

Spending Review of Environment

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Introduction and Summary

The spending review is part of the government's Value for Money project, which reforms the rules, sets up processes and strengthens institutions that support good public interest decisions and significantly increase value for money in the Slovak public sector.

In the second year of the spending review, expenditure on education, labour market and social policies and the environment are assessed, totalling 7.2% of GDP. The interim report identified areas where there is the greatest scope for improving efficiency. The final report then refers to individual measures with an action plan for their implementation. The government will approve the review together with the general government budget by 15 October.

The spending review will review most of the public expenditure during the parliamentary term. It will assess the efficiency and effectiveness of spending and identify measures that will increase the value for money of public finances, thus allowing fiscal savings, better public services to citizens (results) and / or shifting finances to government priorities. It proposes measures in a sustainable way.

In developed countries, a Spending Review is a standard tool to help governments find room in public policies for more efficient use of public funds, as well as the savings necessary to meet national and European fiscal commitments.

The spending review of 0.6% of GDP proposes measures to improve the quality of the environment with a total potential of EUR 130 million (0.1% of GDP), either through lower spending or higher income. The space for savings can be found especially in the streamlining of operations in the state-owned Slovak Water Management Company. Income to the state budget and increase in value will bring measures that will ensure a higher rate of municipal waste recycling and introduction of innovative forms of nature protection financing. The revision identifies options for increasing value and streamlining spending by reducing local air pollution, increasing pressure to comply with public sewerage legislation, and by prioritizing flood control measures. In the Environmental Fund, the review recommends improving strategic management with a focus on results and streamlining the budgeting process.

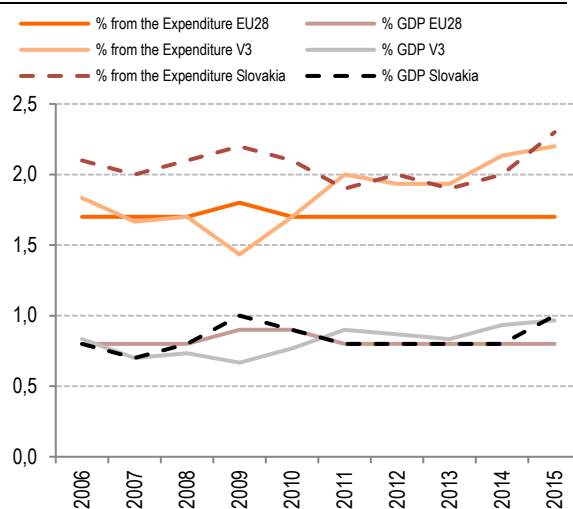
Slovakia shows above-average results in reducing greenhouse gases per GDP, but it is still lagging behind in wastewater management, waste management, and air quality. More than a third of the population is still not connected to the public sewer system, which is significantly more than in the Czech Republic or other OECD countries¹. More than two-thirds of municipal waste ends up in landfills, increasing the risk of environmental contamination and pressure on the use of new resources. The recycling rate is, therefore, one of the lowest in the EU. Air polluted by dust particles in Slovakia will cause more than 5,600 premature deaths. Every year, the entire society loses 63,100 years of life, which represents a cost of EUR 1.95 billion a year.

Environmental protection expenditures in Slovakia are comparable to those of the V3² and EU countries. On average, more than two-thirds of all expenditures of the Ministry of Environment of the Slovak Republic and the Environmental Fund come from EU resources including co-financing (70%), the state budget (18%) and the Environmental Fund (10%). From the budget of the MoE SR, capital expenditures (investments) make up almost 75%. Those are implemented mainly with the support of EU resources.

¹For more information see Chapter 2.1. Waste water treatment and drinking water supply.

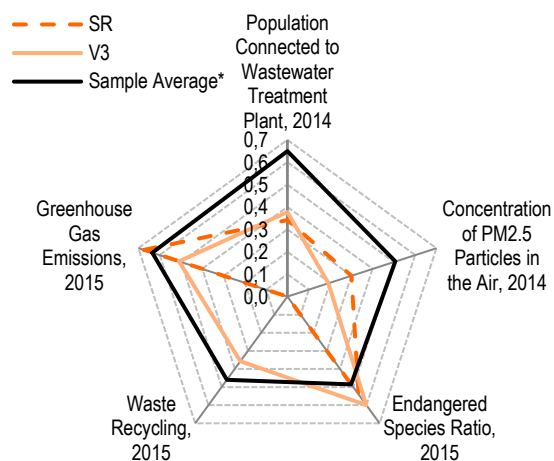
²Czech Republic, Hungary, Poland.

Chart 1: Public Environmental Expenditure (in % of GDP and % of Total Public Expenditure, COFOG 05)



Source: Eurostat

Chart 2: Group of Indicators Pursuing Environmental Objectives (1 = the Highest Score)



*The Sample of Countries Varies Depending on the Indicator. For more Information See Appendix 1.

Source: Eurostat, OECD, EPI

Between 2010 and 2016, the largest amount of funding went to areas with negative results in this period: 43% to wastewater treatment and drinking water supply, 12% to flood control and 15% to waste management. The expenditure review also evaluates expenditure on air protection and climate change, nature and landscape protection, resort operating costs, investment and IT expenditure.

The final report includes an assessment of the greatest challenges in each environmental area from a higher value for money perspective and a proposal for possible solutions.

The air pollution rate is above average. The harmful solid pollutants are the result of inefficient use of solid fuels and internal combustion engines. About 80% of the particulate matter is generated by the commercial, institutional and household sector. The main reasons are the high proportion of solid fuels, including biomass used in households, and the use of inferior internal combustion engines in passenger transport. Targeted support for more efficient combustion plants in households will return several-fold in the form of a positive impact on health, the environment, and the economy. Extending environmental taxes and reducing existing exemptions will contribute to incentives to more efficient energy usage. Proceeds from the abolition of the optional exemptions of approximately EUR 62 million per year can be used to reduce local pollution, e.g. the replacement of household boilers. The phasing out of coal-based electricity production would also have a significant impact on local air quality.

Slovakia has a low recycling rate despite extensive construction of sorting and recovery infrastructure. There is a need for better evidence of existing waste treatment facilities, however, current data shows sufficient capacity with the exception of bio-waste and paper processing facilities. The cost of closing the same landfill area varied significantly, they were up to 7 times higher in some districts. Landfill charges will gradually increase and a mandatory quantity collection for municipalities will be introduced in order to increase the recycling rate³.

Investments in public sewerage and water supply systems have yielded positive results, but Slovakia still shows a below-average rate of the population connected to wastewater treatment plants. The investments focused mainly on meeting the Slovak Republic's commitments to the European Commission. On the other hand,

³Collection of municipal waste and small construction waste, where the fee for the waste depends on the amount or volume of waste produced, called also Pay-as-you-throw system.

smaller municipalities are not eligible for EU funding in this area. They are thus dependent on the annual drawing of small amounts from the Environmental Fund, which are often insufficient to cover the cost of a complete infrastructure building. The review recommends that subsidies from the Environmental Fund should be primarily targeted at municipalities whose projects are in the final stages of water management infrastructure building. New projects should be financed comprehensively. Greater emphasis on the wastewater disposal check can contribute to the connection of approximately 240 thousand residents who do have such an option but have not yet used it for various reasons yet.

Compliance with the prioritization of flood protection projects can significantly increase the amount of damage prevented in the future. Although there are better tools for flood risk management already, lower and low priority projects are currently being implemented for various reasons. Taking measures to eliminate bottlenecks that prevent faster implementation of measures from the first priority tier could reduce future damages by up to EUR 1.3 billion compared to the current construction trend. A lower priority project may be supported if superior projects cannot be financed for other objective reasons, such as land settlement issues.

The long-term sustainability of nature conservation funding can be improved by gradually introducing innovative forms of funding. In order to introduce entry into national parks, it is necessary either to obtain the consent of all landowners or to settle land ownership links.

There is a lack of mandatory procedures for prioritization and effective decision-making on major investment projects. At present, the resort does not apply to prioritize investments in terms of value for money. Each major investment will pursue the fulfilment of strategic objectives and will contain a feasibility study, a relevant analysis of the investment efficiency, and a consistent assessment of other implementation alternatives.

Environmental Fund has the scope to reduce the administrative burden and improve strategic management and analytical project evaluation. Determining a fixed share of the revenues generated from the auctioning of emission allowances to be used for the Fund's projects would help to meet the environmental objectives. The change in revenue budgeting needs to be combined with better spending planning that would ensure non-deficit management. In the area of repayable support, sufficient attractive conditions have not yet been created and therefore the revision recommends strengthening not only loans but also guarantees or equity investments in profitable projects. All repayable forms of support may also be offered under a combined credit and subsidy scheme. Developing a multi-annual support strategy and better analytical evaluation of projects will help improve the strategic management of the Fund. Project selection and evaluation criteria should primarily take into account outcome indicators.

By the end of 2020, the Slovak Water Management Company will gradually reduce its operating costs by EUR 20 million by gradually implementing the optimization measures. Centralization of executive and support functions, elimination of unnecessary activities and higher outsourcing, as well as rationalization of the mechanisms fleet, will lead to higher efficiency and lower costs.

Improved data collection results in greater efficiency. The data availability is more or less restricted. There is scope to improve the quality of monitoring and subsequent reporting in most cases. The data are not comprehensive and often occur in paper form (e.g. registers in waste management, Environmental Fund projects), which is demanding in terms of processing time. Subordinate organizations of the MoE SR collect relevant information that is often not freely available. Data should also be regularly published and used for evaluating activities to increase value for money.

Principal measures

The spending review of environment identified the following main measures in addition to the recommendations in the text. The potential savings or yields or the potential to improve value in EUR or other outcome or output indicators are calculated for each measure if fully implemented. It also defines measurable indicators, responsibility, and deadline. The tasks and their indicators will be elaborated in the Implementation Plan:

Saving

Area	Task	Saving/Yield (in EUR Million)	Measurable Indicator	Responsibility	Deadline
SWMC	Gradually implement measures to streamline operations according to the BCG audit	20	The difference in operating costs compared to the 2015-2017 average	SWMC	2018 - 2020
Waste Management	Gradually increase landfill charges and introduce mandatory quantity collection	58	Proceeds from the landfill levy	MoE SR	2019 - 2021
Air pollution control	Abolish optional excise tax exemptions (coal, electricity, gas)	65	The volume of optional exemptions for coal, electricity, and gas	MoF SR	2018
Nature conservation	Introduce innovative forms of nature conservation funding	6	% of resources outside the state budget and EU funds	State Nature Conservancy (SNC)	2018

Value

Area	Task	Value (per annum)	Measurable Indicator	Responsibility	Deadline
Air Pollution Control	Reduce air pollution by promoting the replacement of more efficient household combustion equipment (e.g. EUR 40 million)	EUR 160 mil. on health benefits	Reduce the PM2.5 emissions	MoF SR, MoE SR	2018
Air Pollution Control	Gradual downsizing of coal electricity production	EUR 500 mil. health benefits + EUR 100 mil. lower electricity consumer spending	% of coal electricity	Ministry of Economy of the SR	
Flood Protection Measures	Take measures for better compliance with existing prioritization of new flood protection projects	EUR 13 mil. on averted damage	Amount of funds used for highest priority projects	SWMC	2020
Public Sewerage	Ensure control of proper waste management and apply sanctions	up to 240,000 residents connected	Residential connection to the public sewerage	MoE SR	2020
EF	The aim of subsidies in wastewater management and drinking water provision is to focus on comprehensive projects	N/A	Residential connection to the water management infrastructure	EF	2018

Management

Area	Task	Measurable Indicator	Responsibility	Deadline
EF	<p>Improve strategic management with a focus on results:</p> <ul style="list-style-type: none"> · develop a multi-annual support strategy based on prioritization of target areas and projects · increase the use of loans in the Fund · improve analytical evaluation, including conversion of selection criteria to outcome criteria 	Yes/No	MoE SR, EF	2018
EF	<p>Streamline the budgeting process:</p> <ul style="list-style-type: none"> · the change in revenue budgeting needs to be combined with better spending planning · decide on a fixed percentage of revenues from the auctioning of emission allowances used to provide grants and loans 	<p>Difference between budgeted and actual revenue and expenditure</p> <p>Share of subsidies in annual EUA revenue</p>	MoF SR, EF	2018
Nature Conservation	Prioritize support for protected areas and for the measures in individual protected area management documents	Amount of funds allocated on the basis of value for money analysis	State Nature Conservancy (SNC)	2018
Nature Conservation	To complete the NATURA 2000 framework in Slovakia	Percentage of habitats and species of Community importance for which Sites of Community importance have been designated	MoE SR, SNC	2020
Investments Preparation and Evaluation	Develop and publish the MoE investment plan, regardless of the source of funding	Yes/No	MoE SR	2018
Investments Preparation and Evaluation	To carry out a feasibility study and a cost-benefit analysis for all investments over EUR 30 mil. (over EUR 10 mil. in IT). Publish feasibility studies before approving major investments	Yes/No	MoE SR	2018
Investments Preparation and Evaluation	Follow the applicable Public Investment Assessment Framework when conducting cost-benefit analyses	<p>Average internal rate of return (IRR) of projects launched</p> <p>Average benefits-costs-ratio of projects launched</p>	MoE SR	2018
IT	Establish and monitor the cost and performance ratio of information systems, including subordinate organizations	Yes/No	MoE SR	30.10.2017
IT	Develop a migration plan of the IS to the government cloud.	Yes/No	MoE SR	30.10.2017

Data and Methodology

Area	Task	Measurable Indicator	Responsibility	Deadline
Environmental Burdens	To adjust the methodology for prioritizing environmental burdens, particularly on the basis of their impacts on population and the environment	Existence of methodological adjustment	MoE SR	2018
Air Pollution control	Increase the number of monitoring stations, improve the methodology for calculating the number of individual pollutants and improve the monitoring of air quality and air pollution	Existence of methodological adjustment	Slovak Hydrometeorological Institute (SHMI)	2018
Nature Conservation	Ensure evidence of expenditures of SNC, which will allow comparison based on value for money	Existence of methodological adjustment	State Nature Conservancy (SNC)	2018
Flood Protection Measures	Adjust existing project prioritization based on quantification of as many evaluation criteria as possible	Existence of methodological adjustment	SWMC, WRI	2020
Waste	Collect data on treatment facilities and collection yards with regular updates (capacity, waste amount) electronically	Existence of methodological adjustment	MoE SR	2018
Investments Preparation and Evaluation	Update the CBA methodology from the OP Environment to be in line with the Public Investment Assessment Framework, be binding on all investments regardless of the source of funding and specify parameters for the environmental sector	Existence of methodological adjustment	MoE SR	2018

Analytical tasks

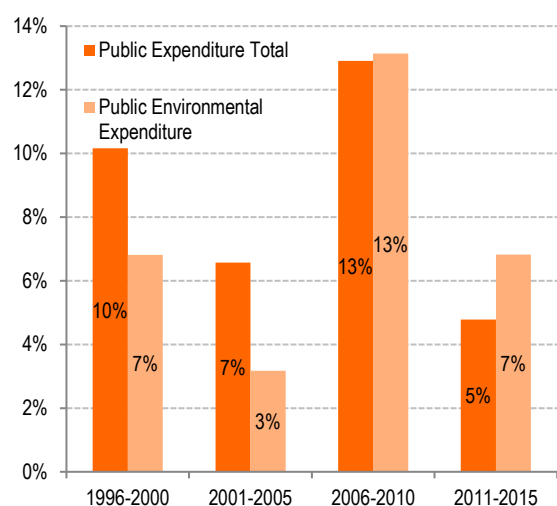
Area	Task	Responsibility	Deadline
EF	Develop benchmarks for individual areas of support	MoE SR	2018
Water Economy Building Company (WEBC)	Perform an audit of WEBC	MoE SR	2018
Slovak Environmental Inspectorate (SEI)	Perform a process audit (an adaptation of directives, sample analyses, the unification of competences and control rules of individual sections)	MoE SR	2008
Flood Protection Measures	Analyse flood causes	MoE SR, SWMC, WRI	2020
Flood Protection Measures	Evaluate the effects of different types of green-box and grey-area measures on flood and other functions of the country	MoE SR, SWMC, WRI	2020
Nature Conservation	Conduct an analysis of negative externalities and their monetization	MoE SR	2018
Public Sewerage	To carry out a study of alternative systems of wastewater removal and treatment (more cost-effective than conventional means) in the Slovak Republic	MoE SR, SAE, EF, WRI	2018
Public Sewerage	Find alternatives to public sewerage financing: water and sewage pricing analysis, PPP projects, loan financing	MOE SR, WRI	2018

1 Environmental Expenditure

Environmental protection expenditures in Slovakia are relatively comparable to those of the V3⁴ and EU countries. Public environmental expenditures in 1996 - 2005 grew more slowly than total public expenditures. In the period 2006 - 2010 they equalled the average growth and in 2011-2015 the average growth even accelerated by 2 p.p. Slovakia spends on the environment a share of GDP comparable to the EU and the V3 countries. The average for the period 2006 - 2015 for all three observed groups is the same (0.8% of GDP). The share of total public expenditures is on average higher by 0.2 p.p. compared to the V3 mean and by 0.4 p.p. compared to the EU average. In 2015, there was an increase in expenditure due to the closure of operational programs.

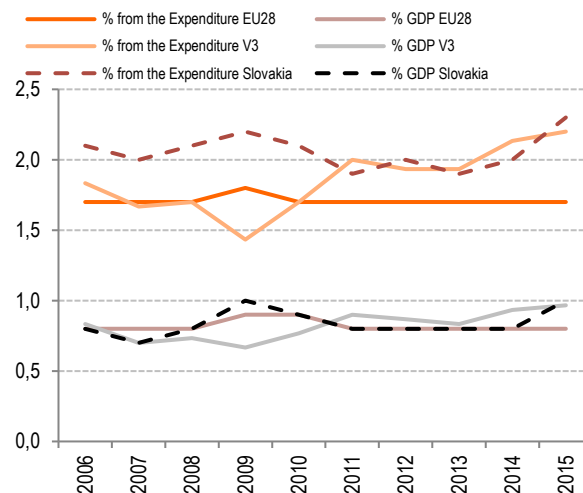
The objective of the environmental expenditure revision of 0.6% of GDP is to propose expenditure and structural measures to streamline the investment envelope, increase the effectiveness of environmental protection programs, and reduce unit operating costs in the Ministry of Environment chapter in a sustainable manner while maintaining stability for the years 2017 to 2020. Public investment and environmental policies are aimed at improving the quality of the environment.

Chart 3: Average Growth in General Government Expenditure (in %)



Source: Eurostat

Chart 4: Public Environmental Expenditure (in % of GDP and % of Total Public Expenditure, COFOG 05)



Source: Eurostat

More than two-thirds of all expenditures⁵ come from EU resources including co-financing (70%), the state budget (18%) and the Environmental Fund (10%), mainly in the form of capital expenditure. In 2015, expenditures increased significantly due to the drawdown of structural funds under the Operational Program Environment (OP Environment) scheme. In addition to the expenditures of the central body and the Environmental Fund, the revision also analyzes the expenditures of the state-owned enterprise in the competence of the Ministry of the Environment - the Slovak Water Management Enterprise in the amount of approx. EUR 115 mil. The expenditures of the second state-owned enterprise - the Water Economy Building Company, have not yet been analysed. State-owned enterprises do not fall within the general government sector and therefore only the transfer from the state budget to these state-owned enterprises is included in the baseline scenario.

⁴Czech Republic, Poland, Hungary.

⁵Expenditures of the Ministry of the Environment of the Slovak Republic and the Environmental Fund.

Table 1: Basic Scenario of all Expenditures of the MoE SR and the Environmental Fund (in EUR Mil.)

	2016S	2017BS	2018BS	2019BS	2020BS
State Budget	56	65	67	68	70
Current Expenditure	49	60	62	63	65
Capital Expenditure	7	6	5	5	5
EU Funds + Co-financing	237	409	111	614	686
Current Expenditure	30	4	4	4	4
Capital Expenditure	207	406	107	610	683
Environmental Fund	66	28	29	30	31
Current Expenditure	17	6	6	6	6
Capital Expenditure	50	19	20	21	22
Expenditure on Financial Assets and Liabilities Transactions	0	3	3	3	3
Total	359	502	206	712	788
% GDP	0.4%	0.6%	0.2%	0.8%	0.8%

Source: BIS

The baseline scenario for the general government budget for the years 2018 to 2020 will be updated with the macroeconomic forecast and the resulting impacts in the unchanged policy scenario or within the measures included in the baseline scenario while maintaining the level of expenditure under the Stability Program for the years 2017 to 2020.

BOX 1: Methodology of Calculation of Basic Scenario in the Environment

The basic data come from 2016 and has been adjusted as follows:

- The budget of the Environmental Fund was adjusted during the year for extraordinary calls, which cannot be considered standard. The baseline scenario is based on the approved 2016 budget.
- The irregularities of current transfers in flood control measures (unregulated payments) and air protection have been eliminated using the average for the past 4 years.
- The baseline scenario (BS) does not include the SWMC, only the transfer from the state budget.
- In the NPC scenario, expenditure on **SK PRES**, costs under OP Environment (the OP has already ended) and other one-off costs were deducted.
- In the area of Species and Territorial Protection, Nature and Landscape Protection in the framework of current transfers from the SR, the average for the period 2013 to 2016 was taken into account due to the **projects** implemented in 2015 and 2016. In the item Goods and services, the planned higher expenditures in 2017 for contributory organizations for project sustainability and other non-budgeted expenses were added.
- **Executive and legislative bodies, financial and budgetary matters, and foreign relations** - due to the irregularity of expenditure and higher fees expected, the baseline scenario is presented by the general government budget.
- In addition to capital and current expenditure with irregular amounts over the reference period, the current value in 2016 was taken into account. Capital payments and exceptions to current expenditure have been averaged over the last 4 years. The resulting values were indexed for the following years (2017-2019) for current transfers and goods and services for inflation forecasts. Capital transfers and the acquisition of capital assets were indexed for GDP growth at current prices corrected for the elasticity of tax and levy revenues. Wages, salaries, public service income, personal adjustments, insurance, and insurance contributions were indexed by the private sector wage growth forecast.
- Only those EU funds, including co-financing, budgeted in RIS were taken into account.

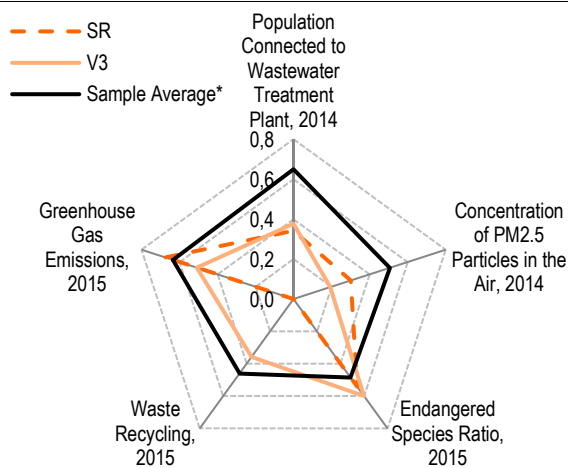
The revision of expenditures proposes measures that bring higher revenues to the state budget and savings by expenditure reallocation. On the other hand, it includes value-adding measures that have a negative impact on the general government budget.

