-531.pdf.</u>

¹⁰ The hierarchy is defined in line with the EU Waste Framework Directive: (1) waste prevention, (2) preparation of waste for reuse, (3) recycling (material recovery), (4) other recovery (e.g. energy recovery) and (5) disposal.

¹¹ Revision No. 229/2014 Coll.

¹² Biodegradable municipal waste diverted from landfill by 2013 and 2020; 50% of waste recycled by 2020; amount of waste landfilled reduced (ban on landfilling of unsorted mixed municipal waste and recoverable waste by 2024).

¹³ Defined in accordance with the EU List of Waste (Chapter 20).

¹⁴ Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste.

¹⁵ The Czech Republic, Hungary, Poland and Slovakia.

¹⁶ www.geology.cz/extranet-eng/sgs/mining-waste.

¹⁷ http://monitor.statnipokladna.cz/en/2017.

¹⁸ Municipalities that inherited responsibilities from the former districts (districts ceased to exist on 1 January 2003) and took over most of the administration of the former district authorities. These municipalities have extended "powers" in areas such as water management, waste management and environmental protection, population records and social affairs.

¹⁹ Landfill owners are required by the current Waste Act to put aside funds for the reclamation and aftercare of the site. The amounts required are CZK 100 per tonne of hazardous and municipal waste and CZK 35 per tonne of other waste, including waste qualified as technological material and asbestos waste.

²⁰ The Green Dot indicates that an entity pays the producer responsibility organisation for takeback, sorting and recovery of packaging waste in accordance with EU Directive 94/62/EC. EKO-KOM was authorised in 2000 by PRO Europe as a licensee of this system.

²¹ www.idis2.com

²² Category M1 or N1 vehicles.

²³ Directive EC 1907/2006 on Registration, Evaluation, Authorisation and Restriction of Chemicals and Directives 2002/95/EC and 2011/65/EU restricting the use of certain hazardous substances in electrical and electronic equipment.

²⁴ The system applies to packaging, vehicles, electrical and electronic appliances, batteries and accumulators, fluorescent and discharge tubes, tyres and oil.

²⁵ Government Decision No. 938 (20.7.2009).

²⁶ The Technology Agency of the Czech Republic is part of the state support system for applied research, development and innovation. It was established in 2009 under the Act on Support for Research, Experimental Development and Innovations. TACR is in charge of implementing innovation policies through targeted support to applied research projects that help increase competitiveness and economic growth. Its largest programme, the Alpha Programme, supports applied research and experimental development in advanced technology, environment, energy and transport. The Epsilon Programme focuses on improving the position of Czech industry by supporting applied research and experimental development with high potential for rapid application in new products, production processes and services; one of its priority areas is the sustainability of energy and material resources.

²⁷ ETV, part of the EU Eco-innovation Action Plan (<u>https://ec.europa.eu/environment/ecoap/etv/about-etv_en</u>), is a new tool allowing claims about innovative environmental technology to be verified by qualified third parties called verification bodies. At the end of the ETV process, a statement of verification is delivered that can be used as evidence that the claims are credible and scientifically sound. Innovations can then expect easier market access and/or a larger market share, and risk for technology purchasers is reduced.

²⁸ <u>https://ec.europa.eu/environment/ecoap/etv/ewa-fermenter_en</u>

²⁹ The CMCEK has been in operation for more than two decades, organising markets in energy, industrial and agricultural commodities. It is a central marketplace for trading in electricity and natural gas to end customers and for trading in timber.

³⁰ Decision No 465/2010, "Rules for implementing environmental requirements in public procurement of state and local administrations".

³¹ Resolution of the Government of the Czech Republic dated 24 July 2017, No. 531 on Guidelines for the Application of Responsible Public Procurement Commissioning Applied by the Public Administration and Local Authorities. <u>http://sovz.cz/wp-content/uploads/2017/11/resolution-no.-531.pdf.</u>

³² The Czech Republic was originally granted a four year derogation for achievement of the EU targets on landfilling biodegradable municipal waste.