2 Revision Areas

The main objective of environmental policy is to improve the quality of the environment in order to protect public health, prevent the loss of biodiversity and ecosystems, prevent environmental risks, and promote the market for secondary raw materials. The results will be monitored by a set of indicators, with the exception of⁶ flood control measures and environmental burdens.⁷ The aim is to approach the EU average level through higher efficiency.

Slovakia shows above-average results in reducing greenhouse gases⁸ relative to the size of the economy, but it is still lagging behind in wastewater management, waste management, and air quality. (Haluš and Dráb, 2016). More than a third of the population is still not connected to the public sewer system, which is significantly more than in the Czech Republic or other OECD countries⁹. More than two-thirds of municipal waste ends up in landfills, increasing the risk of environmental contamination and pressure on the use of new resources. The recycling rate is, therefore, one of the lowest in the EU. Air polluted by dust particles in Slovakia will cause more than 5,600 premature deaths according to the EEA. Every year, the entire society loses 63,100 years of life. The total annual cost of such lost years is EUR 1.95 billion¹⁰.

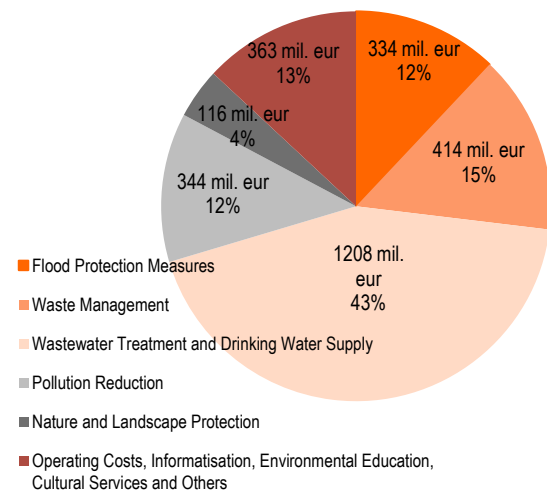
Chart 5: Group of Indicators Pursuing Environmental Objectives (1 = the Highest Score)



*The Sample of Countries Varies Depending on the Indicator. For more information see Appendix 1.

Source: IEP acc. OECD, Eurostat

Chart 6: Average Share of Total Expenditure per Area in 2010 - 2016



Source: BIS

Between 2010 and 2016, the largest amount of expenditure went to the following areas: 43% to wastewater treatment and drinking water supply, 12% to flood control and 15% to waste management, environmental burdens included¹¹.

⁶There is currently a lack of data with the necessary periodicity and the possibility of international comparison.

⁷For more information see Appendix 1: Result indicators overview.

⁸Within the analysed countries, Slovakia ranks worse than the mean value of the given indicator expressed as an arithmetic average.

⁹For more information see Chapter 2.1. Waste water treatment and drinking water supply.

¹⁰For more information see Chapter 2.5. Air protection and climate change.

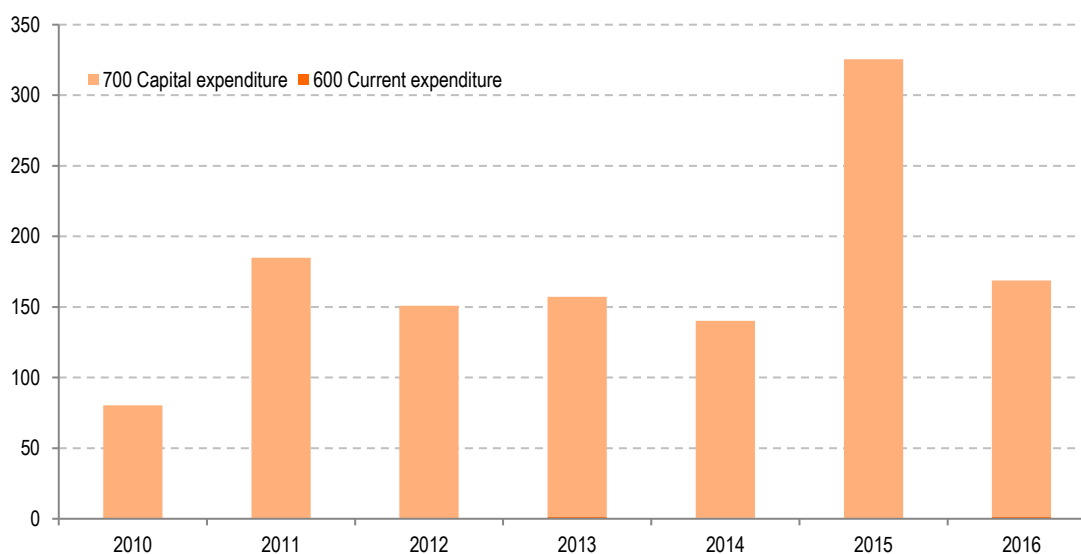
¹¹For more information see Appendix 4: Overview of expenditure assessed in the revision.

2.1 Wastewater treatment and drinking water supply.

More than EUR 1.2 billion from the EU resources, state budget, and the Environmental Fund were invested in water management in order to achieve good water status for all waters. In 2015, the percentage of the population connected to water supply increased to 88.3% and in case of public sewerage system to 65.2%. More than 240,000 residents who have not yet joined the public sewerage system may do so in the near future if there is a greater emphasis on wastewater disposal control. Other alternatives to finance the construction and maintenance of water infrastructure are used to a limited extent. More than EUR 18 mil. from the Environmental Fund were invested in projects without results. Support should, therefore, be targeted at fewer coherent projects that will bring more connected residents in the short term.

Since 2010, more than EUR 1.2 billion has been invested in wastewater management and drinking water supply. The aim is to fulfil the obligation of the Slovak Republic¹² to ensure collection systems for urban water and subsequently to ensure the required wastewater treatment for agglomerations with a population equivalent (PE) over 2,000¹³. The good status of all waters¹⁴ should be achieved by 2015, respectively by 2027 at the latest¹⁵. The funds in the form of capital expenditures come mainly from the EU Cohesion Fund (87%) including compulsory co-financing as well as from the Environmental Fund (13%). On average, approx. EUR 167 mil. were spent on water pipes, sewerage and improvement of monitoring activities.

Chart 7: Overview of Expenditure on Wastewater Management and Drinking Water Supply (in EUR Mil.)



Note: Current Expenditures Are Negligible Compared to Capital Expenditures and Are Therefore Almost Invisible on the Chart.

Source: BIS

Drinking water has maintained a high level of quality long-term. This is due to the fact that more than 82% of the drinking water supplied comes from underground sources that are of high quality and less susceptible to pollution (Public Health Authority of the Slovak Republic, 2015). Sanitary limits in drinking water in distribution networks were

¹² The target is set by the Treaty of Accession of the Slovak Republic to the EU dated 16.4.2003 pursuant to Council Directive 91/271 / EEC.

¹³ The population equivalent (1 PE) is the amount of biodegradable organic pollution expressed as the value of the indicator of biochemical oxygen consumption in five days (BOD5), which is equivalent to the pollution of 60 g BOD5 produced by one inhabitant per day (Act No. 364/2004 Coll.).

¹⁴ The objective is established on the basis of the Water Framework Directive 2000/60/EC, which creates a legal framework for the protection and improvement of the status of waters, aquatic ecosystems and the sustainable, balanced, and equitable use of water.

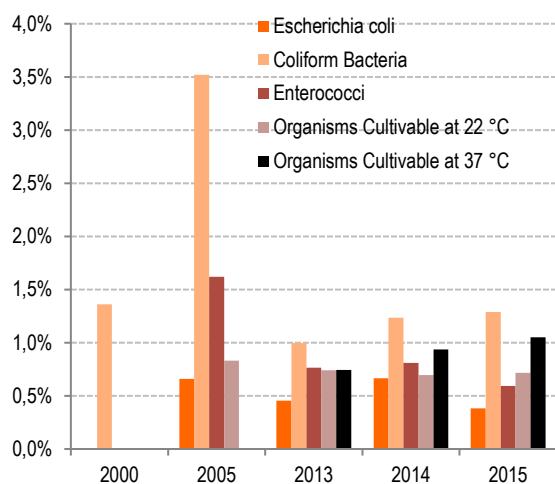
¹⁵ The Directive allows Member States to apply a derogation to the natural conditions of a water body and to extend the period to achieve the good water status until 2027.

most frequently exceeded in 2015 in indicators showing faecal contamination (Escherichia coli, coliforms, enterococci), general water contamination (cultivated microorganisms at 22 ° C and 37 ° C), micromycetes detectable by microscopy, abiosestone, and living organisms¹⁶.

Private wells is often contaminated and does not meet the standards. According to the WRI, up to 80-85% of non-public water, e.g. private wells does not meet hygiene standards (most often due to the presence of faecal contamination, nitrates, and iron). The reason is insufficient depth of wells and wastewater leakage to their vicinity.

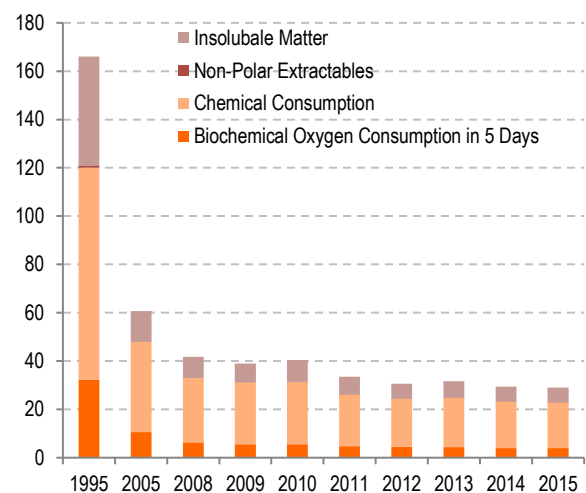
The amount of pollutants in wastewater is decreasing. Industry, agriculture, and households are the main wastewater polluters. Hydromorphological changes, such as changes in watercourses caused by construction of water structures, also have an impact on the water status. Between 1995 and 2015, the number of pollutants dropped by almost 80%. This is the result of the modernizing construction of wastewater treatment plants and the application of more efficient treatment processes (SEA, 2015) as well as the decline in industrial production.

Chart 8: Proportion of Non-Compliant Samples of Selected Drinking Water Indicators



Source: SAE, WRI

Chart 9: The Amount of Pollutants in Wastewater (in Thousands of T)

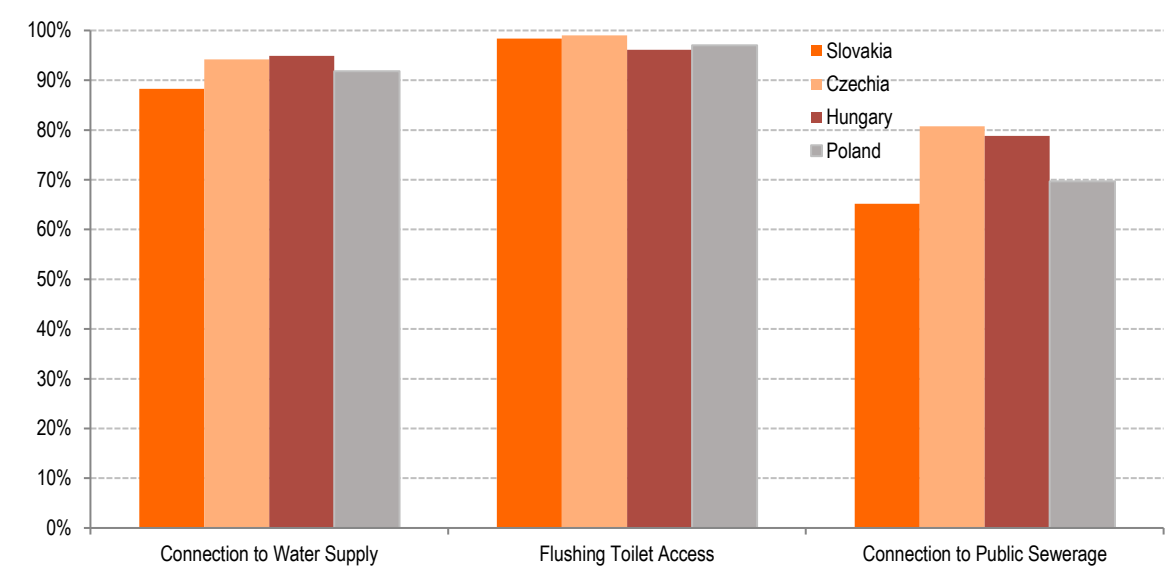


Source: SAE

The share of the population connected to public sewerage systems is still below average in international comparison. Investments in infrastructure brought an increase in the share of the population connected to the public water supply system from 85% in 2007 to 88.3% in 2015. Almost 100% of the population has access to drinking water and safe sanitary facilities as well as an interior flush toilet. The water cycle also includes wastewater removal and treatment. Connection to public sewerage also increased from 54% to 65.2%. In the 2007-2013 programming period, the OP Environment supported projects for the construction of sewer systems and wastewater treatment plants, as well as for intensification of wastewater treatment plants in order to ensure the removal and treatment of urban wastewater in accordance with the commitments of the Slovak Republic towards the EU. The Managing Authority for the OP Environment, which is the Ministry of the Environment of the Slovak Republic, registered a higher demand of applicants within the announced calls compared to the available allocations determined in the calls. This shows that the objectives of the OP E corresponded to the identified problems and the real needs of potential applicants. Nevertheless, it was not possible to cover all the needs of the Slovak Republic in this respect.

¹⁶ Drinking water quality and health safety are determined through a set of 82 indicators.

Chart 10: Access to the Water and Sanitation Services in 2015



Source: Statistical Offices of Individual Countries, Eurostat

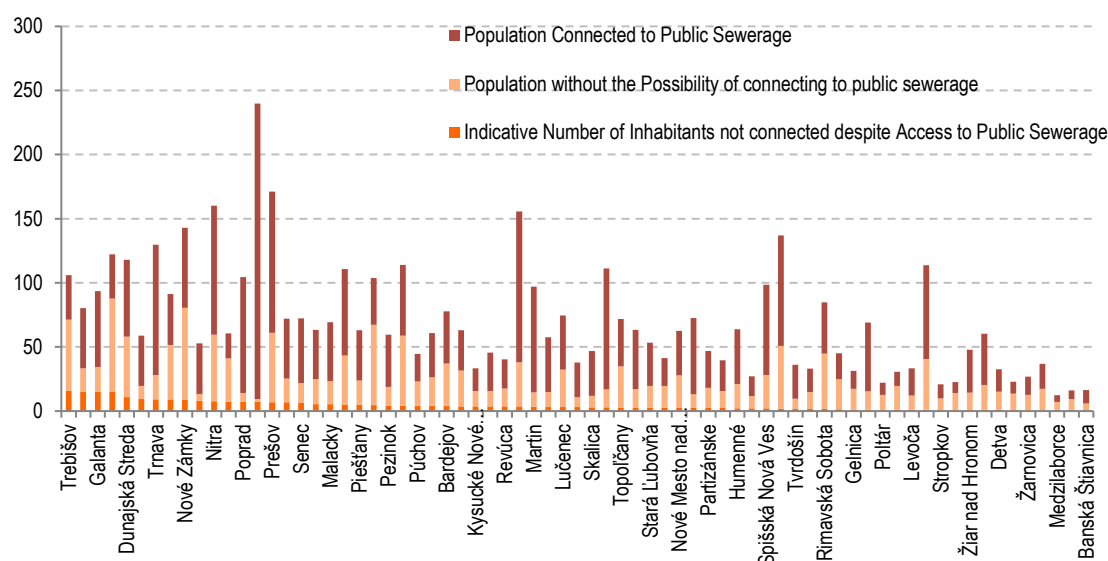
According to the Public Sewerage Act¹⁷, every owner of a property producing wastewater must be connected to the public sewerage. In the case that the owner of the building or the land is authorized for a different method of wastewater management, this obligation ceases.

The infrastructure built can service an additional 280 thousands of inhabitants. Based on an estimate of the mayors of individual municipalities about the percentage of public sewerage available to the population in 2014, the already built public sewerage would be able to serve additionally more than 280,000 inhabitants. It is estimated that 22,000 inhabitants will be connected within the projects financed from the OP Environment, which are in the 5-year maintenance phase, and therefore the total estimate will decrease by this value approximately. The first group of people who did not join the public sewerage system are those who are authorized for another method of wastewater management. Upon expiry of the permit, the resident is obliged to connect to the public sewerage (if technically possible). The second group consists of residents who have not settled wastewater drainage in accordance with current legislation and are not interested in getting connected or cannot afford it due to financial reasons. Citizens face additional costs of building a drainage connection and paying a monthly collection. The population in each group cannot be identified based on the data available.

Connection of inhabitants to public water supply and sewerage, as well as wastewater treatment plants within supported projects from the OP Environment, can be reported only after the completion of the project's implementation, or after issuing the final operational authorization, which is preceded by a trial operation. In the case of WWTPs, the trial operation usually takes 1 year (often more). For this reason, the inhabitants are being connected to the newly built sewerage networks with a time lag, within the project sustainability period (5 years after proper completion of the project - both material and financial). An increase in residential connection to public sewerage is therefore foreseen. On the basis of a rough estimate, another 22,000 residents can be connected in this way.

¹⁷Act No. 442/2012 Coll. on public water supply and sewerage systems and on the amendment of Act no. 276/2001 Coll. on regulation in network industries.

Chart 11: Residential connection to the public sewerage in 2014 listed by districts (in thousands of inhab.)



Note: Bratislava is Not Located in the Chart to Maintain a Better View. 99% of the Population is Connected to the Public Sewerage.

Source: IEP Based on the WRI Data

A targeted information campaign and greater emphasis on controlling the disposal of wastewater from unconnected households can contribute to increasing the number of connected inhabitants. The proper operation of septic tanks, domestic sewage treatment plants, and other facilities is usually more expensive than charges for discharging wastewater into public sewerage. However, small fear of fine in the case of failure to maintain can distort these financial incentives. The revision, therefore, recommends stricter monitoring of compliance with the applicable legislation on wastewater treatment in households and imposing incentive fines by municipalities and district authorities. On the basis of a rough estimate, the additional investment costs due to the construction of the sewer connection for a family house equipped with a septic tank will be recovered within 5 years through lower operating costs¹⁸.

Environmental education and awareness-raising on the environmental and health implications of wastewater discharges into groundwater and surface waters have proven to be a very effective tool for increasing citizens' willingness to connect to the public sewerage. Improper management of wastewater increases the risk to health through contamination of drinking water, causes odour, and can lead to the deaths of water animals. Raising awareness of water protection can thus motivate people to care for the quality of the environment in their immediate neighbourhood.

Other alternatives to finance the construction and maintenance of water infrastructure in larger agglomerations are used to a limited extent. The construction of public sewerage and wastewater treatment plants is currently focused mainly on agglomerations of population equivalent over 2,000, where the objective set out in the Treaty on the Accession of the Slovak Republic to the EU should be met¹⁹. By 2015, but by 2018 at the latest, all agglomerations of over 2,000 population equivalent are to be connected to the public sewer system. Nevertheless, 177 municipalities from this category did not have sewerage systems in 2016. Thus the OP Quality of Environment continued to focus mainly on these agglomerations, where 41 projects were approved in the

¹⁸A model example for a household with an annual average water consumption of 120 m³ and a septic tank with a volume of 10m³, the disposal of the septic tank contents cost of EUR 50; construction of sewerage connection in the amount of EUR 2,450 (excavation works, installation of sewerage in the length of 25 m, project documentation, the connection proper), sewerage charge EUR 1.2 per m³. If a purchase of a new septic tank is being pondered, the recovery period of additional costs will drop to less than 3 years.

¹⁹ According to Directive 91/271 / EEC and the Water Framework Directive.

contracted amount of EUR 400 mil. Nevertheless, it is not possible to cover all the needs of the Slovak Republic from the Structural Funds to achieve the objectives set out in the Accession Treaty. Another option of funding is by including appropriate investment and operating costs in the payment for the drinking water supplied and wastewater drained.

The residential connection to the public sewer systems in the municipalities with a population under 2,000 is below average. Almost 28% of the population live in agglomerations of population equivalent up to 2000. Of these, 40% are connected to the public sewerage and another 870 thousand (60%) do not have this option yet. In 2018, the Environmental Fund will launch a call for low-developed regions, which will focus specifically on water management projects.

Table 2: Connection of Municipalities to Public Sewerage in 2015

	Municipalities in Agglomerations		The Population of Municipalities in Agglomerations		Residential Vonnnection to the Public Sewerage	
	Number	Share	Number	Share	Number	Share
Agglomerations of PE over 2,000	633	22%	3,915,146	72%	3,164,429	58%
<i>Public Sewerage</i>	457	72%	3,640,132	93%		
<i>No Public Sewerage</i>	176	28%	275,014	7%		
Agglomerations of PE under 2,000	2,257	78%	1,506,203	28%	369,912	7%
<i>Public Sewerage</i>	587	26%	614,995	41%		
<i>No Public Sewerage</i>	1,670	74%	891,208	59%		
Total	2,890	100%	5,421,349	100%	3,534,341	65%

Given the financial demands of water management construction, it would be advisable to provide financing for more cost-effective alternatives to the construction of sewage treatment plants, such as the plant-based wastewater treatment. Natural and technical possibilities of the construction of plant-based WWTPs²⁰ in the conditions of the Slovak Republic should be assessed by the available study. Such WWTPs are common abroad, e.g. in the Czech Republic, Denmark, and Belgium.

The subsidy method does not bring the highest value. It is possible to secure part of the funds that municipalities use as the main source of financing from the Environmental Fund. If the application for funding is approved, municipalities draw small amounts each year from which they are unable to build a complete infrastructure and the project is thus prolonged over time. Municipalities may not obtain resources to continue the project every year, which delays its use. Water pipelines are similarly demanding on investment and construction time. For example, the municipality of Bežovce was approved for support in the amount of EUR 767 thousand in the field of wastewater management in 2013-2015. However, based on the available 2015 data, no residents connected²¹ to the public sewer system are registered. Based on the available data, there are no registered residents in further 120 municipalities that were supported by the Environmental Fund at least once in the period 2011 - 2014.

²⁰Plant-based WWTPs are artificial wetlands with plants and animals with the ability to eliminate pollution in waste water.

²¹The municipality is obliged to provide data according to Act No. 442/2002 Coll. on public water supply and sewerage systems and Decree 605/2005 Coll. on the data provision. If the investment is in trial operation or not approved officially, municipalities have no obligation to report this fact. Likewise, a sewage system or water supply can be considered as public if more than 50 inhabitants are connected to it.

Table 3: Overview of Supported Projects from the Environmental Fund Related to the Sewer System in Bežovce

	2013	2014	2015
Approved Drawdown Amount	367,000	200,000	200,000
Population	979	982	971
<i>Inhabitants Connected</i>	0	0	0

Source: IEP Based on the WRI and EF Data

In 2011 - 2014, the Environmental Fund supported 452 projects amounting to EUR 56.8 mil. Almost 66% (EUR 37.32 million) of the total volume of support related to public sewerage and wastewater treatment plants went to wastewater treatment in agglomerations of population equivalent up to 2000. EUR 18 mil. was therefore invested in projects without registered added value.

Table 4: Overview of Approved Drawing Amount for 2011 - 2014 (in EUR million)

Supported area	Approved Drawdown Amount	Costs Unused
Extension or Intensification of Existing Wastewater Treatment Plants	2.9	0.1
Wastewater Treatment Plants in Agglomerations of PE 2,000 - 10,000	3.9	2.1
Water Resources Protection	3.1	1.8
Wastewater Treatment Plants in Agglomerations of PE up to 2,000	37.3	14.1
Extension or Reconstruction of the Existing Sewer Network	9.6	0.5
Total	56.8	18.5

Source: IEP Based on the EF Data

Subsidies from the Environmental Fund should be primarily targeted at municipalities whose projects are in the final stages of water management infrastructure building. Completion of projects under construction will operationalise the investments "lying in the ground".

New projects should be financed comprehensively. Support should, therefore, be targeted at fewer coherent projects that will bring more connected residents and decrease wastewater pollution in the short term.

2.2 Flood protection measures

Flood prevention is more cost-effective than post-disaster relief. Slovakia has the tools to identify the most vulnerable areas that will be cost-effective to address. By faster preparation of flood protection projects, it will be possible to achieve higher benefits compared to the current trend of construction. A better overview of flood protection solutions can be obtained from the efficiency analysis of individual green-box and grey area measures and from the analysis of the flood causes.

Flood prevention is more cost-effective than post-disaster relief. The US Federal Emergency Management Agency reports the 1: 4 cost ratio of preventive measures to damage prevented for all types of disasters and up to 1: 5.1 for floods ([FEMA, 2007](#)). The ratio in the UK is 1:9 ([OECD, 2016](#)). In Slovakia, we have faced two major flood situations of pan-European significance since 2000, with damage exceeding USD 10 billion in the Danube and Elbe basins. The first situation occurred in 2002, with the total damage in the Danube and Elbe basins exceeded USD 21 billion. The second situation occurred in the same area in 2013, with damage reaching USD 13 billion. Fortunately, Slovakia was not affected as much as neighbouring countries and in 2013 Bratislava was effectively protected from the consequences of 100-year-flooding-event. Compared to 2002, when the flood barrier has not yet been built in Bratislava, damages in 2013, even at a higher flow rate, reached only 2% of the 2002 damages ([SAS, 2015](#)).

Slovakia has the tools for effective and efficient flood management²². Three useful tools for flood planning, prevention, and warning have been developed in previous years. The Slovak Hydrometeorological Institute the **POVAPSYS (Flood warning and forecasting system)** project put into operation. The Slovak Water Management Company as the administrator of important watercourses prepared the **Flood hazard maps** and the **Flood risk maps**²³. These are the most important tools in identifying risk areas and in developing land-use zoning plans. Based on the flood hazard maps and flood risk maps, the **Flood Risk Management Plans in the Sub-Basins of the Slovak Republic (FRMP)** were approved by the MoE SR. FRMPs include proposals to implement measures aimed at reducing the likelihood of the individual territory flooding and reducing the potential adverse consequences of floods for human health, the environment, cultural heritage, and economic activity. They include identification of 588 endangered areas in Slovakia and suggest possible measures for each area. Each FRMP will be reviewed every 6 years and updated if necessary.

BOX 2: Green or Grey Measures?

Green or **nature-friendly** measures increase the landscape's water retention capacity. The effect of green measures lies not only in water retention in the country but also in biodiversity or flood protection. Green measures are for example intermittent dams, afforestation, or restoration of a flood plain.

Grey measures mean larger infrastructure projects whose primary objective is to protect the area from flooding by mitigating or safely carrying a flood wave forward. Examples are water reservoirs, polders, dykes, or water trough modifications. The risk of a rapid flood wave forwarding may be a worse flood at places below the regulated section of the watercourse. Under the investment measures, **a mix of green and grey measures** appears to be the **most advantageous**²⁴. The effectiveness of green measures is not well documented since it

²²The main legislative instrument is Act no. 7/2010 Coll. on flood protection, as amended, which, among other things, ensures good cooperation between ministries.

²³The flood hazard maps define the geographical areas in which the preliminary flood risk assessment identified the existence of a potentially significant flood risk and areas where a significant flood risk is likely to occur and contain data on the potentially adverse consequences of floods.

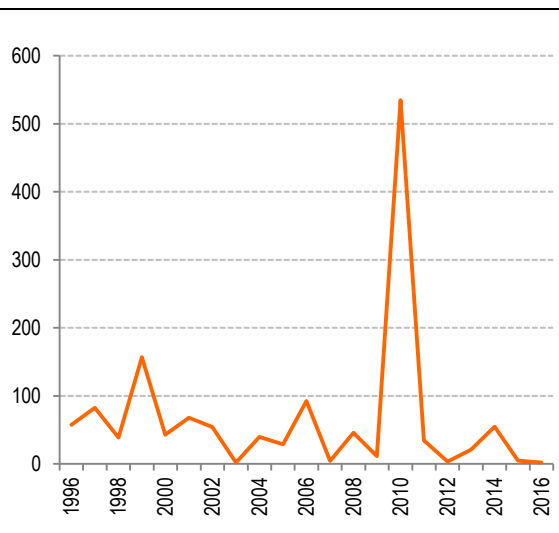
²⁴ FRMP, p. 62

is not possible to regulate flow rates as with grey measures (EK, 2017). Green measures have benefits that go beyond a purely flood-related function that has not yet been quantified. On the other hand, the grey measures have a quantified efficiency and they might have a multipurpose use, e.g. water reservoirs.

The function of the green measures will be assessed by the ministry in terms of flood-protection and other functions in the country, such as the ability to retain water in the country and prevent drought. For grey measures, for example, the impact of flow acceleration from regulated river sections will be studied. The efficiency analysis of both types of measures will result in accurate evaluation of the effectiveness of individual construction types, their overall impact on the environment and consequently better decision-making regarding the type of measures preferred.

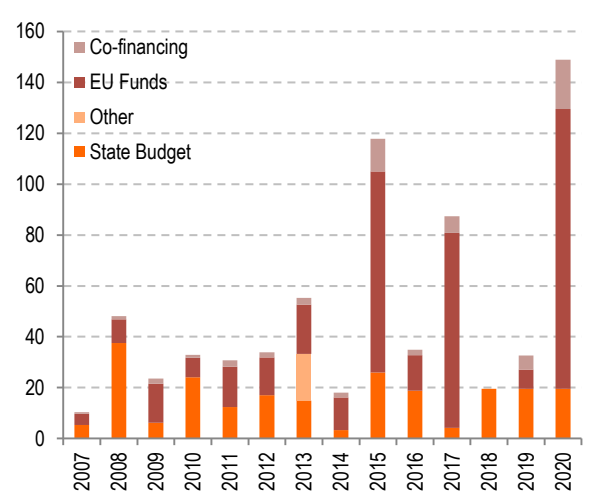
Between 1996 and the end of 2016, the cost of security work, rescue, and flood damage totalled EUR 1.39 billion. The average annual damage for the whole measured period thus reaches EUR 66 million. The worst year was 2010 when the total damage reached more than EUR 534 million. Between 2011 and the end of 2016, however, the average annual flood damage fell to EUR 22 million. The flood risk management plan estimates the annual damages of future floods at EUR 51.5 million a year.

Chart 12: Total Damages and Costs Incurred in 1996 - 2016 (in EUR Million)



Source: MoE SR, Department of water

Chart 13: Expenses on Flood Protection Measures in the Period 2007 – 2020 Classified by Resources (in EUR Million)²⁵



Source: BIS

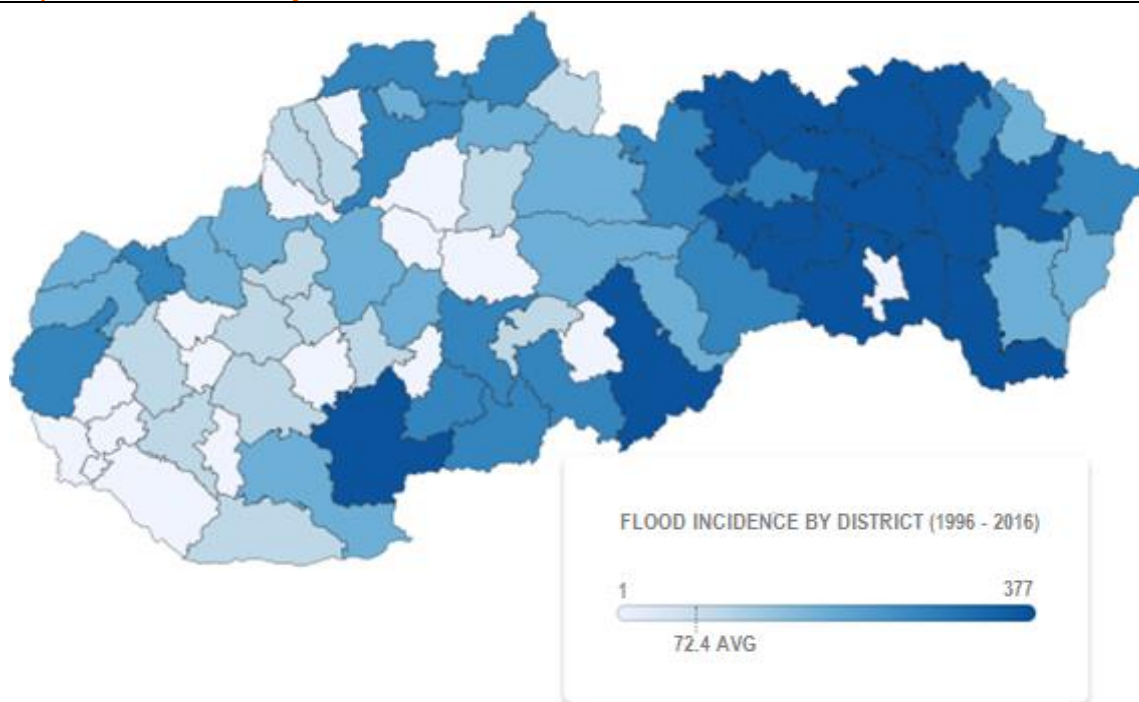
Funding for investment construction largely depends on the Structural Funds. The revision evaluates projects supported by the EU Structural Funds under the OPE in 2007-2013 and from the Environmental Fund in 2013-2016. From the operational program, the following amounts were used: EUR 145 mil. directly for flood protection measures in the country, EUR 148 mil. for the purchase of equipment needed for rescue and security work, ²⁶EUR 12.6 mil. for the development of flood risk and risk maps EUR 20 mil. for developing the Flood warning and forecasting system POVAPSYS. Within the calls of the Environmental Fund in 2013 - 2016 funds for the construction of flood protection measures in the amount of EUR 5.25 mil. were used. The recipients of subsidies are municipalities and state enterprises under the founding competence of the MoE SR, the Ministry of Agriculture and the Rural Development (MARD SR) of the SR and the Ministry of the Interior (MOI SR).

²⁵Outside of the Environmental Fund.

²⁶Within the project Active Flood Measures, equipment for the Fire and Rescue Service, the Slovak Water Management Company (the equipment is on loan) and for 771 municipalities was purchased. The use of equipment by the municipalities is not documented.

Eastern Slovakia was the most affected and the most supported as well. Between 1996 and 2016, 40% of the floods were registered in the Prešov Region, which represents 18% of the territory and 15% of the population of the SR. The highest shares of flooded urban areas are in Košice (7.7%), Prešov (7.1%) and Bratislava (6.9%), while Nitra (1.6%) and Trenčín (2%) are the least vulnerable.

Map 1: Number of Floods by the District in 1996 - 2016



Source: IEP according to the OP E and EF Data

In general, projects in areas with a higher number of floods were supported²⁷. In the past, other tools have been used to identify problem areas. The theoretical application of the current criteria back to the past shows that funds were also directed to areas with a lower incidence of floods²⁸. Recently²⁹, funds in the amount of EUR 30.7 mil. have been spent on such projects which could not be supported under the current conditions. According to the Flood Risk Management Plan approved in December 2015, flood investment is always linked only to areas where two or more floods occurred in the period 1997-2010³⁰. The retrospective application of this exclusion criterion to projects shows that, since 2013, areas with no or just a single flood occurrence since 1997 have been supported. In this statistic, the Environmental Fund seems less targeted than the Structural Funds, when up to 45% of domestic fund expenditure was used in areas with one or no year-on-year flood recorded. For the Structural Funds, this was 23% of expenditure.

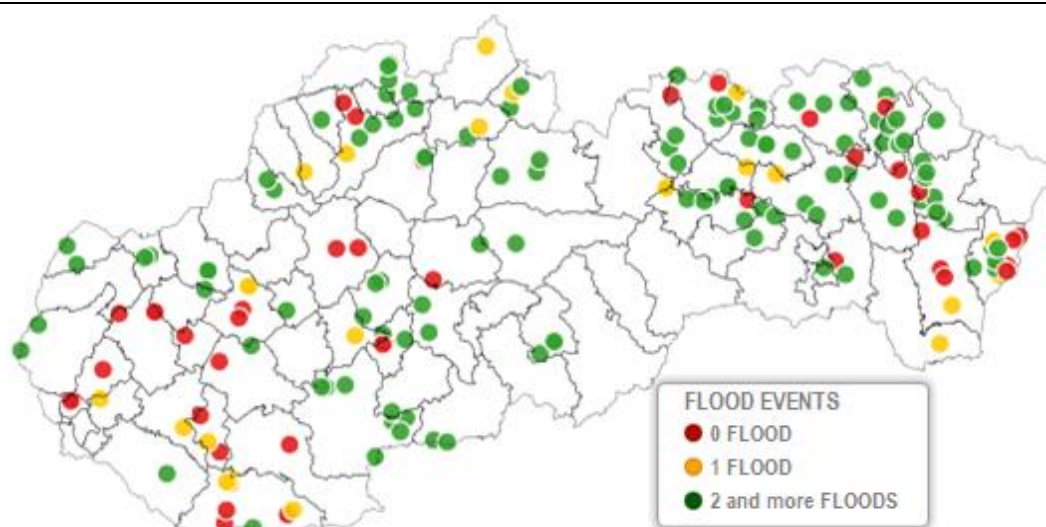
²⁷The only criterion by which we can retroactively assess the risk rating of a territory is the frequency of floods.

²⁸Prior to the approval of the first Flood Risk Management Plans, the classification of the different areas for implementation of flood protection measures was carried out on the basis of the national level analyses which applied slightly different principles compared to the procedures developed under the implementation of Directive 2007/60 / EC.

²⁹ 2007-2013 Structural Funds, 2013-2016 Environmental Fund.

³⁰The assessment process included 2,459 geographical areas in which the III. degree of flood activity expressing the real flood hazard for the site in question was declared at least once. Geographical areas where III. degree was declared during the 14-year assessment period only once have been provisionally excluded from areas with a potentially significant flood risk, as the occurrence of one flood in 14 years does not normally indicate the existence of a significant flood risk.

Map 2: Allocation of Projects of the OP E and the Environmental Fund (2013 - 2016) according to the Number of Floods since 199731



Source: IEP Based on the MoE SR - Department of Water, EF, and OP E Data

Project prioritizing is not consistently applied in practice for various reasons. Of the 32 sites where projects are planned in the near future, only 19 are of the first priority as set out in the Flood Risk Management Plans. FRMP projects were divided into three priority groups based on eight criteria. The first plans to support projects that should deliver the greatest value for money and will lead to an expected amount of EUR 3.23 billion of potential damage prevented. The deadline set is by 2021. Most of the projects planned (19) are from the first priority group. However, the list of projects also includes projects ranking 431, 323 or 285, and in the preparatory phase there are projects which do not appear in the Flood Risk Management Plans at all ³²and will not be implemented on the basis of the criteria set out in the FRMP. A project with a lower priority can be primarily supported if the projects above it cannot be implemented for other objective reasons (land settlement, higher preparedness of a lower priority project, etc.).

Table 5: Plan for Building Flood Protection Measures by 2019

	Number of Projects	Construction and Maintenance Costs	Potential Damage Prevented
1st Priority	19	EUR 168 mil.	EUR 762 mil.
2nd Priority	4	EUR 16 mil.	EUR 31 mil.
3rd Priority	5	EUR 43 mil.	EUR 15 mil.
Outside the FRMP	4	N/A	N/A
Total	32	EUR 227 mil.*	EUR 808 mil.*

*The total amount does not comprise the projects outside the FRMP

Source: IEP Based on the FRMP and SWMC Data

³¹The criterion was defined for the planning cycle 2015-2021. Until then, the planning of the flood infrastructure was based on the documents in force at that time - the Flood Protection Program until 2010 and the Water Policy Concept until 2015.

³²Projects implemented on the basis of the Resolution of the Government of the Slovak Republic, within the Investment Priorities of the Government of the Slovak Republic, etc., which have been developed over the years due to specific circumstances in the relevant region. Alternatively, they are projects prepared before FRMP approval

BOX 3: FRMP Prioritization Criteria

The methodology of current prioritization of flood protection measures de facto prioritises areas with a higher value of damages prevented, higher damages prevented to costs ratio, and higher implementation costs³³. Prioritization, however, was not intended that way and should take into account 8 criteria in equal relative weight kritérii³⁴ (numbering corresponds to relative importance).

1. inhabitants endangered
2. number of economically sensitive objects
3. number of environmentally and strategically sensitive objects
4. number of cultural heritage objects
5. number of flood management plan measures
6. amount of the damage prevented
7. total implementation and maintenance cost during the operational lifetime
8. damage prevented-to-cost ratio

In terms of cost-effectiveness, the most important criterion is the ratio of the amount of damage prevented to the cost of measure implementing and maintenance. This ratio should certainly not be less than 1:1 and ideally should not fall below 4:1 as stated by FEMA³⁵. Of the 32 sites planned to be built by 2019, seven are below 1:1 and the other 10 projects are below 4:1 in terms of damage prevented-to-cost ratio. An example is the flow adjustment of the Neresnica brook in Zvolen, where we can prevent “only” 430 euros of potential flood damages for every EUR 1000 invested³⁶.

Strict adherence to prioritization can significantly increase value for money. In the current construction plan until 2019 it is possible to prevent damage of EUR 808 mil. and protect 22 thousand inhabitants for EUR 227 mil. In adherence with prioritization (FRMP), we would be able to implement projects for the same amount, which would prevent the amount of damage higher by EUR 1.54 billion and would protect 38 thousand more people. If all the criteria had the same weight (FRMP 2), we would still be able to prevent an additional EUR 407 million of damage and protect 21,000 more people. In both FRMP and FRMP 2 cases, we would achieve better results in all 8 criteria for the same cost. In the theoretical scenario, we focused on the highest possible cost-effectiveness in terms of avoided damage, efficiency coefficient, and population protection only. Given the number of projects that would have to be completed, we would again achieve better results in the other 5 criteria set out in the FRMP. In terms of project readiness, this scenario is currently unrealistic.

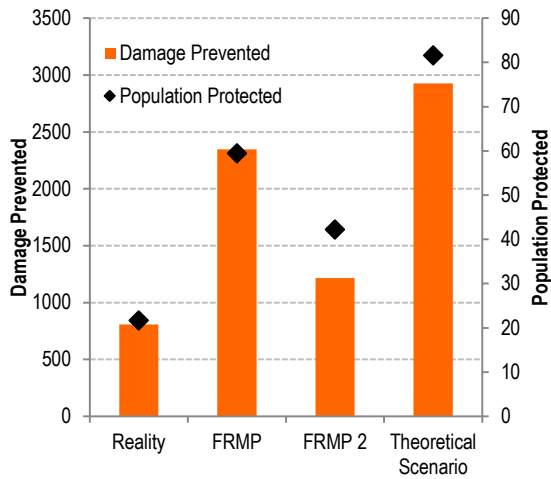
³³Criteria with a higher number of unique values were preferred.

³⁴In the case of the same total, a criterion with the lower serial number is preferred.

³⁵The ideal cost-benefit ratio is an indicative depending on morphology, population density, and the like.

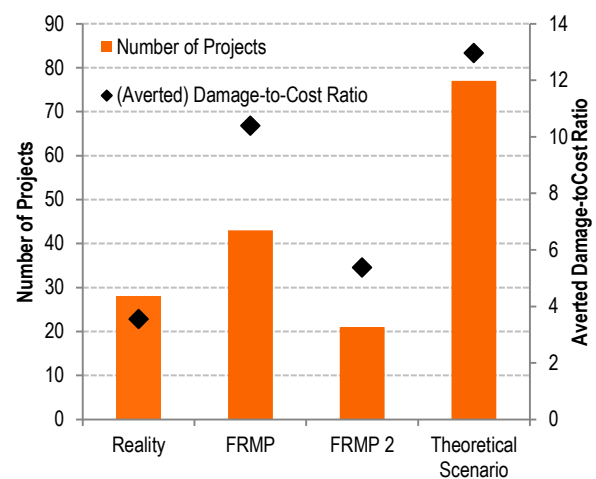
³⁶ In this case, the reason for implementation is to ensure the continuity of the Krakow - Budapest transport corridor. However, this criterion was neither defined in the FRMP nor quantified.

Chart 14: Value for Money of the Projects at a Cost of EUR 227 mil.



Source: IEP Based on the FRMP Data

Chart 15: Number of Projects and Damage Prevented-to-Cost ratio Depending on the Scenario



Source: IEP Based on the FRMP Data

Implementing measures to better adhere to prioritization for all new projects could bring up to EUR 1.3 billion of prevented damage more compared to the current construction trend. In the current plan, the benefit-cost ratio is 3.5:1. In the first priority group, this ratio is 11:1. Slovakia still has an estimated budget of EUR 170 million at its disposal from the OP Environment for flood protection measures. The difference between the value of projects in the priority group and the current trend is almost EUR 1.3 billion which at the assumed 100-year lifetime represents an additional EUR 13 million of prevented damage. In order to improve the preference for the construction of the most effective projects from FRMP 1st priority group, it will be necessary to prepare projects in the flood protection area for implementation more quickly. The most pressing reasons for the slow process are lengthy public procurement or demanding land purchase without the possibility of expropriation.

The key value-for-money indicator of building flood control measures does not have a clear methodology. In the FRMP, 101,000 persons at the flood risk were identified, of which 71,000 are to be protected in the first priority by 2021. However, the total number of persons³⁷ protected in the OP Environment is set at almost 13,000 inhabitants during the next programming period. Slovakia can achieve this goal by implementing two flood protection projects with a sufficient number of inhabitants protected. 226 thousand persons were protected in the previous OPE³⁸, with the target being 71.5 thousand inhabitants. These gaps in plans and outcomes point to inconsistencies and differences in methodologies.