References

- CENIA (2016), *Statistical Yearbook of the Environment of the Czech Republic 2015* (Statistická ročenka životního prostředí České republiky 2015), Czech Environmental Information Agency, Prague, <u>http://www1.cenia.cz/www/node/717</u>.
- CENIA (2009), Environmental Technologies and Eco-innovation in the Czech Republic, Czech Environmental Information Agency, Prague, <u>www.cenia.cz/web/www/web-pub2.nsf/\$pid/CENMSFVKXSCW/\$FILE/environmental_technologies_and_eco-innovation_in_the_cr.pdf</u>
- EC (2016) *Eco-innovation in the Czech Republic Country profile 2014-15*, European Commission, Brussels, <u>https://ec.europa.eu/environment/ecoap/sites/ecoap_stayconnected/files/field/field-country-files/czech rep_eco-innovation_2015.pdf;</u>
- EC (2015a), Construction and Demolition Waste management in the Czech Republic, European Commission, Brussels, <u>http://ec.europa.eu/environment/waste/studies/deliverables/CDW_Czech%20Republic_Factsheet_Final.pdf.</u>
- EC (2015b), *Public procurement Study on administrative capacity in the EU Czech Republic Country Profile*, European Commission, Brussels, <u>http://ec.europa.eu/regional_policy/sources/policy/how/improving-investment/public-procurement/study/country_profile/cz.pdf</u>.
- EC (2013), Support to Member States in improving waste management based on assessment of Member States' performance, European Commission, Brussels, http://ec.europa.eu/environment/waste/framework/pdf/Final%20Report%20_130507.pdf.
- EC (2017), *The EU Environmental Implementation Review Country Report: Czech Republic*, European Commission, Brussels, <u>http://ec.europa.eu/environment/eir/country-reports/index2_en.htm.</u>
- EEA (2016), Prevention of hazardous waste in Europe: the status in 2015, EEA Report No 35/2016, European Environment Agency, Copenhagen, <u>www.eea.europa.eu/publications/waste-prevention-in-</u> <u>europe.</u>
- EEA (2016), Waste prevention in Europe: the status in 2014, EEA Report No 6/2015, European Environment Agency, Copenhagen, <u>www.eea.europa.eu//publications/waste-prevention-in-europe-2015</u>.
- EEA (2015), More from less: Material efficiency in Europe, EEA Report No 10/2016, European Environment Agency, Copenhagen, <u>www.eea.europa.eu/publications/more-from-less.</u>
- EEA (2013), Municipal waste management in the Czech Republic, ETC/ETP Working Paper, European Environment Agency, Copenhagen, <u>www.eea.europa.eu/publications/managing-municipal-solid-waste/czech-republic-municipal-waste-management/view.</u>
- Eurostat (2017a), "Generation of waste by waste category, hazardousness and NACE Rev. 2 activity", *Waste generation and treatment* (database), <u>http://ec.europa.eu/eurostat/data/database</u> (accessed June 2017).
- Eurostat (2017b), *Material flows and resource productivity* (database), <u>http://ec.europa.eu/eurostat/data/database.</u>
- MIT (2015), Action plan to support increasing self-sufficiency of the Czech Republic in raw material resources by substituting secondary raw materials for primary resources, Ministry of Industry and

Trade, Prague, <u>www.mpo.cz/en/industry/politics-of-secondary-raw-materials-czech-republic/action-plan--221855.</u>

- MoE (2017), "Response to the questionnaire for the OECD Environmental Performance Review of Czech Republic", Ministry of the Environment, Prague.
- MoE (2014a), Waste Management Plan of the Czech Republic for the period 2015–2024, Ministry of the Environment, Prague, <u>www.mzp.cz/C1257458002F0DC7/cz/plan_odpadoveho_hospodarstvi_aj/\$FILE/OODP-</u> WMP_CZ_translation-20151008.pdf.
- MoE (2014b), *Czech Republic's waste prevention programme*, Ministry of the Environment, Prague, <u>www.mzp.cz/C1257458002F0DC7/cz/predchazeni_vzniku_odpadu_navrh/\$FILE/OO-</u> <u>EN_WPP_Czech-20150407.pdf</u>.
- Monier, V., M. Hestin and J. Cavé (2014), "Packaging waste in the Czech Republic", *Development of Guidance on Extended Producer Responsibility (EPR)*, European Union, Environment Directorate, Brussels.
- Kovanda J. (2013), Material Consumption in the Czech Republic: Focus on Foreign Trade and Raw Material Equivalents of Imports and Exports, Charles University Environment Center, Prague.
- OECD, Green public procurement, website, <u>www.oecd.org/gov/public-procurement/green</u>.
- OECD (2017), OECD Environment Statistics (database), <u>www.oecd-ilibrary.org/environment/data/oecd-environment-statistics_env-data-en</u>.
- OECD (2016a), *Extended Producer Responsibility: Updated Guidance for Efficient Waste Management*, OECD Publishing, Paris, <u>http://dx.doi.org/10.1787/9789264256385-en.</u>
- OECD (2016b), *Policy Guidance on Resource Efficiency*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264257344-en.
- OECD (2016c), *Science, Technology and Innovation Outlook 2016*, OECD Publishing, Paris, http://dx.doi.org/10.1787/sti_in_outlook-2016-en.
- OECD (2016d), OECD Economic Surveys: Czech Republic 2016, OECD Publishing, Paris, http://dx.doi.org/10.1787/eco_surveys-cze-2016-en.
- OECD (2015), Creating Incentives for Greener Products: A Policy Manual for Eastern Partnership Countries, OECD Publishing, Paris, <u>http://dx.doi.org/10.1787/9789264244542-en.</u>
- OECD (2013), Competition Policy Roundtables, *Waste management services*, OECD Publishing, Paris, www.oecd.org/daf/competition/Waste-management-services-2013.pdf.
- SAO (2017), Audit No. 16/23 Funds earmarked for implementation of measures related to waste management, Supreme Audit Office, Prague.
- SAO (2013), Audit conclusion from audit no. 12/20, Funds collected in accordance with Act on Hazardous Waste Management, Supreme Audit Office, Prague.
- SAO (2011), Audit conclusion from audit No. 10/14 Financial Means Earmarked for Measures Regarding the Waste Disposal, Supreme Audit Office, Prague.
- Technology Agency of the Czech Republic, website, www.tacr.cz/index.php/en.



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