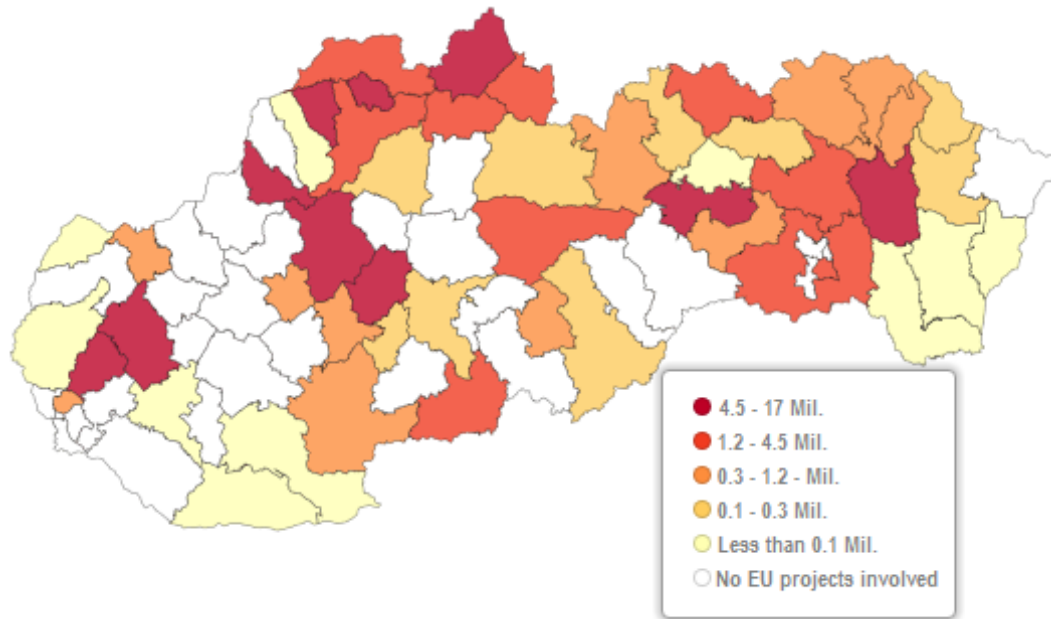
There were no measurable indicators of project effectiveness, especially in the past. There are no backward evaluation criteria for the Environmental Fund and only one criterion evaluating the cost-effectiveness, namely the size of the protected area, was included in the OP E for all projects.³⁹ According to this indicator, the most expensive region is the Žilina region, where one protected km² cost us an average of almost EUR 1 mil. , while in Nitra or Košice region it is only about EUR 30 thousand. The large difference between the costs of individual flood protection measures is due to different natural conditions or to systematic and inconsistent data collection rather than cost inefficiency.

³⁷Population benefiting from flood protection measures' indicator.

³⁸Section of Environmental Programs and Projects of the MoE SR.

³⁹Of the set of measurable indicators, only this indicator occurred in all projects.

Map 3: Price of Protected Area (EUR / km2)



Source: IEP according to the OP E Data

The collection of flood data needs to be improved in order to allocate the location, date and amount of the costs of security work, rescue and damage to each flood event, and to process this data in an appropriate form. These details are already being collected to some extent and will be available in the coming years. The assessment of floods in buildings crossing the cadastral area (roads, railways) is posing a problem still. There is no legal requirement to cover the damages caused by the floods, therefore not all mayors have the motivation to report floods or flood damages even if they are legally obliged to do so⁴⁰. **It is essential for the future that flood reports also include information about the cause of the flood in each affected area. The analysis of the causes of floods should also cover all types of floods caused by groundwater, surface water, and surface runoff in rural landscapes and urban areas.**

The efficiency ratio is the best value-for-money metric. It is the ratio of potential damage prevented to construction and maintenance costs over the life of the work. The amount of damage prevented is calculated on the basis of the methodological material for the estimation of flood damages developed by the Water Research Institute⁴¹. The methodology calculates the extent of flooded areas based on the type of land (built-up area, land, roads or forest) and estimates the damage based on the level of flooding in buildings and the extent of flooding on land, roads or forests. These values are multiplied by the probability of the harmful event and the expected duration of the planned flood control measure. This calculation may also include the number of population at risk, the number of economically and environmentally sensitive objects and cultural monuments. In this way, the 5 currently used criteria can be assessed in a single issue, which in turn will allow much more precise prioritization of a particular project. The project's priority should be binding for the Structural Funds, the state budget and also the Environmental Fund financing.

Freely available updated data will help the resort to plan flood protection. Databases integrating all existing and planned flood protection measures, land use plans and detailed information on flood events would be ideal. The availability of quality geodatabases, which are the responsibility of public authorities, will lead to an improvement of flood risk management planning in Slovakia.

⁴⁰Act no. 7/2010 Coll. on Flood Protection, Section 26 Flood Risk Map.

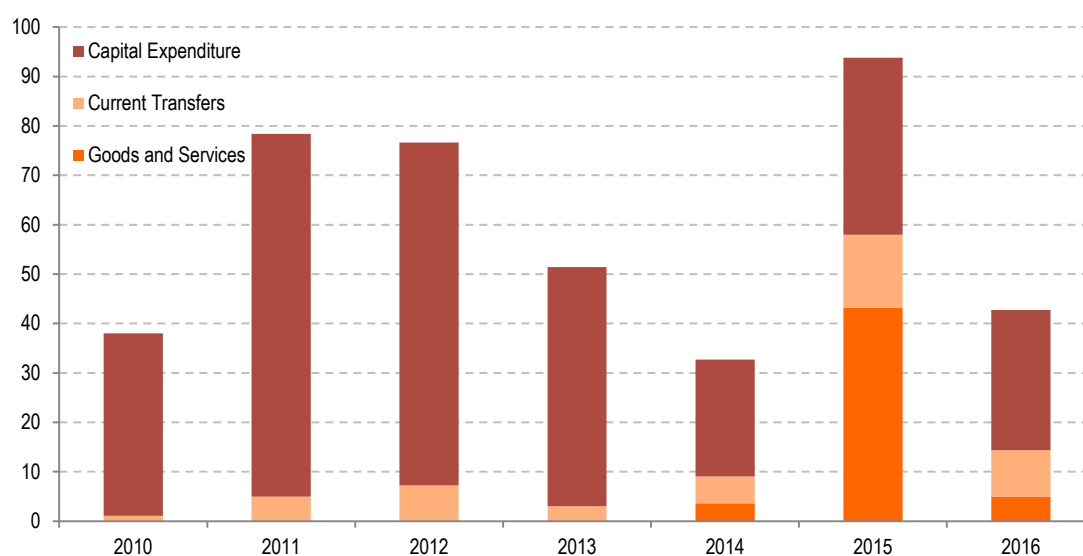
⁴¹FRMP chapter 6.3 <http://www.minzp.sk/mpr/>.

2.3 Waste Management

Expenditure on waste management since 2010 reached EUR 414 mil. in order to increase the rate of separation and recovery of municipal and bio-waste in particular. Slovakia has a low recycling rate despite extensive construction of sorting and recovery infrastructure. Waste treatment capacities appear to be sufficient apart from bio-waste and paper segment, but better data collection is needed. Increasing landfill charges and introducing mandatory unit-based system will contribute to increasing the motivation of municipal waste sorting.

Expenses on waste management in the period 2010 - 2016 reached EUR 414 mil. The main objective is to complete the infrastructure and reduce the negative impacts of waste generation and processing on human health. The financing sources are mainly from the EU Structural Funds (90%) and the Environmental Fund (10%), of which capital expenditures account for the largest part.

Chart 16: Economic Breakdown of all Expenditure in Waste Management (EUR Million)



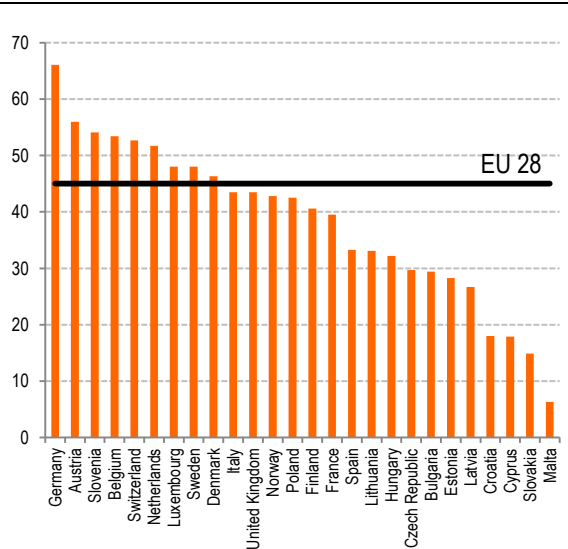
Source: BIS, The State Treasury

Slovakia has a low recycling rate despite extensive construction of sorting and recovery infrastructure for the public expenditure of almost EUR 317 million. Landfilling of almost 51% remains the dominant activity of all waste management, up to 69% for municipal waste alone. In a pan-European comparison, we have a low average municipal waste generation per capita (average 2005 to 2015 of only 305 kg/year) as well as in absolute terms (1.6 million tonnes/year), but the recycling rate of municipal waste at 14.9% is one of the lowest in Europe. The result is the highest landfill rate compared to the V3 or EU28 average.

Landfilling represents a significant, though hardly quantifiable, cost for the whole society. Increased incidence of some diseases has been documented for people living near landfills, mainly due to landfill gas. The resulting methane and carbon dioxide, in turn, contribute to global warming. Despite insulating barriers, leaks are likely to occur and may result in ground and surface water pollution. Last but not least, landfills take up land and devastate the area in which they are located.

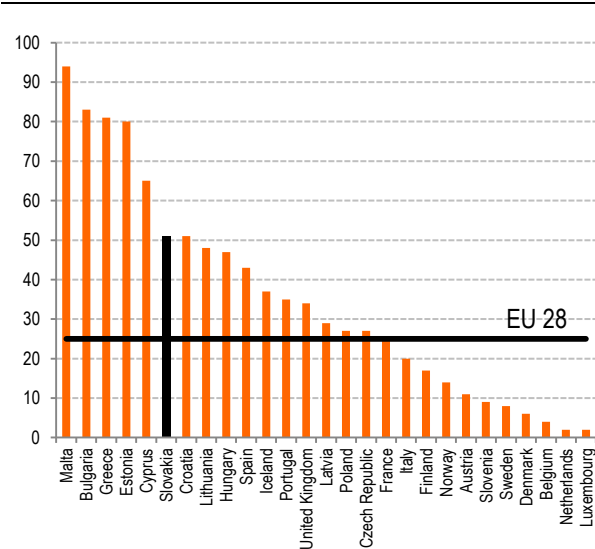
Landfill charges in Slovakia are one of the lowest in the EU. One of the reasons for the high landfill rate instead of the recovery of municipal waste may be the low landfill charges and the related weak motivation to increase the level of separate collection. Countries with higher landfill fees also show higher recycling rates. The outdated reporting method and the different recycling calculation methodologies are also a complementary factor to the low recycling rate.

Chart 17: Low Municipal Recycling Rate, 2015 (%)



Source: Eurostat

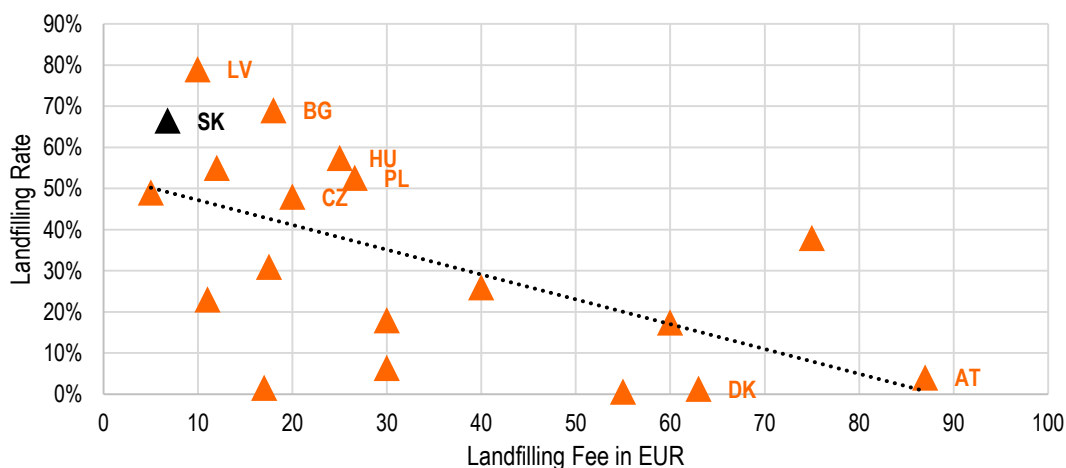
Chart 18: High Landfilling Rate, 2014 (%)



Source: Eurostat

Several measures need to be used in parallel to reduce landfilling. The most effective ones are the increase in landfill charges, the mandatory introduction of the pay-as-you-throw system, and consequently the fight against illegal dumps. Increasing landfill charges has no fiscal target, but will have a positive impact in the coming years. In the coming years, it is estimated that the income from the municipal waste tax could be EUR 14 million higher than the current revenue in the first year, EUR 20 million higher in the second year, and up to EUR 24 mil. in the third year. In the long run, the yield will gradually decline as a result of increased separation rate. These measures should be complemented by information campaigns and education. The gradual increase in fees could contribute to the reduction of land-filling by 70 thousand tons in the first year and up to 239 thousand tons in the third year. Thus, in the third year, only the benefits of lower methane and CO2 leakage could reach EUR 2.4 to 3.1 mil. saved.⁴² The real benefits would be higher if other factors such as soil or groundwater pollution are included.

Chart 19: There is a Statistically Significant Relationship between the Level of the Fee and the Landfill Rate



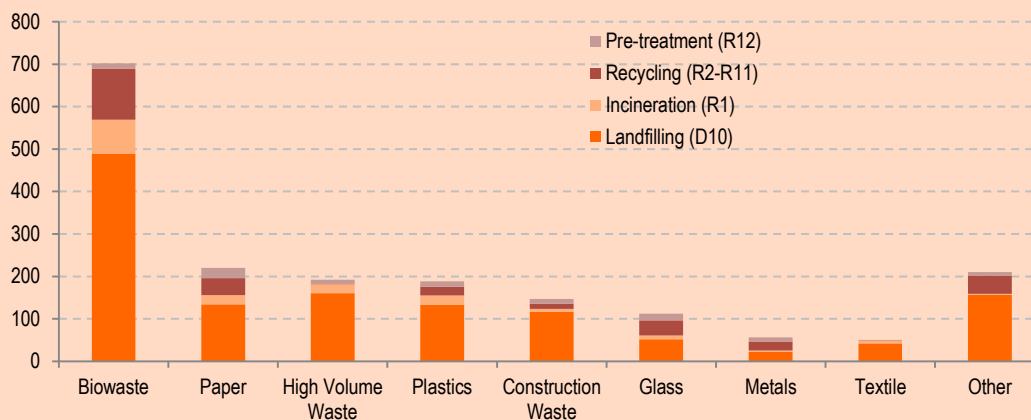
Source: IEP Based on the EIONET Data

⁴²The estimated cost of landfilling damages is EUR 10-13 per tonne of landfill (Spadaro, Zoughaib, 2008). By adding more weight to other landfill restrictions such as visual aspect, noise, and odours, the cost is around € 15-20 per ton of waste (DG Environment, 2000)

BOX 4: Estimated Composition of Municipal Waste in 2015

Unsorted mixed waste comprises up to 63% (1.2 million tonnes) of municipal waste and ends up in landfills. Mixed waste composition studies ([Priatelja Zeme - SPZ, 2011](#), [ENVI-GEOS, TU Košice, 2011](#)) have shown that nearly 48% is biodegradable waste, 13% is paper and plastic, and 5% is glass. Based on studies, we estimate that in 2015, 700,000 tons of bio-waste was produced in Slovakia, which represents 37.5% of all municipal waste. This is followed by paper, bulky waste, and plastics, each with approximately 10%. Their landfill rate exceeds 50%, rising up to 80% for bulky and small construction waste. Overall, there is approximately 1.1 mil. tonnes (61%) of recoverable waste, while we are already recovering 0.6 mils. ton. The rest is non-recoverable waste (waste from street and chimneys cleaning, unspecified waste).

The Estimated Amount of Municipal Waste (in Thousands of Tonnes)



Source: IEP

Waste treatment capacities appear to be sufficient apart from bio-waste and paper segment, but better data collection is needed. Data on capacities of waste recovery facilities come from records sent in paper form to district offices, whereby the above values are added manually and often do not correspond to reality or are missing altogether. It is therefore essential to create a centralized system that ensures more efficient data collection and improved data quality. However, based on these data from 2016, it is likely that plastics and glass processing capacities in Slovakia are sufficient. In the case of incinerators, co-incineration plants, and plastics management, the capacities are even over the degree of need. In meeting the objectives of the Waste Management Program 2016-2020, we can come across insufficient capacities of recycling facilities for bio-waste and paper. Currently, around 71% of paper-processing capacities are used, but meeting targets will require an increase in capacity by 50% at least. In addition, cardboard waste is also reported within the paper category. We have no capacity to process cardboard waste in Slovakia. No funds from the OP E were invested in the construction of paper waste recovery facilities.

Table 6: Waste Treatment Capacities (thousands of Tonnes)

	Municipal Waste Recovered in 2016	Current Capacity March 2017	Capacity Needed to Meet the 2020 Objectives	Capacity Increase Required
Bio-waste	357	915	1292	41%
Paper	133	202	302	50%
Plastics	75	215	155	-28%
Glass	106	147	115	-22%
Incinerators	479	795	361	-55%
Co-incineration Plants	276	482		

Source: IEP Based on the WMP Registration Lists of Waste Recovery Facilities

BOX 5: Is Recycling without Sorting Possible?

Mixed waste processing is a mechanical system that receives mixed solid waste and subsequently sorts recyclable materials using various technologies. Recyclable commodities may be subjected to further processing, the non-recyclable residue of mixed waste is sent to a disposal facility such as landfill. Such an automatic separation facility was first introduced in 1970 and is currently attracting interest as a way to address high landfill rates, low participation rates in waste collection systems, and the preparation of fuel products. It has been shown to provide an opportunity to recycle at a higher rate when compared to other collection systems. According to [Covanta Energy](#), the machine can recover 80 to 90% of resources such as recyclable paper, cardboard, plastics, and metals. However, such processing can cause a reduction in the quality and increased contamination of the recyclable components, especially paper. In addition, operating costs are often higher as they require a higher proportion of the workforce than recovery facilities for sorted waste components.

Bio-waste treatment capacities are currently used at 39% only but are deemed insufficient in the long term. At present, we use the capacity of facilities for processing industrial and municipal bio-waste to only 45%, which is related to the insufficient level of separate collection. Up to 70% of bio-waste (490 thousand tons), which is mainly hidden in unsorted municipal waste ends up in landfills. In the long term, current bio-waste capacities are insufficient. Meeting the waste management targets for bio-waste will require an increase in capacity from the current 901,000 tonnes to 1,300,000 tonnes. Under the OP E, the town of Žiar nad Hronom received the highest support for the construction of processing capacities in the amount of EUR 18 mil. for the implementation of a waste recovery centre for the energy recovery of biodegradable components of mixed municipal waste. Financial support over EUR 10 mil. was also allocated to Alternative Energy company for the construction of a biogas plant in Bošany.

In addition to building large-capacity facilities and promoting the collection of sorted bio-waste, the promotion of domestic composting is a suitable alternative as well. In family houses, the production of bio-waste is around 380,000 tonnes per year, while 322,000 tonnes remain unsorted. For the recovery of all municipal bio-waste, the construction of a large-scale facility with subsidies of EUR 24 mil. would be needed. There is an alternative option with domestic composting containers, the cost of which would be between EUR 9.4 and 122 million depending on whether we would award composters depending on the amount of waste or the number of family units living in the individual family houses⁴³. In 2017, the financial support for the purchase of composters amounting to EUR 5 mil. is planned.

Table 7: Composting Plant Construction Cost Compared to Subsidies for Household Composters (in EUR Million)

	EUR/ Ton of Recovered waste	Total Expenditure
Large Capacity Composting Plant (20 Years of Life)	75	24
Composting Container (20 Years of Life)	29	9.4 - 122

Source: IEP Based on the WMD MoE Data, Market Research

In 2017, the planned support of a separate collection of municipal waste in the amount of EUR 35 mil. and another EUR 25 mil. is allocated for overall support of waste recovery and separation in the least developed regions in Slovakia.

The cost of closing the same landfill area was up to 7 times higher in some districts. Increasing the rate of waste recovery and consequently reducing landfill will require gradual closure of the remaining landfills in Slovakia.

⁴³ The composting container must have a wall thickness of min. 5-7 mm and weight min. 14-28 kg depending on the size of the container, the price of the container is estimated from market research.

Projects funded from the Environmental Fund amounting to EUR 10.4 mil. were aimed at remediation of sites with illegally placed waste also called black dumps. The value for money drawn from the operational program was identified on the basis of the area of the closed landfill in m². The Environment Fund projects do not show any mandatory indicators and therefore it is not possible to determine their effectiveness. The highest value for money of closed landfills financed from European funds was reached by the districts of Snina, Žiar nad Hronom, Krupina, Trnava, Kežmarok, Rimavská Sobota and Nové Zámky, which did not exceed EUR 55 to close 1 m² of landfill. On the contrary, Veľký Krtíš and Námestovo spent up to EUR 140 resp. EUR 172 to close 1 m² of the landfill, making the process ineffective. Applying a cost median would bring a theoretical savings of EUR 17 mil. Some landfill closure projects could also have been subject to a landfill gas capture and combustion system in the case of its increased production in the specific landfill. This item cannot be identified from the project budget but may cause our savings estimate to be biased.

Table 8: Estimate of Theoretical Savings according to Best Practice in EUR

	Median	Total Expenditure	Theoretical Savings
Landfill Closure and Recultivation	55.4 EUR / m ²	51,781,997	17,035,100

Source: IEP Based on the DEPP MoE Data

Setting benchmark values for the closure and reclamation of landfills, including the private sector, can bring significant savings. The estimation based on the data available⁴⁴ claims that companies operating landfill sites have an average allocation of EUR 25 to close and monitor 1 m² of a landfill.

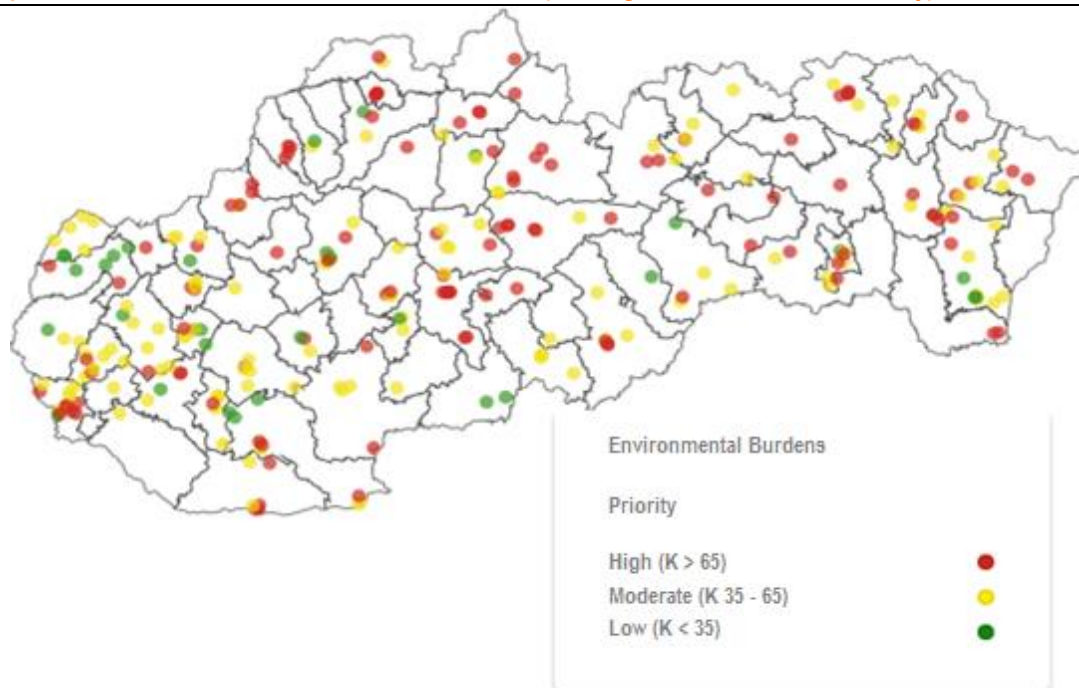
At present, there are no records of collection yards to assess the need for further construction of similar facilities. It would be advisable to monitor the capacity and quantity of separated waste at the collection yards in the electronic waste portal with regular updates.

⁴⁴The survey was based on the amount of the special-purpose financial reserve that the landfill operators are obliged to keep under the Waste Act.

2.4 Environmental Burdens

In Slovakia, 1,758 sites are registered as having an environmental burden, out of which 139 are confirmed environmental burdens with the highest solution priority. All of the 1,758 sites are classified into three registers in the [Information System of Environmental Burdens](#). Register A (potential environmental burdens) contains 891 sites, Register B (confirmed environmental burdens) contains 299 sites, and Register C (remediated environmental burdens) contains 792 sites. Out of these sites, 115 are simultaneously in Registers A and C and 109 are simultaneously in Registers B and C. This means that in the past, some remediation work was already done at 224 sites or that it is currently being done at these sites, but despite that, they can still pose a risk. The reason for that might be insufficient remediation, partial or currently ongoing remediation, or post-remediation monitoring at the site.

Map 4: Confirmed Environmental Burdens in Slovakia (with High, Medium, and Low Priority)



Source: SEA

BOX 6: Burden vs. Damage

An environmental burden means pollution of an area caused by human activity which poses a significant risk for human health or rock environment, groundwater, and soil. It is pollution which originated before 2007, and most commonly before 1989. Such areas might be contaminated by industrial, military, mining, transport, and agricultural activities, as well as by improper waste management. New burdens by definition cannot occur, although undiscovered sources of pollution, which originated before 2007, may still be found. Potential environmental burden is the status of an area where the presence of an environmental burden is justifiably presumed.

Environmental damage is pollution which originated after 2007 and is addressed in a separate law. Subjects who operate risk-bearing sites are obliged to create reserves for future remediation of potential environmental damage. Currently, there are no environmental damages registered in the information system.

By 2021, EUR 210 million, mainly from European sources, is planned to be invested in their removal, survey, monitoring, and other related activities. EUR 180 million from the total sum will be used for environmental burden remediation itself. Currently, the largest project is the remediation of a landfill in Vrakuňa, the total cost of which will amount to approximately EUR 30 million, and projects of a similar size will also be carried out at the sites of Predajná I. and Predajná II. Among the 26 areas for which a survey has already been conducted and to which EUR 40 million will be allocated in the near period, there are 20 areas with the highest remediation priority and 6 areas with a medium remediation priority (SAE, 2016). A potential environmental burden can be reclassified as a confirmed environmental burden on the basis of a survey, in which the main criterion is risk classification. The order in which the remediation as such is carried out also depends on risk analysis, which, unlike the risk classification, is not freely available and cannot easily be quantified.⁴⁵ Another factor determining the order of remediation works is the readiness of the project and the ability of the organisation designated to carry out the remediation work to actually do so. However, in the coming year, it will be necessary to adjust prioritisation in such a way that Slovakia would be able to identify and remediate first of all those environmental burdens which pose the biggest threat to the population and to the environment.

It is not easy to quantify the efficiency of the resources used. In practice, project efficiency indicators (the number of citizens affected, the size of the remediated or surveyed area) cannot be used as a generally comparable indicator, mainly due to the variety of remediation works. Despite that, we can at least classify certain remediation groups into comparable groups (landfill recultivation). In the Czech Republic, the estimated cost of recultivation itself is EUR 26-74 per m² of the landfill (MoE CR, 2015). Among the projects supported within the OP E, the median of landfill recultivation costs, including the whole project, was EUR 55 per m².

One of the main principles of [The State Remediation Programme of Environmental Burdens](#) is the 'polluter pays' principle. Since all environmental burdens originated more than 10 years ago, it is often the case that the original owner or the legal successor no longer exist and the remediation is paid for by the state. In Europe, it is estimated that approximately 35% of remediation costs arise from the public sector (SEA, 2011). In Slovakia, it is questionable what percentage of remediation costs comes from the public sector and what percentage comes from the private sector, since proceedings to determine the person liable only took place in a portion of the sites and the state only started remediating the first sites from public expenditure in 2015⁴⁶. In the case of multiple large private subjects, their obligation to remove an environmental burden is derived from the law or they are designated as the person liable and they have fulfilled their obligation or are still fulfilling it. On the basis of an EU regulation, Slovakia will adopt an amendment of the act on environmental burdens, according to which the state shall be entitled to the difference in the price of land before and after remediation carried out on private land.

⁴⁵ Risk analysis does not quantify the varied nature of the risk for the environment or for health, or the scope of pollution.

⁴⁶ Excluding landfill recultivation which has been under way for a longer period in accordance with the legislation on waste.

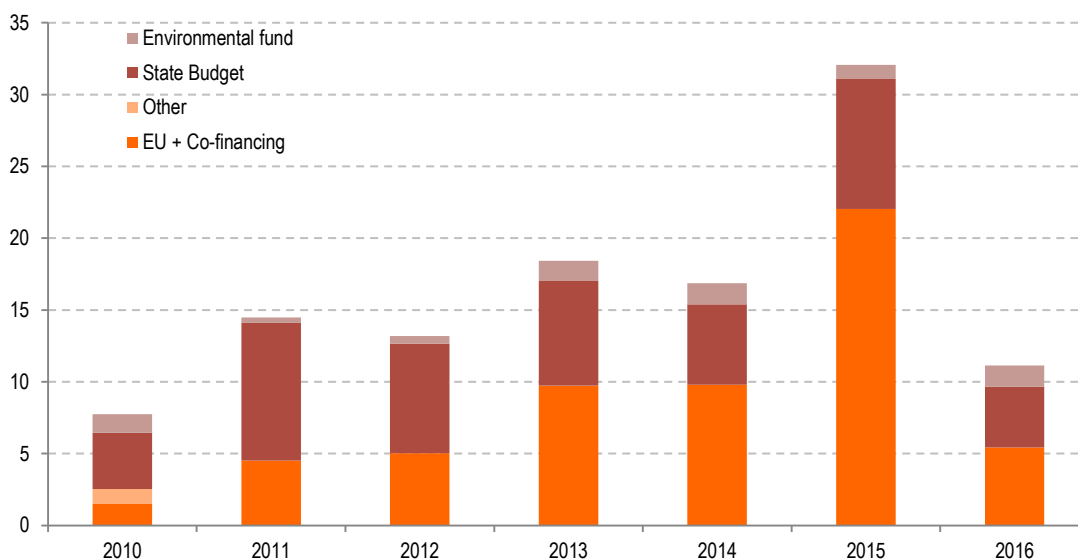
2.5 Nature and Landscape Protection

From 2007 to 2016, the total expenditure on nature and landscape protection amounted to approximately EUR 116 million. The largest part of the projects supported was dedicated to infrastructure measures. The status of species and habitats of European significance is improving, although, in an international comparison, we protect them to a lesser extent. A separate record of expenditures by individual protected areas will be established to compare the increased value and efficiency of the resources used. Long-term sustainability of nature protection financing can be improved by the gradual implementation of innovative forms of financing.

From 2010 to 2016, the total expenditure on nature and landscape protection⁴⁷ amounted to approximately EUR 116 million in total. The average volume of expenditure was approximately EUR 16.5 million per year (4% of the total environmental expenditure). Approximately 51.2% of financial resources were from the state budget and were mainly dedicated to the State Nature Conservancy of the Slovak Republic (SNC SR)⁴⁸ and its Slovak Caves Administration component, the Slovak Museum of Nature Protection and Speleology (SMNP&S), the Slovak Environmental Agency (SEA), and Bojnice ZOO. These organisations mainly used the financial resources from the state budget to cover wage and insurance costs (EUR 18.8 million, or EUR 6.5m million) and to purchase goods and services (EUR 9.2 million). EU funds including co-financing were mainly used for purchasing goods and services (EUR 19 million, for example, equipment and systems used in field work) and for capital investments (EUR 15.8 million, e.g., the purchase of cars).

The unusual values in the years 2015 and 2016 were caused by the closing of the OP E 2007-2013. The increase and subsequent decrease of state budget expenditure were caused by a lack of resources for supplementary financing of projects in the contributory organisations, which borrowed these resources (increase in 2015) and subsequently returned their greater part (decrease in 2016).

Chart 20: Expenditure on Nature Protection by Source (in Millions of EUR)



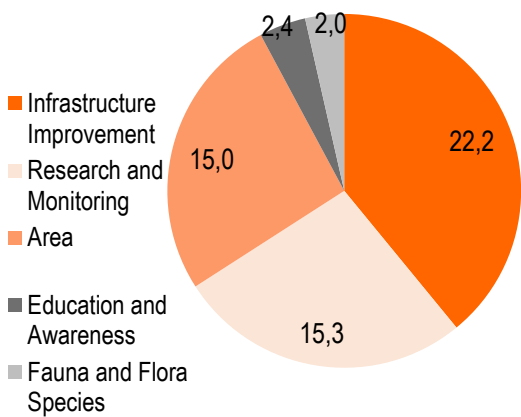
Source: BIS

⁴⁷ Care for individual species, habitats, ecosystems, and non-living parts of nature, as well as care for the appearance of nature and its use.

⁴⁸ The State Nature Conservancy of the SR is a professional state organisation which supervises and cares for specially protected parts of nature.

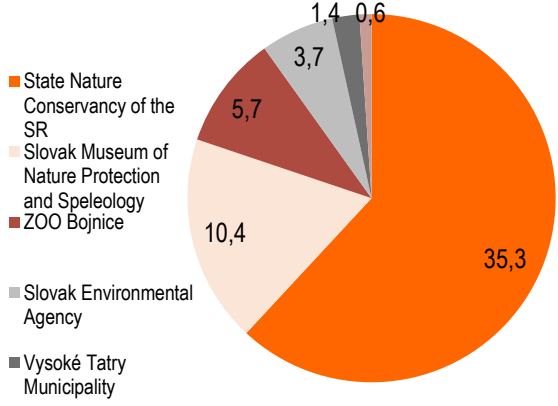
The majority of the supported projects were focused on infrastructure improvements. The volume of financial resources drawn from the Structural Funds in the years 2007 – 2015 and from the Environmental Fund in the years 2013 – 2016 amounted to EUR 57 million. Almost 40% of that was used for the reconstruction and building up of administrations of the individual protected areas, the construction of nature trails, digitalisation, and for improving the quality of the Slovak Museum of Nature Protection and Speleology collection. The second largest group (26%) represents monitoring and research projects⁴⁹. Approximately 30% of the total expenditure was used for the protection of nature itself (i.e. on the area and species management). Out of that, EUR 15 million was used for the preparation and implementation of documents on the care of protected areas⁵⁰. The smallest part (EUR 2 million) was allocated to saving and improving the status of selected species of plants and animals. There was a relatively small share of projects focused on education and awareness (EUR 2.4 million).

Chart 21: Subsidies from EU Funds 2007 – 2015 and from the Environmental Fund 2013 – 2016 (in Millions of EUR)



Source: OPE, EF

Chart 22: Beneficiaries of Subsidies from EU Funds 2007 – 2015 and from the Environmental Fund 2013 – 2016 (in Millions of EUR)



Source: OPE, EF

Within the Operational Programme ‘Quality of Environment’ (OP QE) 2014-2020, a further EUR 142 million including co-financing has been allocated to sites of the Natura 2000 network and to green infrastructure⁵¹. Activities are mainly focused on drawing up management documents and their implementation, conservation and restoration of biodiversity, ecosystems, and their services through revitalisation, restoration, and the building of green infrastructure.

BOX 7: The Natura 2000 Network

According to [the European Commission](#), Natura 2000 sites produce annual benefits of EUR 200 to 300 billion. Ecosystem services such as CO₂ sequestration and its long-term storage, insect pollination, maintaining water quality, or flood protection, for which the states would otherwise have to pay, contribute to this. Apart from that, there are between 1.2 and 2.2 billion visitor days to Natura 2000 sites each year, which generates further

⁴⁹ The project *Preparation and Implementation of Habitat and Species Monitoring and Improvement of Public Disclosure* (EUR 11.5 million in value), whose classification is not entirely clear due to its scope, also belongs to this group. Since the Comprehensive Information and Monitoring System of habitats and species was also created within this project, the project was classified into the research and monitoring category.

⁵⁰ A management programme is the documentation of nature and landscape protection drawn up for protected areas, which, among others, states the objectives of protection and measures.

⁵¹ This is the investment priority 1.3 *Protecting and restoring biodiversity and soil and promoting ecosystem services, including through Natura 2000, and green infrastructure*, for which the allocation including co-financing is EUR 142.1 million for the duration of the OP QE.

recreational benefits worth up to EUR 9 billion per year (even without taking into account the economic benefits for local entities from the consumption of goods and services by visitors to these areas). Based on the EU Biodiversity Strategy, Slovakia has also committed to map and assess the status of ecosystems and their services in its territory by 2020⁵². Specialised literature dealing with the assessment of ecosystem services is only in its early stages in Slovakia. For example, in the past, estimates of ecosystem services of the [Velká Fatra National Park](#) and a survey of willingness to pay for a visit to [Tatra National Park](#) were conducted.

The Natura 2000 network, which includes more than 27 thousand important sites and more than a million square kilometres, is the largest coordinated network of protected areas in the world, built up by the EU Member States independently from their national systems of protected areas. In Slovakia, there are 514 sites which are part of the network, covering an area of 14.4 thousand square kilometres, which makes up approximately 30% of Slovakia's territory. The objective of this network is to conserve natural heritage, which is significant not only for a given Member State but especially for the EU as a whole. [Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds](#) and [Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora](#) constitute the legal framework for the establishment and management of this network.

The status of species and habitats of European significance is improving, although, in an international comparison, we protect them to a lesser extent. Area demarcation of sites of European significance is insufficient and below the EU average for selected habitats and species of European significance⁵³. The percentage of habitats and species for which sites of European significance have been demarcated⁵⁴ since 2006 has grown by approximately 5% in Slovakia, while the average growth in the EU has been 8%; Thus, in 2013, the Slovak Republic legally protected 79% of significant habitats that should be protected, which is well below the EU average of 91%.

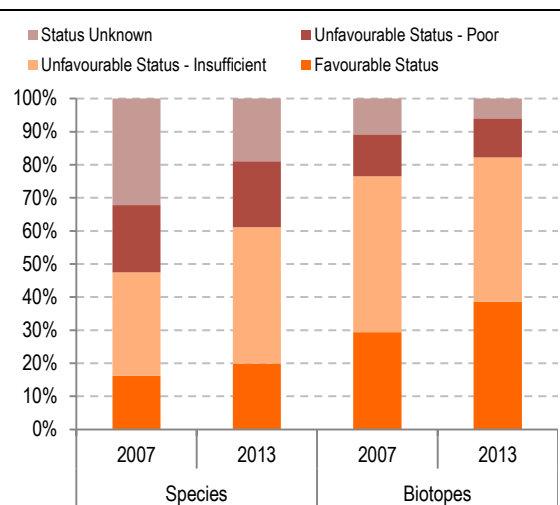
By completing and declaring the remaining sites of Community interest within the Natura 2000 network, the legal framework for local protection, conservation, and sustainable use of this natural heritage will be completed. This will impose a ban on various activities depending on the need for protection of the given habitats in the individual areas, such as forestry operations during the nesting season, construction of buildings and road networks, etc. The completion of this network as such is a legislative procedure and it will not require further expenses; in the case of future active care for these areas, it will be necessary to ensure its financing from innovative sources.

⁵² These tasks were transferred into the Updated National Strategy for the Protection of Biodiversity to 2020 and its action plan. In 2013, a working group for the mapping of ecosystems and assessment of ecosystem services in Slovakia was established, albeit with no significant results.

⁵³ Habitat – the natural area for the life of an organism, characterised by certain properties and factors. Habitats of European significance are protected because of their specific nature (more information, for example) habitats of a species of Community interest are the habitats in which the species lives at any stage of its biological cycle.

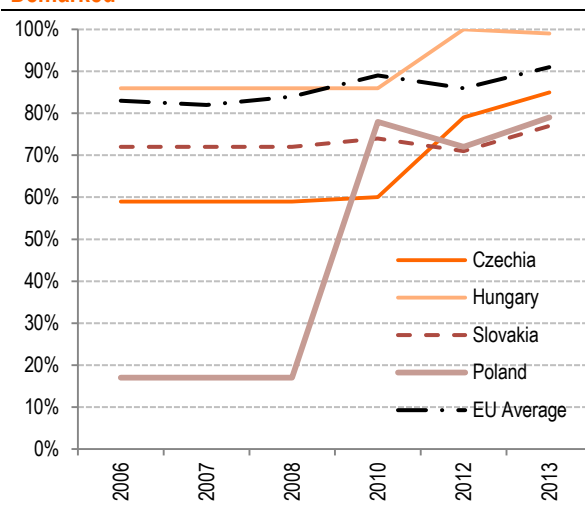
⁵⁴ According to the EU Habitats Directive 92/43/EEC, sites of Community importance are declared for a certain proportion of the total coverage in the territory of the state. For the rarest habitats and species, it might be necessary to declare 100% of their natural range as protected, for habitats with a more common occurrence, 40-60% of their natural range is protected. Once this percentage is fulfilled, the state reaches the level of 100% for the indicator considered.

Chart 23: The Status of Species and Habitats



Source: Composite Report of Slovakia Pursuant to the EU Habitats Directive

Chart 24: The Percentage of Habitats and Species for Which Sites of Community Interest Have Been Demarked



Source: Eurostat

The status of protected species and habitats in the period of 2007 – 2013 shows an improvement, which is partly caused by having a better knowledge of the status of habitats. The status of approximately 20% of species and 38.6% of habitats of Community interest is currently favourable. According to the OECD, in Slovakia, as many as 44% of amphibians and 34% of bryophyte are endangered, and they are also the most endangered in an international comparison. The lowest rates of threatened species are among invertebrates (6%) and higher plants (15%).

From a long-term perspective, protection of the valuable areas and their management require the implementation of innovative forms of financing. The main activities in the area of nature protection are still financed from the Structural Funds. Not only investment but also basic activities (such as regular management of protected areas) use the Structural Funds as their source of funding.

From a long-term perspective, it is necessary to create a sustainable system of nature protection financing, which will also use resources other than those from the state budget and the EU. By introducing a €1 entry fee for national parks, it is theoretically possible to collect more than EUR 6 million⁵⁵. In protected areas not owned by the state, it is only possible to collect entry fees with the consent of the owner of the land in question. That is why it is necessary to obtain such consent or to settle the question of ownership before the introduction of entry fees. Areas belonging to the state do not have this limitation. Alternatively, introducing accommodation fees in protected areas might be considered, part of which would be allocated to the area in question. In this case, the earnings would drop to EUR 2.7 million for all national parks. Other possibilities include concessions for conducting commercial activities in protected areas, adoption programmes, membership in a club for friends of the park, and charging for negative externalities.

Data on expenditures of protected areas cannot currently be compared. The State Nature Conservancy of the Slovak Republic does not keep records of expenditures in a way which would allow for the comparison of unit costs across individual national parks or protected countryside areas. This is because the activities of individual

⁵⁵ The revenue from entry fees depends on the number of visitors to the national parks, potential exemptions (regional discounts), and expenses related to the collection of the fees.

administrations also include activities in protection zones and unprotected landscape, which might constitute an even larger area than the protected area itself. Since June 2017, a new information system has been in test operation, which should allow for a more detailed classification of expenditures by the main task plans, individual administrations, and projects, although even then, in light of the overlapping of activities, it will not be possible to classify expenses into the required groups. Another contributing factor is the system of fund allocation to the individual organisational units of the SNC SR, which works on an ad hoc basis, i.e. on the basis of applying for them, not on the basis of priority assessment and cost.

The allocation of funds for the administration of individual protected areas does not focus on the highest value for money. The only documents which currently contain the data necessary for a partial value for money analysis are the management programmes for the Special Protection Areas, although the Slovak government has so far only approved six of them. The planned measures are not prioritised among the individual areas in such a way that they would first of all support areas with the most valuable habitats from a Slovak as well a global perspective. An example of this could be the planned measures within the Special Protection Areas, where the highest expenses per one hectare of area are planned for the SPA of Dunajské luhy. The costs are mainly influenced by the fact that the banks of the reservoir are mounted with concrete panels or directly sealed under asphalt, which requires extensive revitalisation and therefore financially demanding one-off measures. With better records and data analysis, it will be possible to give priority to supporting larger areas with a higher number of protected species and habitats, higher vulnerability, etc. This analysis should include the sites of the Natura 2000 network, as well as sites of international importance, such as Ramsar sites.

Prioritisation of Special Protection Area funding does not exist in practice since as many as 86% of these measures are of high priority. Measures within management programmes are assigned a priority, but in practice, it is not possible to decide the order of their implementation based on this list. For the 34 SPAs with a drawn-up management programme, approximately 4,800 measures are planned in total, out of which 86% are assigned a high priority.

Not all forms of compensation for constraints on landowners are being used. Limitation of common management for landowners in protected areas can be compensated in five legal ways. These are the exchange of the land for another suitable land owned by the state (which is not always possible), the rent of lands, the purchase of lands by the state, contractual care, and financial compensation. Currently, from the above options, the primary way is financial compensation paid by the Ministry of Interior of the Slovak Republic, which may be requested, for example, by non-state forest owners in a non-intervention zone, who have not been granted an exception for timber harvesting after a windstorm. Since 2013, these expenditures have represented on average about EUR 2 million per year, and on a year-on-year basis, they show an upward trend. Other forms of compensation are currently applied only marginally, e.g., within the Slovak Paradise National Park. By gradual zoning of other territories, the need for funds from the MoE SR's resources will increase. According to the Act on Nature and Landscape Protection⁵⁶, financial compensation for the restriction of common management is not paid for lands owned by the state, or in the administration or use of a state property administrator, even though they are restricted in the same way as non-state owners.

BOX 8: Engaging Owners outside Non-interference Zones Improves the State of Protected Areas

⁵⁶ § 61e of Act No. 543/2002 Coll. on Nature and Landscape Protection, as amended.

Experience from abroad has shown that contractual management which engages landowners helps improve the state of areas in a relatively efficient way. An example can be found in [the region of Burren in Ireland](#), belonging to the Natura 2000 network. After it was declared a protected area, landowners complained about the newly imposed restrictions. From their point of view, nature and biodiversity protection did not bring tangible benefits, they were fined, and they had to follow the strict breakdown of approved activities. Contractual care, which allowed them to use any means to reach a favourable status of the area brought exceptionally good results. Since farmers received support on the basis of reaching the set objectives, they had an economic motivation to manage their lands by means of traditional and environmentally friendly livestock grazing, which does not harm the local biodiversity.

This model can at the very least be applied to the land owned and administered by the state, where means of cultivation which do not harm the nature protection objectives should automatically be preferred.

There is an upward trend in expenditure on compensation for damages caused by protected animals. In 2014, it was almost EUR 500 thousand and in 2016, the amount almost tripled to EUR 1.4 million. This compensation is paid by the department of the Ministry of Interior of the Slovak Republic.

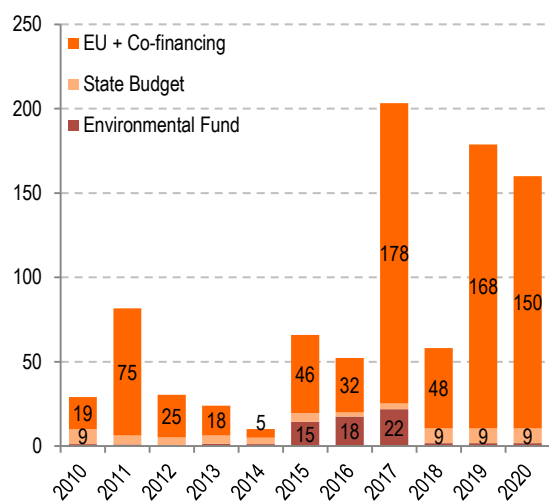
2.6 Protection of Ambient Air and Climate Change

The majority of expenditure on the protection of ambient air and climate change was covered by the EU Structural Funds, with the largest uptake within regional authorities and state enterprises. From the perspective of the EU, there is above-average pollution of ambient air. Despite the fact that the households generate as many as 80% of particulate pollutants, the expenditure so far has been primarily industry-oriented. Targeted support for more efficient combustion appliances in households will help improve the quality of ambient air. Broadening environmental taxes and restricting existing exemptions will increase the motivation to use energy in a more efficient way.

Since 2010, EUR 293 million has been invested in the protection of ambient air. Expenditure on the improvement of ambient air quality has a wide-ranging nature, which is why it influences several result indicators. Thermal insulation or support for renewable resources only improve the quality of ambient air indirectly, and therefore, it is not possible to directly attribute the results to the total costs in this area. The expenditure so far has been primarily aimed at reducing industrial emissions, which does not have a direct impact on the quality of ambient air⁵⁷. The deciding factor for the improvement of ambient air quality are the emissions released from local furnaces and in transport, which have so far not been given much attention in terms of expenditure.

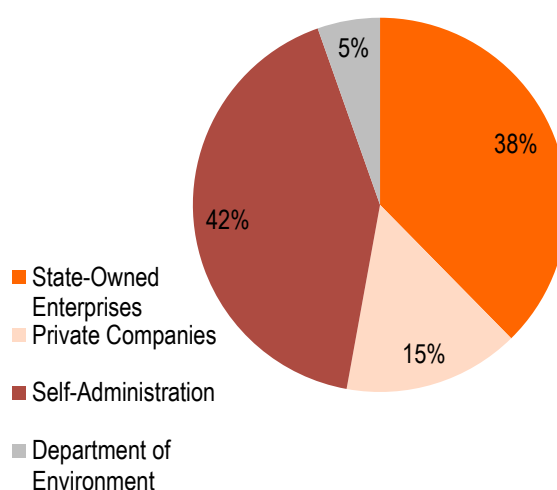
The majority of expenses in the years 2013-2016 were covered by the EU structural funds⁵⁸ (EUR 101 million), with a smaller representation of the state budget (EUR 16 million) and the Environmental Fund (almost EUR 35 million⁵⁹). During this period, thermal insulation was subsidised by approximately EUR 47 million; the expenditure in the 2007-2013 programming period amounted to EUR 310 million in total, of which heating plants made up more than EUR 122 million and almost EUR 45 million went into transport.

Chart 25: Expenditure on the Protection of Ambient Air (in Millions of EUR)⁶⁰



Source: BIS, EF

Chart 26: Total Public Expenditure on the Protection of Ambient Air⁶¹ in the Period of 2007-2013



Source: OPE

⁵⁷ Expresses the level of ambient air pollution based on the fulfilment of limit or target pollution values for pollutants, exceedance of these values and average concentrations.

⁵⁸ Including co-financing.

⁵⁹ Out of which almost EUR 31 million went into thermal insulation within the context of calls in the years 2014 and 2015.

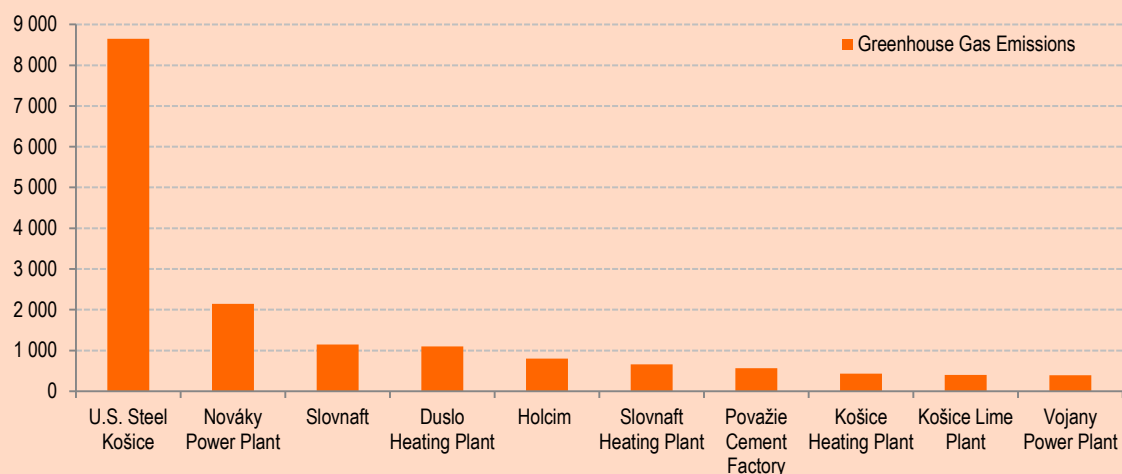
⁶⁰ Environmental Fund data available since 2013.

⁶¹ The Structural Funds and the state budget for the 2007-2013 programming period, all projects.

BOX 9: Development of Greenhouse Gas Emissions and Ambient Air Pollution

In 2014, greenhouse gas emissions in Slovakia amounted to over 40 million tonnes of CO₂ equivalents in total, which constitutes a 45% decrease compared to the year 1990. The aim of the Kyoto Protocol and the Energy and Climate Plan for 2020 has therefore been fulfilled for a long time. The main component of greenhouse gasses is carbon dioxide, with a smaller representation of water vapour, methane, ozone, nitrous oxide, some fluorides and Freons. The top 10 polluters generate approximately 40% of total greenhouse gas emissions. The order at the top ranks has remained unchanged for a long time.

Greenhouse Gas Emissions of the 10 Biggest Polluters, 2015 (in Thousands of Tonnes)



Source: EC, Carbon market data

The two biggest producers of particulate pollutants from the total volume of big polluters⁶² in the year 2015 were U.S. Steel⁶³ and Slovenské elektrárne (Slovak Power Plants) in the district of Prievidza and the 10 biggest polluters released more than 4.3 thousand tonnes in total.

The Share of the 5 Biggest Industrial Polluters, 2015

	Particulate Pollutants	Sulphur Dioxide	Nitric Oxide	Carbon Monoxide	Organic Substance
U. S. Steel Košice	47.0%	11.4%	22.9%	74.8%	15.3%
Slovak Power Plants	8.3%	71.8%	13.1%	0.2%	1.8%
Považie Cement Factory	3.1%	0.0%	2.5%	1.4%	0.4%
FORTISCHEM	2.9%	0.0%	0.2%	0.2%	0.0%
Duslo	2.6%	0.0%	2.2%	0.1%	0.1%

Source: NEIS, SHMI

In a European comparison, Slovakia reports high values of the particulate matters PM₁₀ and PM_{2.5}⁶⁴; it is necessary to keep improving the quality of their monitoring. The particulate matters have a significant negative impact on people's health. Among the EU countries, we have the third highest share of the population exposed to

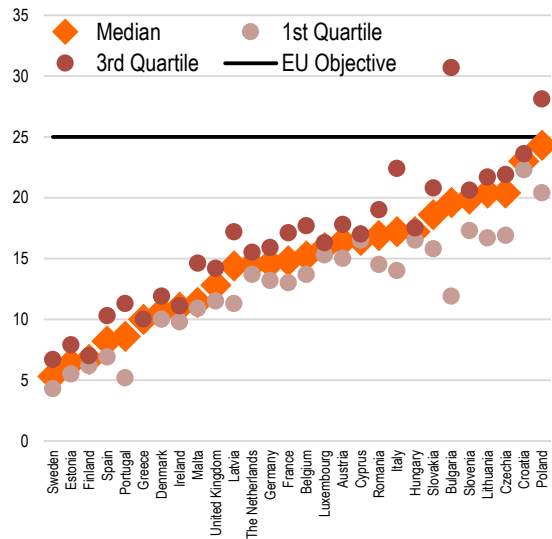
⁶² The National Emission Information System, statistics of the amount of harmful substances released, as reported by their biggest producers.

⁶³ Recent investments into new technology can help lower this share in the future.

⁶⁴ Average concentrations of pollutants across the territory of the Slovak Republic are modelled from the input data of 38 measuring stations placed across Slovakia (the interpolation method, which takes into account the information from nearby stations – the accuracy of the estimates increases together with the density of the stations). To improve the assessment of ambient air quality at individual locations, it is desirable that their number increases in the future.

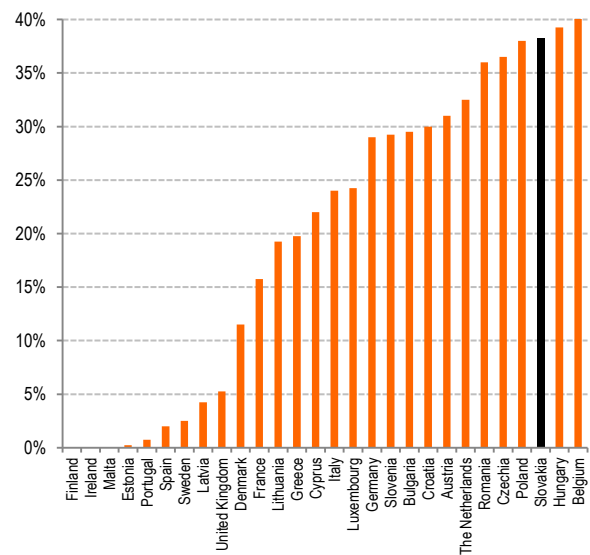
above-average concentrations of PM_{2.5}, which, compared to the European average, is only decreasing at half the speed. In order to improve the monitoring of pollutants, a broadening⁶⁵ of the network by 14 new stations is planned, which represents a total expense of EUR 2,800,000.

Chart 27: Annual Average Concentration of PM_{2.5}, 2014



Source: EEA

Chart 28: Average Share of the Population Exposed to Above-Average Concentrations of PM_{2.5} (WHO limit), 2014



Source: EPI according to Satellite Data from Dalhousie University, the Estimate of the Exposed Population according to the Global Rural Urban Mapping Project, NASA

According to [the EEA](#), ambient air pollution causes more than 5,600 premature deaths. The most common causes of premature death are cardiovascular diseases, strokes, pulmonary and respiratory problems. In Slovakia, the cost of lost years of life is estimated at EUR 1.95 billion per year⁶⁶. However, it is not possible to eliminate this cost completely due to the presence of polluting sources for combustion, or transport. Nevertheless, it is possible to reduce it by EUR 450 million with higher efficiency and after reaching the average EU values.

Generation of electricity from coal should gradually be reduced and employees of mines should be reintegrated into the labour market. From the monitored industrial firms, the power plant in Nováky, which burns domestic brown coal, generates as much as 72% of sulphur dioxide and 8% of particulate matters. Reducing mining would, apart from reducing CO₂ emissions by 5% and bringing significant health benefits, result in a saving of approximately EUR 100 million per year, through which the electricity consumers subsidise coal mining. [The OECD](#) in its latest assessment of the SR reiterates its recommendation to stop this support in order to improve the quality of ambient air. It will be key to gradually retrain and reintegrate the workforce back into the labour market through an active policy or special educational programmes.

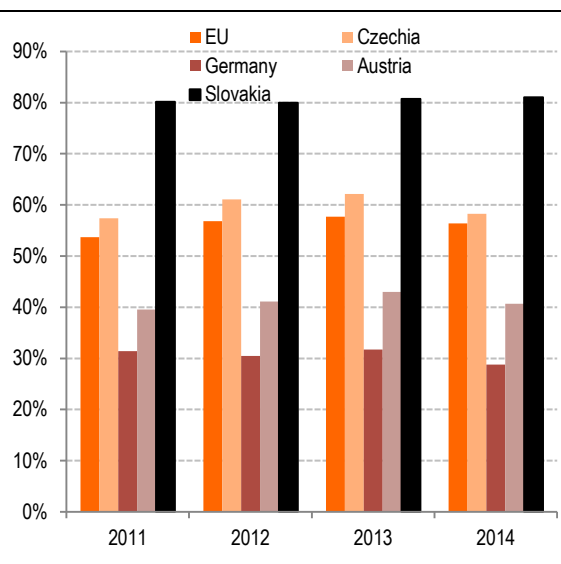
The majority of harmful particulate matter is produced by small unregulated sources which do not receive sufficient support. Small stationary and mobile sources generate the majority of particulate pollutants, while large

⁶⁵ From the resources of the Structural Funds, announced in the summer of 2017.

⁶⁶ Expressed as 35 times the reference average wage for one gained year of standardised quality of life value according to Act No. 363/2011 Coll. on the Scope and Conditions for the Payment of Medicines, Medical Devices and Dietetic Foods on the basis of Public Health Insurance and on Amendments to Certain Acts.

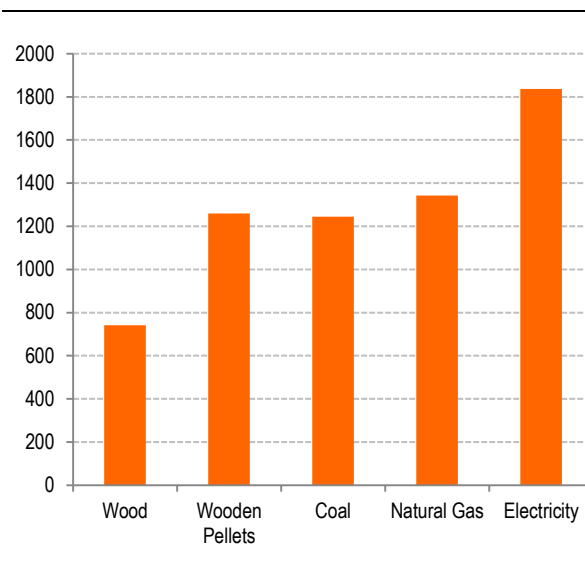
subjects, on the other hand, contribute less. Approximately 80% of particulate pollutant production is accounted for by the household, trade and institutions sectors⁶⁷. The main reasons for this are the high proportion of solid fuels including biomass used in households and the use of inferior combustion engines in passenger transport. Nonetheless, it can be seen from the overview of funding uptake that the predominantly supported projects are those of large applicants with a high individual volume of emissions.

Chart 29: The Household, Trade, and Institutions Sectors' Share of PM_{2.5} on Their Total Volume in the Country



Source: Eurostat

Chart 30: The Annual Costs of Heating a House by Fuel Type (in EUR)



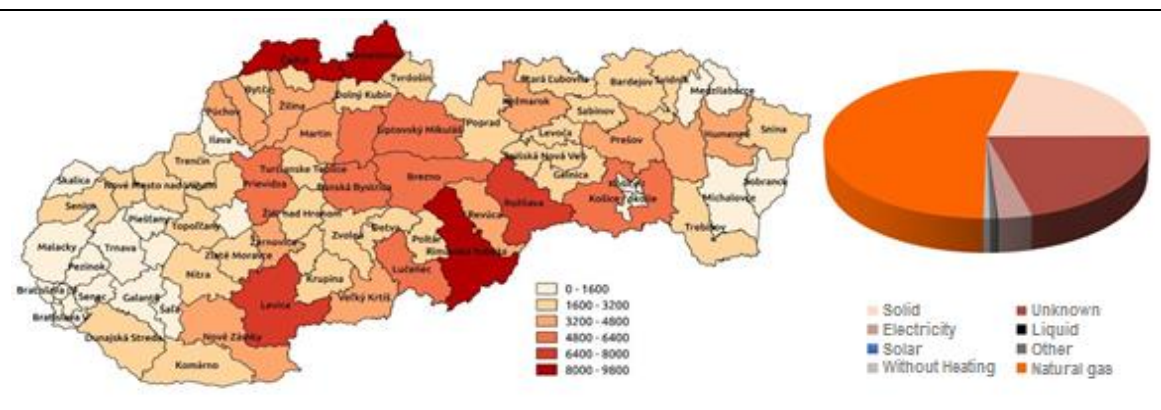
Source: SIEA

Households lack a strong motivation to switch to cleaner fuels. Heating with wood is the most economically advantageous, but not always the most environmentally friendly method. For most households, the main criterion for fuel selection is the cost, which is the lowest for wood heating, often even nil and significantly below the market price for many households⁶⁸. At the same time, heating with wood is the most problematic in terms of emissions⁶⁹, which, in combination with incineration in obsolete boilers, has a negative effect on the quality of ambient air. This is also proven by smog situations from early 2017, whose main cause was an above-average demand for warmth and [the related excessive fuel consumption](#).

⁶⁷ According to the methodology for the reporting of emissions, emissions are classified according to the source – energy, energy in industry, transport, industrial processes, agriculture, waste and households, trade, institutions (not falling in the other categories). In this sector, we can also find subjects monitored by the national emission system, although it is mainly households that are represented here.
⁶⁸ Both Slovakia and [the European Commission](#) draw attention to compliance with the prohibition of illegal logging and subsequent timber trade.

⁶⁹ [PM_{2.5} emissions](#) are highest in the case of heating with wood in a fireplace (820 g/GJ), followed by biomass (740 g/GJ), wood burning boiler (470 g/GJ), coal (398 g/GJ), and gas (0.2 g/GJ).

Chart 31: The number of Flats in Family Houses Using Solid Fuels in Aach District (Legend), Fuel Share in the SR



Source: SHMI according to the 2011 Population and Housing Census

The highest number of households within family houses heating with solid fuels is located in the districts of Rimavská Sobota, Čadca, and Tvrdošín (the only district in which the share of heating with solid fuels exceeds 80%), while the lowest shares of heating with wood and coal were recorded in western Slovakia (less than 20% of these households). This might be caused by the economic advantage and availability of solid fuels including biomass. Despite that, most of these households are connected to gas, which has a much lower particulate matter emission factor, although, from the climate perspective, it is still not an ideal solution.

It is possible to reduce the dependency on fuel which is problematic in terms of emissions by also targeting the support at households in order to reduce pollution from local sources. One of the possibilities is to create a subsidy scheme in the form of subsidies for combustion plants, e.g. according to the model of a scrapping premium for cars, whilst respecting the value for money principles. In a model scenario, if a subsidy of EUR 40 million was granted, it would be possible to achieve a 20% reduction in the amount of the PM_{2.5} released by the household sector, and thus to save at least EUR 160 million on the cost of damages incurred. In the Czech Republic, a similar support scheme was introduced in 2013 ([the so-called “stove subsidies”](#)) and, what’s more, since 2017, it is possible to [inspect combustion sources](#) directly in households. If waste incineration is identified, a fine of up to CZK 50,000 may be imposed.

Slovakia’s implicit tax on energy consumption⁷⁰ is the second-lowest in the EU and less than half compared to the European average. An increase (expansion) of environmental taxes or a narrowing of existing exemptions (such as the household fuel consumption exemption) would help motivate people to use energy more efficiently. The potential revenue from cancelling optional exemptions amounts to EUR 65 million.

Table 9: The Impact of the Cancellation of Optional Exemptions from Energy Taxes (in Millions of EUR, ESA 2010, Prognosis)

Description of the Text	2017	2018	2019	
Electricity	8.8	9.0	9.2	
Section 7 Subsection 1(e) of Act	Generated from a renewable source	2.9	3.0	3.1
Section 7 Subsection 1(f) of Act	Generated in a facility designed for the combined generation of electricity and heat	0.0	0.0	0.0
Section 7 Subsection 1(g) of Act	Used for the combined generation of electricity and heat	0.2	0.2	0.2
Section 7 Subsection 1(h) of Act	Used for the transportation of persons and cargo by trains, underground, trams	0.1	0.1	0.1

⁷⁰ The share of total revenue from energy taxes and the final energy consumption.

Section 7 Subsection 1(i) of Act	Generated aboard a ship	0.0	0.0	0.0
Section 7 Subsection 1(j) of Act	Used by a final household customer of electricity	5.4	5.6	5.7
Coal		28.7	29.4	30.2
Section 19(d) of Act	In the combined generation of heat and electricity	27.5	28.2	28.9
Section 19(e) of Act	In the generation of electricity	0.0	0.0	0.0
Section 19(g) of Act	For the transportation of persons or cargo in railroad or river transportation	0.0	0.0	0.0
Section 19(h) of Act	By a final household customer of coal	1.2	1.3	1.3
Natural Gas		23.9	24.5	25.2
Section 31 Subsection 1(d) of Act	In the combined generation of heat and electricity	7.4	7.6	7.8
Section 31 Subsection 1(f) of Act	By a final household customer of natural gas	16.4	16.9	17.3
Section 31 Subsection 1(h) of Act	Railroad transportation of persons or cargo	0.0	0.0	0.0
Total		61.4	62.9	64.6

Source: IFP MoF SR

From an environmental point of view, there is no justification for a reduced tax rate for diesel. Although diesel engines are more fuel-efficient than petrol engines, they generate more ambient air-polluting emissions and CO₂ per litre of fuel and they cause further social costs, such as noise ([OECD, 2015](#)). In light of the induced environmental costs, it is necessary to align consumer taxes on propellants.

2.7 Organisations under the MoE

Since 2013, employment in the department sector has grown by 1.2% per year on average, while the total wage costs have increased by 2.8% per year on average. The share of IT spending at the level of 1% of the budget puts the MoE SR among the departments with the lowest IT spending. The Ministry's decisions on investments primarily follow the rules of the Structural Funds, there is a lack of a holistic investment strategy as well as of a single methodology for the assessment of projects above the set limit of expected costs. During the period considered, the number of inspections slightly decreased, on average every fifth inspection resulted in a fine and the revenue from fines increased year-by-year. There is space for a better analytical estimate of revenues and expenditure of the Environmental Fund and for a better analytical assessment of projects. The Slovak Water Management Enterprise, s. e. has been loss-making in the long term, but through gradual implementation of optimisation measures, operating costs will have decreased by EUR 20 million by 2020. The economic result of the Water management Construction, s. e. is positive, but with a downward trend.

One budgetary and eight contributory organisations,⁷¹ as well as two state enterprises⁷² fall under the responsibility of the MoE SR. The Slovak Environmental Inspectorate is a budgetary organisation, which serves as the state supervisory authority in the area of environmental protection. Among the contributory organisations of the Ministry is the Slovak Environment Agency, which holds the position of an intermediary authority under the managing authority for the OP QE and monitors and controls its projects, assesses the state of the environment and also addresses environmental education. Professional activities in specific environmental areas are under the authority of the Slovak Hydrometeorological Institute (hydrological and meteorological services), the State Nature Conservancy of the Slovak Republic (nature and landscape protection), the State Geological Institute of Dionýz Štúr (geology), and the Water Research Institute (scientific and research activities in the area of waters), as well as cultural and educational institutions (the Slovak Museum of Nature Protection and Speleology, the Slovak Mining Museum, and Bojnice ZOO). State enterprises under the responsibility of the Ministry mainly address the question of water. There is currently an ongoing procedural and organisational audit at the Office of the MoE SR and at the Slovak Environmental Inspectorate.

2.7.1 Contributory and budgetary organisations of the MoE SR

An analysis of unit costs of approximately EUR 120 million in value for a period of four years (which is approximately 62% of the total cost of management of these organisations and approximately 10% of the department sector's costs) showed that the MoE SR and its subordinate organisations were below the reference sample average during the period considered.

Table 10: Average employee wages

	Average Employee Wages (in Thousands of EUR)					Change in Average Wages (2012 = 100%)				Average Increase
	2012	2013	2014	2015	2016	2013	2014	2015	2016	
MoE SR	15	16	17	17	18	102%	108%	108%	114%	3.3%
SEI	10	11	11	11	12	103%	106%	108%	114%	3.4%
WRI	12	11	12	12	13	98%	100%	106%	114%	3.3%
SHMI	10	11	11	12	12	104%	107%	111%	114%	3.4%
Bojnice ZOO	8	7	8	9	10	94%	103%	112%	124%	5.5%
SEA	12	12	13	14	14	100%	112%	117%	122%	5.0%
SNC SR	8	8	9	10	10	102%	109%	128%	123%	5.3%
SGIDŠ	9	10	11	11	11	108%	117%	124%	121%	4.9%

⁷¹ More in Appendix 3.

⁷² More in subchapter 3.8.

SMM	6	6	6	7	8	105%	105%	109%	132%	7.1%
SMNP&S	8	8	7	8	9	100%	89%	95%	112%	2.9%
Total	84	85	88	94	99	101%	106%	112%	119%	4.4%

Source: BIS

Expenditure on human resources increased on average by 2.8% each year, representing an annual 4.4% increase per employee. The highest increase, by 7.1% per year on average, was found in the case of average wages in the Slovak Mining Museum, which have long term been the lowest in the department.

Table 11: Expenditure on Goods and Services from All Sources

	Expenditure on Goods and Services (in Thousands of EUR)					Change in Expenditure on Goods and Services (2012 = 100%)				Average Increase
	2012	2013	2014	2015	2016	2013	2014	2015	2016	2016/2012
SEI	1,119	1,210	1,328	1,023	1,239	108%	119%	91%	111%	2.6%
MoE SR	4,433	4,639	7,511	65,122	9,311	105%	169%	1469%	210%	20.4%
WRI	1,913	1,674	1,241	2,802	1,270	88%	65%	146%	66%	-9.7%
SHMI	5,181	5,579	6,485	8,025	4,622	108%	125%	155%	89%	-2.8%
Bojnice ZOO	892	974	1,033	1,434	1,130	109%	116%	161%	127%	6.1%
SEA	1,518	2,096	1,888	2,267	2,450	138%	124%	149%	161%	12.7%
SNC SR	3,599	6,459	8,476	13,287	6,376	179%	236%	369%	177%	15.4%
SGIDŠ	1,931	3,382	7,566	4,778	2,590	175%	392%	247%	134%	7.6%
SMM	368	436	499	569	519	118%	136%	155%	141%	9.0%
SMNP&S	202	415	243	701	242	205%	120%	346%	120%	4.6%
Total	21,156	26,863	36,269	100,005	29,749	127%	171%	473%	141%	8.9%

Source: BIS

Expenditure on goods and services of the MoE SR department sector increased by EUR 8 million in this period (to EUR 29.8 million). When only considering expenditure from the state budget, the expenditure on goods and services has on average increased by 4.8% annually since 2012.

In the unit cost analysis, the average values for each of the reference groups were compared to the values of individual organisations per employee. Such a comparison is indicative, which is why it needs to be supplemented by a more detailed analysis in the area of wages, e.g. with information on the employee structure or work productivity.

BOX 10: The Methodology of Reference Value Calculation

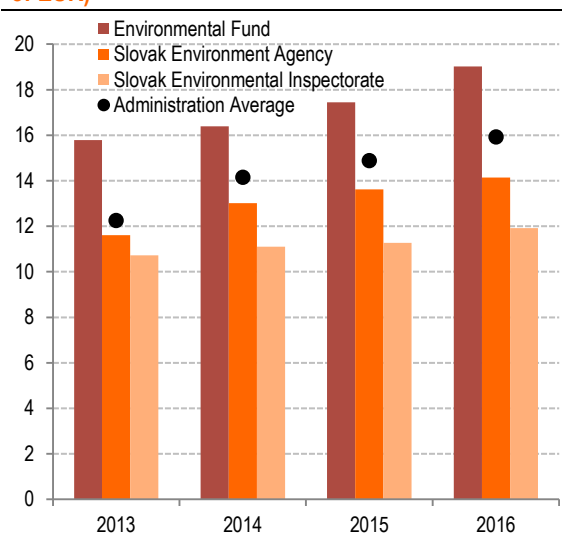
Contributory and budgetary organisations of the public administration were classified into reference groups according to their scope. In 2016, 13 Offices of the Ministries of the Slovak Republic belong to the *Ministries* reference group. In the *Administration* group, there are 68 mostly administrative organisations (for example, all inspectorates, Office of the President of the Slovak Republic, the Statistical Office of the Slovak Republic, and the Transport Authority). In the culture group, there are 54 cultural and educational as well as sports organisations (e.g. museums, libraries, zoos). In the science and research group, there are 56 scientific and research organisations (for example, the scientific institutes of the Slovak Academy of Sciences). For the Environmental Fund, a separate reference group was created, consisting of organisations which administer the Structural Funds and provide subsidies⁷³. In these reference groups, the average was calculated for all

⁷³More in part 3.6.5.

organisations of the public administration which belong to them. Each of the MoE SR organisations was then compared to the reference value of its group.

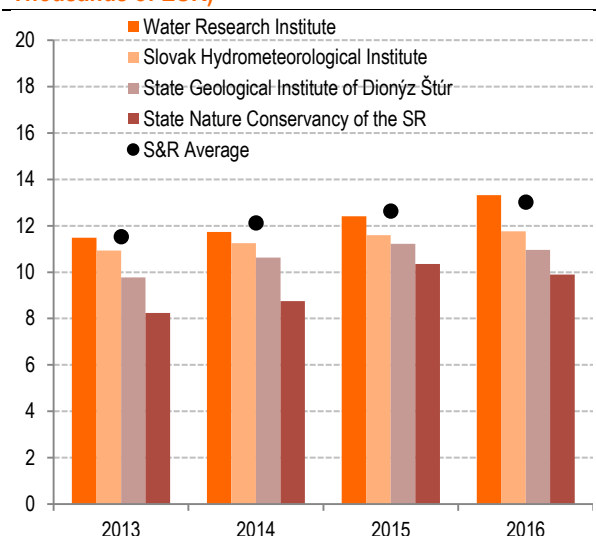
On the basis of a simple comparison of selected operational costs, the majority of the organisations under the responsibility of the MoE SR have unit costs that are lower than the average of their reference group. In terms of rent, all organisations were below the long-term average until 2015. At the beginning of this year, the Environmental Fund moved to new premises and started paying rent which is above the average for administrative organisations per employee. On average, energy costs were 52% above the reference sample apart from the MoE SR, the SEI, and the SEA. In other areas covered (compensation, travel costs, material, and wages), the MoE SR and organisations falling under its responsibility reached values below or only slightly above the reference group average.

Chart 32: The Average Annual Wage Level in the Admin. Organisations of the MoE SR (in Thousands of EUR)



Source: BIS, State Treasury

Chart 33: The Average Annual Wage Level in Scientific and Research Organisations of the MoE SR (in Thousands of EUR)



Source: BIS

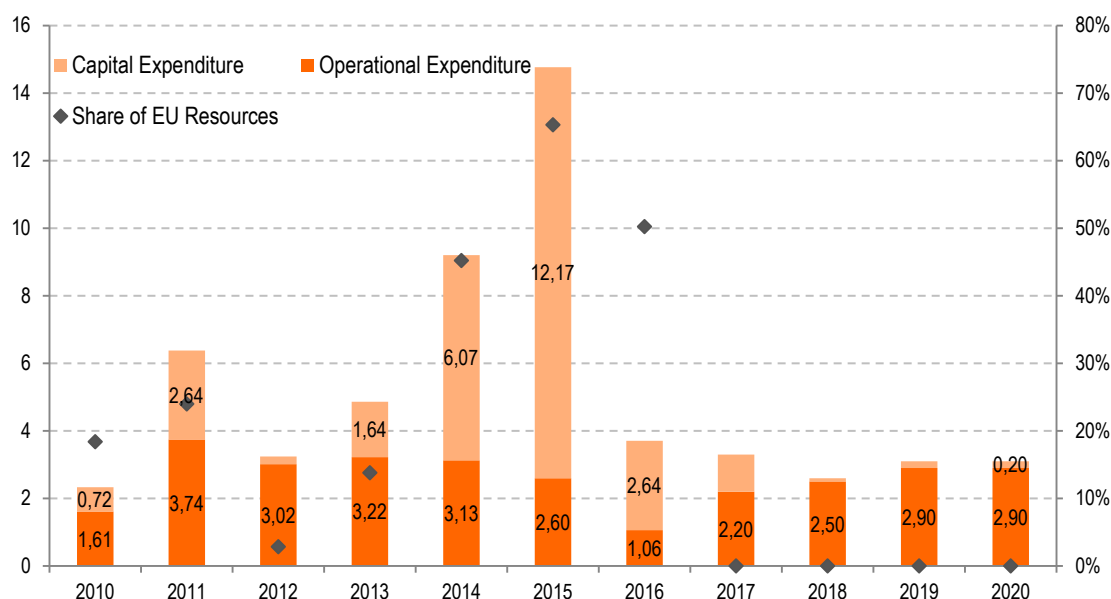
In the future, a revision of expenditure will in more detail examine the activities of subordinate CBOs with the aim of passing judgment on their continued operation separate from the Office of the Ministry and from other organisations. The efficiency of ensuring their activities through the department sector will be analysed; the revision will consider a transfer of competences, an acquisition of external contractors, as well as a transfer of activities to the private (non-profit) sector (together with the support of the state) as alternatives. It will mainly take into account the cost efficiency, the work they perform, the need for their availability to clients, independence, and public interest.

2.7.2 The budget and IT expenditure

The expenditure on IT of the Ministry of Environment⁷⁴ has for a long time been between EUR 2 to 5 million on average, while the average for the years 2017 to 2020 is EUR 2 million. With a long-term share of IT expenditure at the level of 1% of the budget, the Ministry belongs to the departments with the lowest expenditure on IT. Approximately 30% of the IT expenditure in the years 2010-2016 was covered by EU resources. The expenditure for the years 2017-2020 does not currently include planned, not yet approved investments from the OP QE.

⁷⁴ Expenditure on hardware, software, communication infrastructure, and telecommunication equipment. Defined according to the final report of the revision of expenditure on computerisation, [Appendix 1](#).

Chart 34: IT Expenditure of the MoE Department Sector (Millions of EUR, Left Axis), the Ratio of EU Resources (% , Right Axis)



Source: BIS

IT expenditure is concentrated in two organisations, the Office of the Ministry itself and the Slovak Hydrometeorological Institute, on average, it reaches 80% of the total expenditure of the department sector. In the case of the Office, it constitutes less than 1% of the total expenditure, while in the SHMI, it is 10%. After that, the revision only focuses on the expenditure of the Office of the Ministry.

Table 12: IT Expenditure 2010 – 2020 (in Millions of EUR)

Organisation	2010 R	2011 R	2012 R	2013 R	2014 R	2015 R	2016 R	2017 B	2018 B	2019 B	2020 B
Office of the MoE	2.6	2.3	1.6	1.9	1.6	4.5	2.3	1.1	1.7	2.1	2.1
SHMI	1.3	3.1	0.9	1.4	4.5	4.9	0.7	0.9	0.6	0.6	0.6
Other	0.6	0.9	0.7	1.6	3.1	5.4	0.8	0.5	0.4	0.4	0.4
Total	4.4	6.4	3.2	4.9	9.2	14.8	3.7	2.5	2.7	3.1	3.1

Source: BIS

Operating costs constitute 75% of all IT expenditure of the Office of the MoE SR (approximately EUR 1 – 2 million). In 2017, 83% of the budget is allocated to 3 items: ensuring the connectivity of the Office (govnet), accounting support (SAP), and service support of the Spatial Data Registry (SDR).

Table 13: The Major Cost Items

Item	Cost (Thousands of EUR)	2017 Budget Share
Application Support of the SDR I. system	500	47%
Communication Infrastructure	238	22%
Agreement for the Provision of Operational Services for EIS SAP	150	14%
Total	888	83%

Source: Ministry of Environment of the SR

For the biggest information systems, the Ministry is looking at operational indicators, such as the availability of the system or the number of reported and solved incidents in the case of support. No performance indicators which would allow for the assessment of benefits realisation of particular systems are specified or considered.

The department does not dispose of a methodology or another internal directive which would deal with the assessment of IT investments. Therefore, it is not possible to say that the process of investment selection is set in such a way that the best possible alternative with the highest value is selected. All future projects should fulfil the same standards as the IT projects within the [Operational Programme Integrated Infrastructure](#), the National Concept of eGovernment or [the methodologies used abroad](#). Their standards require a feasibility study as well as a cost-benefit analysis, which would justify the selection of one out of multiple solutions.

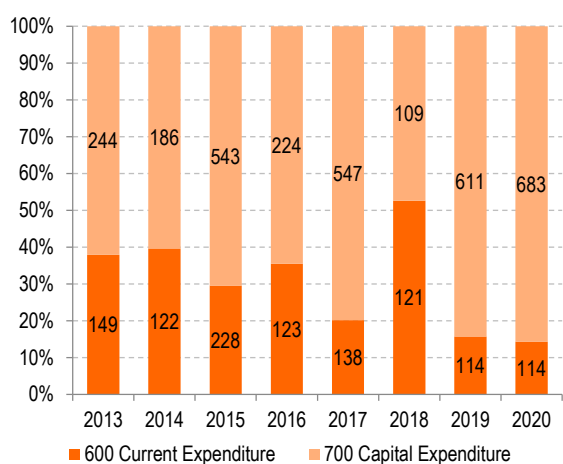
The revision recommends setting up and monitoring the cost and efficiency of the individual information systems in the whole department and drawing up a plan for the migration of the IS into a government cloud. In 2015, Slovakia started building up a government cloud with the aim of centralising data centres and achieving an economical operation of information systems. The cloud should serve as a shared data centre for all state administration authorities, which reduces the need for investment into the purchase and maintenance of computers.

2.7.3 The process of investment preparation and assessment

Investments constitute approximately two-thirds of the budget and they are mainly made with the support of the Structural Funds. The Ministry's decisions on investments primarily follow the rules of the Structural Funds, there is a lack of a holistic investment strategy as well as of a single methodology for the assessment of projects above the set limit of expected costs.

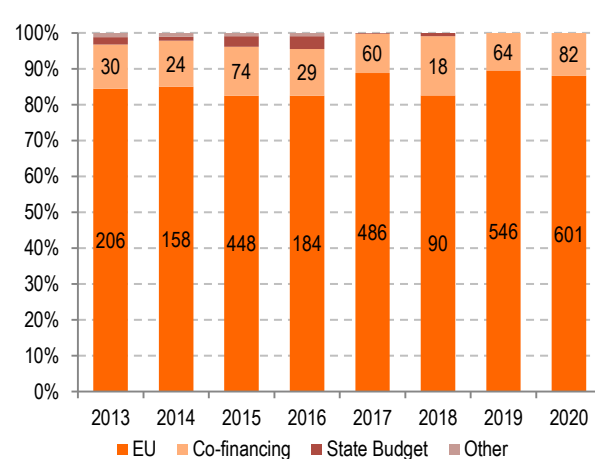
Investments constitute approximately two-thirds of the budget of the Ministry of Environment of the SR. Between 2013 and 2016, EUR 300 million was invested on average each year. The MoE SR is the managing authority of the OP QE and in the previous programming period, it was the managing authority of the OP E. All investments are therefore concentrated at the central authority and only 1% is directly at the SHMI.

Chart 35: Expenditures by Economic Classification (in Millions of EUR)



Source: BIS

Chart 36: Investment Expenditures by Source



Source: BIS

Almost all of the MoE SR investments for the years 2017-2020 should be financed from the Structural Funds, in 2017, the budgeted investments amount to EUR 547 million. Almost all investments (90%) are targeted outside the public administration in the form of investment transfers. Between 2013 and 2016, it was on average EUR 278 million out of EUR 300 million (93%), while for the years 2017 to 2020, it should be almost all capital transfers of the MoE SR.

Table 14: A List of New Investment Undertakings and Investment Undertakings in Preparation

Name of the Investment	Estimated Investment Expenditure incl. VAT (Millions of EUR)	The Main Source of Funds
Environmental Burdens – Remediation of Selected Sites (Total)	120.0	EU
Remediation and Recultivation of Mine waste Repositories	40.8	EU
Banská Bystrica, Flood Protection of Built-up Areas	27.6	EU
Information System of Waste Management	18.0	EU
Remediation of Critical Landslides	15.0	EU
Flood Threat Maps, Flood Risk Maps, and Management Plans for Flood Risk Cycle II	14.4	EU
Reconstruction of Stations – Construction Work – SHMI Projects	12.4	SB, EU
Komoča – the River Nitra, Sealing of the Right-bank Protection Dyke km 0.000 – 6.260 and Left-bank Protection Dyke km 0.490 – 6.490 of the Nitra Shifted River Course; Work	10.9	EU
Special Devices and Stations – SHMI Projects	10.3	SB, EU
Special Devices – SHMI Projects	8.8	SB, EU
Košice – Priority Flood-Prevention Measures in the SR, the Hornád Protection of Built-up Areas of the City, Right Bank, Construction II – rkm 140.575 – 142.517 (rkm 34.575 – 36.517) – Contractor	8.4	own sources
Purchase of Tractors	7.2	own sources
HW – SHMI Projects	6.0	SB, EU
Total	299.7	

Source: MoE SR

The budget of the Environmental Fund for 2017 is planned to be EUR 51 million, and then EUR 27 million per year until 2019. Investments of the Fund constitute more than half of its budget. A more detailed classification is not possible since all investments are budgeted within a single programme, “Support of Environmental Fund projects” and they are not classified as investment undertakings.

The Ministry’s decisions on investments primarily follow the rules of the Structural Funds, there is a lack of a holistic investment strategy as well as of a single methodology for the assessment of projects. The OP QE defines the main investment strategy and the process of investment selection, it has clearly defined priority axes, targets, and measurable indicators. Economic return is only monitored for large projects, while for other ones, only unit cost efficiency is monitored. The Ministry should prepare an inventory of investments ordered on the basis of objective indicators.

The method of assessing how large projects and calls for demand projects will contribute to the fulfilment of objectives and investment priorities is not formalised and known. In contrast to the previous programming period, the OP QE does not have a standardised methodology for economic analyses. Feasibility studies are either not public or are not conducted despite the fact that according to the OP QE, they should be conducted together with a CBA. Similarly, no detailed financial or economic analysis is required for the selection of projects from the Environmental Fund.

The Ministry will strengthen the principles of value for money in the process of investment preparation and assessment. For all investments above EUR 20 million, a cost-benefit analysis which follows the [Public Investment Assessment Framework](#) will be conducted at the beginning of the investment process. The updated departmental CBA methodology defines specific guidelines for the assessment of environmental projects. On the basis of strategic priorities and the value for money principle, an investment plan will be drawn up and published, based on which individual projects will be prepared.

2.7.4 The Slovak Environmental Inspectorate

Inspections based on inputs constitute approximately 21.8% of all inspections. During the period considered, the number of inspections slightly decreased, on average every fifth inspection resulted in a fine and the revenue from fines increased year-by-year. The professional staff of the Inspectorate are also responsible for the legal side of the inspections, which is why it is necessary to ensure an adequate workforce.

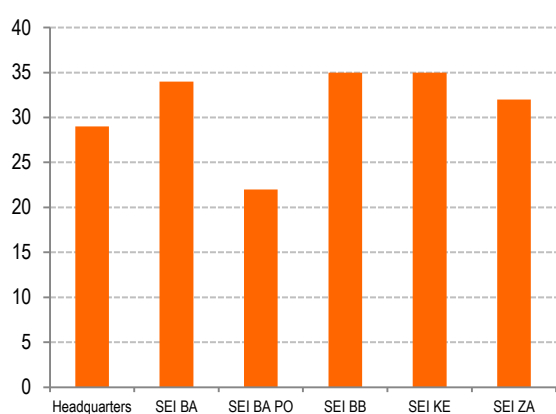
The total expenditure of the Slovak Environmental Inspectorate amounted to almost EUR 47 million in the period of 2007 – 2016. The average annual expenditure during this period was approximately EUR 4.7 million and it has been stable for a long time, amounting to approximately EUR 20 thousand per employee on average. This expenditure is covered by the MoE SR department sector and since the Inspectorate is a budgetary organisation, the expenditure is directly connected to the state budget. The revenue from fines imposed by the Inspectorate constitutes part of the income of the Environmental Fund. During the same period, a similar organisation in the Czech Republic, the Czech Environmental Inspectorate, had an annual budget of almost [EUR 13 million per year](#), which amounts to approximately EUR 22 thousand per employee.

BOX 11: What is the Slovak Environmental Inspectorate?

The Inspectorate supervises observation of environmental legal provisions, imposes fines and introduces corrective measures, and supervises activities of subjects affecting the environment, which might be a less costly solution than remedying the consequences of unregulated pollution. It was established by resolution of the Minister – the president of the Slovak Commission for Environment – of 29 August 1991 No. 1545/1991-1 as a budgetary organisation falling under the responsibility of the MoE SR.

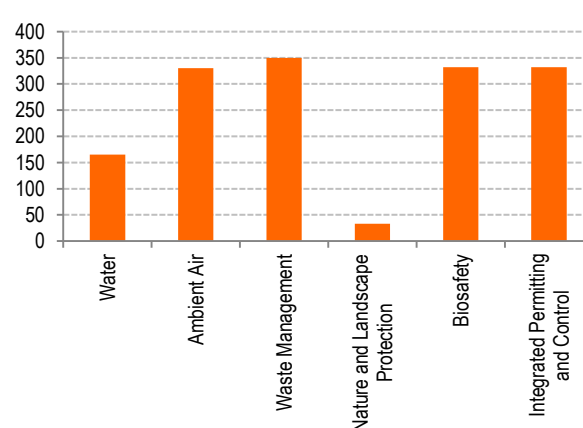
The structure of the Inspectorate comprises the headquarters and four regional inspectorates (Bratislava, Banská Bystrica, Žilina, and Košice), with factual departments in individual areas (water, ambient air, waste management, nature and landscape protection, biosafety) and the department of integrated permitting and control, which issues permits and supervises the operation of installations and activities specified in an Annex to [Directive 2010/75/EU](#).

Chart 37: The Number of Inspectors at Individual Inspectorates, March 2017



Source: SEI

Chart 38: The Maximum Amount of a Fine in Areas of Control (in Thousands of EUR)



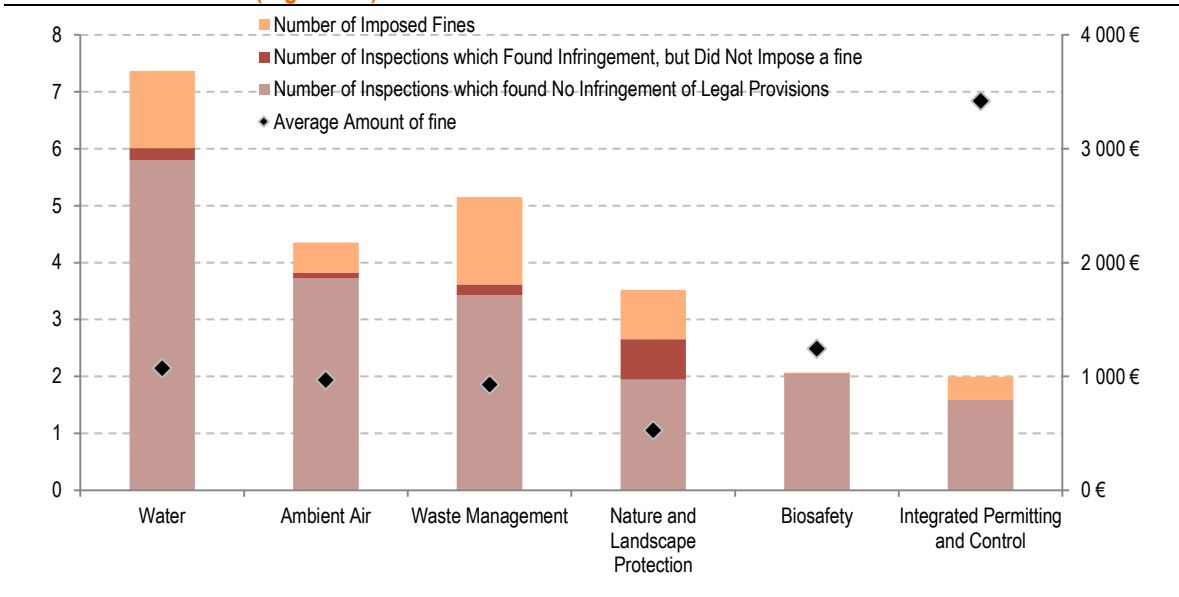
Source: processed by IEP on the basis of individual provisions

Inspections based on inputs constitute approximately 21.8% of all inspections. Every year, an inspection plan is drawn up, which the inspectors are supposed to follow. Apart from this plan, they are also obliged to address inputs and extraordinary changes in the state of the environment. From 2010 to 2016, more than 50% of all inspections in the area of nature and landscape protection were conducted on the basis of inputs. For comparison, at the Czech Environmental Inspectorate, inspections based on inputs constitute approximately 16% of all

inspections. Other inspections are conducted by the Inspectorate in relation to extraordinary water pollution and extraordinary threats to water quality. In 2015, such inspections constituted approximately 6% of all inspections. Every inspection must be announced in advance in accordance with the Act on Control in State Administration. However, this obligation seems to be ambiguous in practice. Its precise definition would allow for a single common procedure in all areas of control and would prevent different interpretations from the perspectives of the inspector and the monitored subject.

From 2010 to 2016, there was a fluctuating number of inspections with a slight downward trend, on average every fifth inspection resulted in a fine and the revenue from fines increased year-to-year. The number of inspections conducted by the Inspectorate also differs according to the area concerned. During the period considered, most inspections were conducted in the area of water control and the fewest inspections were conducted in the area of integrated permitting and control. In this period, the highest share of infringement of legal provisions was found in the area of nature and landscape protection, while the lowest share was found in the area of biosafety. In total, approximately 25% of inspections found infringement of legal provisions and a fine was imposed in almost 20% of all inspections. In recent years, the average amount of an imposed fine has been significantly different based on the area in which it was imposed. On average, the lowest fines were imposed in the area of nature and landscape protection (EUR 535), which may be caused by the fact that the maximum amount of the fine in this area is the lowest among all areas, pursuant to the Act on Nature and Landscape Protection⁷⁵. The highest average fines were imposed within the area of integrated permitting (almost EUR 4 thousand), which primarily follows the Act on Integrated Pollution Prevention and Control⁷⁶ and therefore, it constitutes a separate category of big polluters.

Chart 39: The Number of Inspections, Findings, and Fines (in Thousands, Left Axis) and Their Average Amount in the Years 2010-2016 (Right Axis)



Source: SEI

The professional staff of the Inspectorate are also responsible for the legal side of the inspections. Once a fine is imposed, the polluter has the right to appeal, which is often utilised according to the staff, although exact data on the number of appeals are not available. In the subsequent legal proceedings, the court may reduce or completely annul the fine. Since the costs of legal proceedings are borne by the party which lost the case, this obligation falls to the Inspectorate also in the case when a fine is reduced. Currently, there are no lawyers employed

⁷⁵Act No. 543/2002 Coll. on Nature and Landscape Protection.
⁷⁶Act No. 39/2013 Coll. on Integrated Pollution Prevention and Control.

at the Inspectorate, who would deal with administrative proceedings. Employees of the Inspectorate personally take part in these proceedings, although they are usually experts on the factual sections of the Inspectorate's scope. For comparison, in the Czech Republic, the Inspectorate has a separate legal department with twelve lawyers, which ensures a smooth running of proceedings even in complicated cases. In some cases, the SEI currently approaches a law firm, but the presence of legal experts directly within the organisation would improve this situation.

1.1.1. The Environmental Fund

Subsidies are dominant in the support of the Environmental Fund. Loans, which are a more efficient support instrument for the state, are currently unattractive for the market. Therefore, the revision recommends increasing the promotion of loans and implementing a loan-subsidy scheme. There is space for management improvement by creating a support strategy based on prioritisation of target areas and by a better analytical assessment of projects. A high percentage of unsuccessful applications means unnecessary administrative burden, which would be reduced by a more precise specification and by improving the electronic system of registration of applications.

BOX 12: What is the Environmental Fund?

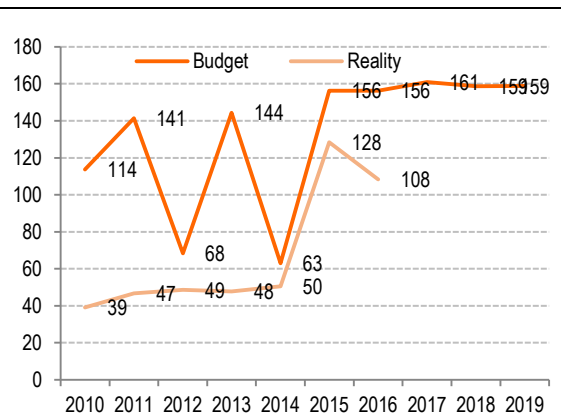
The Environmental Fund implements the state support of care for the environment and it is established by law⁷⁷. The head of the Fund is the statutory representative of the Fund, appointed and dismissed by the Minister of Environment. The Environmental Fund's Board is an advisory body to the Minister of Environment.

The Fund's main role is to provide funds to applicants in the form of subsidies or loans to support projects with a scope of activities focused on achieving the objectives of the national environmental policy at the national, regional, or local level.

Revenue from emission allowances auctions constitute the largest part of the Environmental Fund's income. Determining a fixed share of the revenue from emission allowances auctions, which would be used for the Fund's projects, would help improve the fulfilment of environmental objectives. It is necessary to connect the change in budgeting revenues with better planning of expenditure, which will ensure non-deficit management. [The EU](#) recommends using 50% of the revenue from the sale of emission allowances for green objectives. The effective amount of revenues used for green objectives is fluctuating, from 2013 to 2016, on average approximately 54% of revenue was used for subsidies, for 2017, approximately 22% of revenue is budgeted for subsidies.

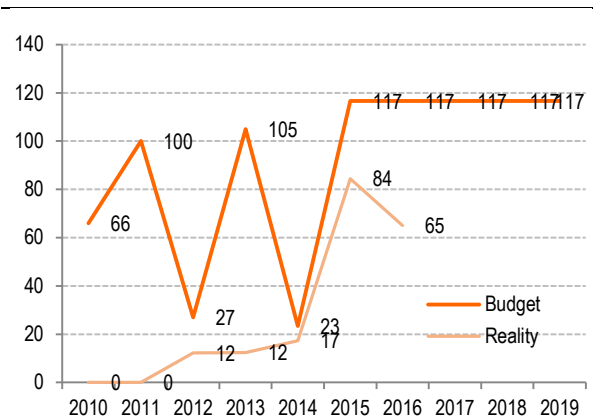
⁷⁷ Act No. 587/2004 Coll. on Environmental Fund and on Modification and Amendment of Certain Acts, as amended.

Chart 40: Difference Between Budgeted and Actual Revenues (in Millions of EUR)



Source: State Treasury, BIS

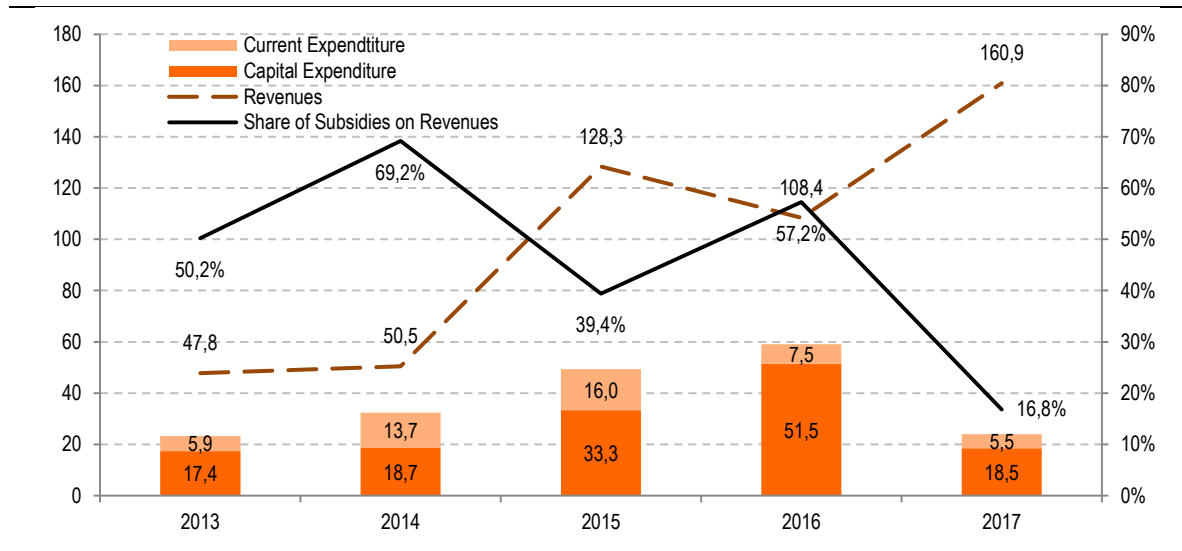
Chart 41: Difference Between Budgeted and Actual Revenue from the Sale of Emission Allowances (in Millions of EUR)



Source: State Treasury, BIS

In 2013 – 2016, most subsidies went to the area of water (44%) and ambient air protection (26%). Lower expected common expenditure increases the difference between the budget and the reality. In 2016, common expenditure was budgeted at almost EUR 8 million, while in reality, almost EUR 17 million was spent. This underestimation happens every year; in 2015, the budgeted expenditure was EUR 10 million lower than the actual expenditure, and in 2014, the budgeted expenditure was EUR 8 million lower than actual expenditure. According to the Fund, the underestimation is caused by costs which cannot be anticipated at the time of budget preparation. In the year 2014, these unbudgeted but actual costs can be explained by the transfer to the European Bank for Reconstruction and Development and in 2015 and 2016, they can be explained by the receipt and subsequent provision of funds of the Recycling Fund within the remediation process of sites with illegally stored waste. From 2013 to 2016, expenditure amounted to an average of 51.3% of the Fund's annual revenues.

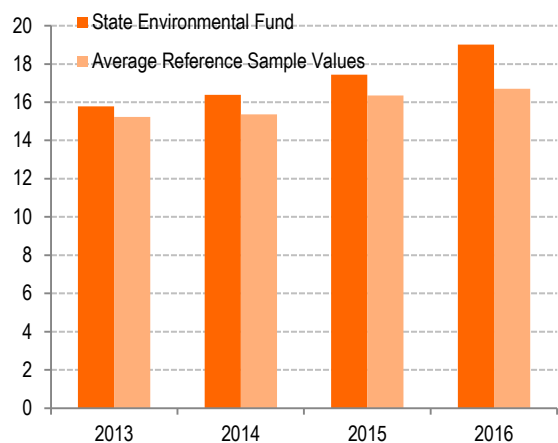
Chart 42: Comparison of Revenues and Expenditure (in Millions of EUR, Left Axis) and the Share of Subsidies on the Fund's Revenues (Right Axis)



Source: State Treasury

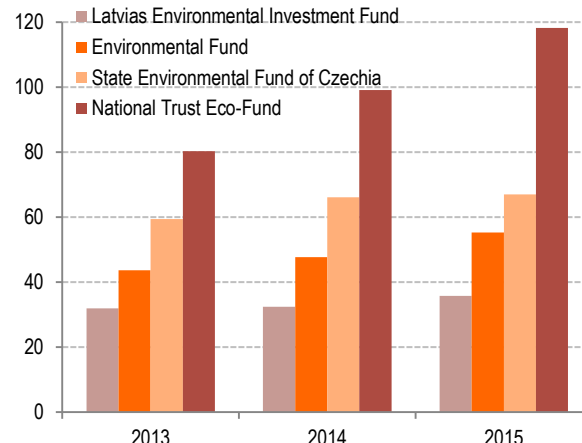
In 2016, the annual wage cost per employee including allowances and bonuses amounted to EUR 19,022. In comparison with similar institutions abroad, the Fund achieved good results in terms of the volume of administration costs per employee, when the amount of these costs was the second lowest during the years considered.

Chart 43: Average Wage per Employee of The Environmental Fund and the Reference Sample⁷⁸ (in Thousands of EUR)



Source: BIS, State Treasury

Chart 44: Comparison of the Fund's Administration Sosts per Employee (in Thousands of EUR, PPP)



Source: EF, LEIF, SEFCR, NTEF

The administrative burden may be reduced by increasing the efficiency of the processes of record-keeping and application processing. The number of applications for support from the Fund's resources significantly exceeds the number of granted subsidies. After excluding applications within the Village Restoration Programme, which is administered by the Slovak Environment Agency from the Fund's resources, in 2013-2016, subsidies were granted to 20% of applicants from approximately 2000 applications. The processing of the submitted applications and requesting the completion of incomplete applications by the Fund requires an excessive administrative burden.

For better system efficiency, it is necessary to adjust the individual procedures, including the adjustment of the Fund's electronic system. An automated system does not put the application on the list in case it does not state the correct formal particulars. By stating the specifications in individual subsidy calls, e.g., stating the maximum limit of support or benchmarks, the number of unsuccessful applicants will potentially decrease.

Applicants prefer the provision of subsidies to loans, although loans are more desirable from the perspective of the Fund's economic management. In 2016, no requests for a loan provision were processed⁷⁹. In comparison to commercial loan products and to a subsidy, which does not have to be paid off, the Fund's loan support is not favoured. Currently, it is not possible to use the money set aside for loans for any other purpose, it is frozen and does not bring any value.

Repayable forms of support should be promoted. Apart from loans, the portfolio of offered products should be broadened to include guarantees or capital investments into shares of economically viable projects. For this, the Environmental Fund could use the know-how of Slovak Investment Holding. All repayable forms of support can

⁷⁸ The reference sample was made up of: the Slovak Research and Development Agency, the Implementation Agency of the Ministry of Labour, Social Affairs, and Family of the Slovak Republic, the Agricultural Paying Agency, the Slovak Tourism Agency, the Slovak Agency for International Development Cooperation, the Slovak Investment and Trade Development Agency, the Slovak Environment Agency, the Slovak Innovation and Energy Agency, and the Research Agency.

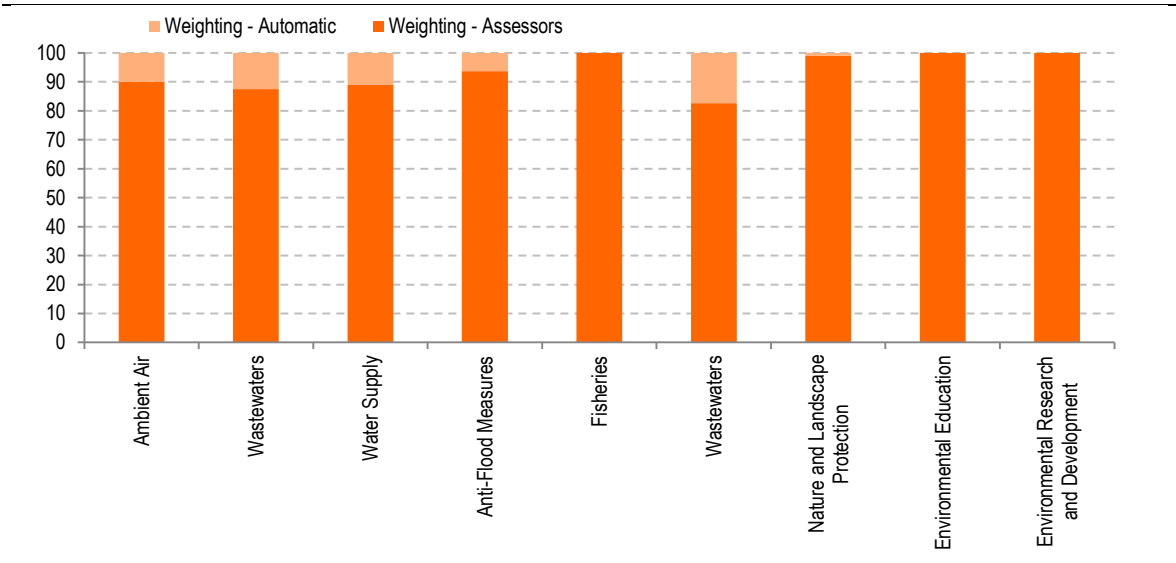
⁷⁹ The Fund did receive and administer two requests, but one of them was dismissed during a formal inspection and the administration of the second request was never finished.

also be offered in a combined loan and subsidy scheme. A competitive advantage of the Fund’s loans in comparison to traditional commercial loans is the fact that the commitments are not included in the total debt of the municipality⁸⁰. Furthermore, the provision of a repayable form of support is also advantageous from the perspective of public finances. Marketing activities for the promotion of loans, such as “good practice”, advertisement, and trainings for the regional self-administration can also significantly raise public awareness. The Environmental Fund should have a reserve which would allow for flexible allocation in the case of potential extraordinary unforeseeable events.

Improving the analytical assessment of projects will help the strategic management of the Fund. To the largest extent possible, it will take into account measurable result criteria. The orientation towards result criteria will eliminate subjectivity and help determine the best project in terms of the value for money principle. Currently, for example, in the area of protection of ambient air and ozone layer of the Earth, the only measurable result criterion is the reduction of emissions, which is attributed the weighting of 1% of the total assessment. The Fund states the formal particulars of submitted applications without mentioning the details of the composition of working groups and the Fund’s Board (or the specifications of the methodology for data assessment). Details of the submitted projects alongside the points they were awarded are not currently available and the criteria and weightings for their awarding are not adequately specified.

The revision, similarly to the [OECD](#), recommends creating a strategy of support through subsidies and loans. The strategy will contain a summary of objectives and priorities. At the same time, it will be compliant with the national environmental strategy and partial action plans for the individual areas.

Chart 45: Comparison of the Weightings of the Criteria (in Percentage)



Source: IEP according to EF

⁸⁰ Act No. 583/2004 Coll. on Budget Rules of the Regional Self-Administration and on Change and Amendment of Particular Acts

Similar funds abroad allow for public scrutiny to a greater extent. Unlike the Slovak Fund, the Bulgarian, Czech, and Latvian funds have a list of board members published both on their websites and in their annual reports. For projects supported by the Bulgarian fund, their impact on the environment is assessed and published alongside the description of the project's activities, whereas no such information is available in the case of the Slovak Fund. In the case of the three foreign funds, the finances of the funds are subject to regular annual financial audits, while the finances of the Slovak Fund are subject to irregular audits of several institutions⁸¹. Results of these audits are not mentioned in the Slovak Fund's annual reports. To take the United Kingdom as an example, similar funds there are established at country level (separately for England, Scotland, Wales, and Northern Ireland) and they only address a certain environmental area. An example of this is the [Scottish Water Environment Fund](#).

BOX 13: Bulgaria – The National Trust Eco-Fund

It was established under the Debt-for-Environment mechanism, under which a part of Bulgaria's debt was waived in exchange for support of environmental projects. Within this project, functioning mechanisms from Switzerland were adopted and, as a result, there is a high level of fund transparency and control.

In its annual report, it not only lists all the supported projects, but even states how much reduction of CO₂ equivalents each of them achieved, or other similar relevant indicators for the given areas. The Slovak Fund published a list of supported projects with the amount of support and the area in which the subsidy was granted. Furthermore, [the Bulgarian annual report](#) describes in detail the costs of the Fund's administration and for each item, in which the budgeted amount was exceeded, it gives factual reasons due to which it was not possible to keep the expenses for the given item within the limits set by the budget. For some items, these reasons are also explained in the annual report of the Slovak Fund, but not for all. For example, no reason is given for exceeding the budgeted wage costs by 21% in the year 2015.

Other examples of similar funds exist [in Latvia \(The Latvian Environmental Investment Fund\)](#) and [the Czech Republic \(The State Environmental Fund of the Czech Republic\)](#).

⁸¹ In particular: the Ministry of Environment of the SR's Department of Internal Audit, the Supreme Audit Office of the SR, and the Financial Control Administration.

3 State owned enterprises

3.1.1 The Slovak Water Management Company, s. e.

The SWMC is a state enterprise which ensures care for rivers and investment properties built on them and takes care of the quantity and quality of surface water and groundwater. Among its public service activities are flood prevention and the creation of navigation conditions. The SWMC has a national scope with four branch enterprises in Bratislava, Piešťany, Banská Bystrica, and Košice.

The Slovak Water Management Company, s. e. has had a long-term negative economic result. Despite a 15% decrease in revenue from the sale of goods and services in 2015 in comparison to 2014 to EUR 71 million, total revenues increased by 10% to EUR 111 million. The main reason for this was a 440% increase in financial resources provided by the state budget to EUR 26 million. In 2015, there was a 6% decrease in total expenditure in comparison to 2014, to EUR 115.7 million.

Despite the decrease in expenditure and an increase in revenues, the economic result is still negative. The year 2013 was the only one in the past 6-year period when the SWMC had a positive economic result, which was mainly caused by an increase in transfers of finances from the state budget in the amount of EUR 31 million. In terms of the number of employees, the SWMC belongs to the largest institutions under the authority of the department of the MoE SR.

Table 15: Revenues and expenditure of the Slovak Water Management Company, s. e.

	2010	2011	2012	2013	2014	2015
Revenues	133.3	100.5	102.4	124.2	101.0	111.2
<i>Revenue from Own Goods and Services</i>	87.8	75.3	75.3	80.2	82.8	71.2
<i>Financial Resources from the SB</i>	25.5	14.2	17.0	31.1	4.9	26.6
Expenditure	135.5	119.0	120.6	122.0	122.3	115.7
<i>Material and Energy Consumption</i>	17.9	14.7	14.4	15.8	14.4	12.3
<i>Repairs and Maintenance</i>	7.1	12.1	5.4	9.5	9.6	6.9
<i>Personnel Costs</i>	58.3	55.7	52.9	48.0	47.5	47.9
<i>Long-term Asset Depreciation</i>	21.8	8.6	19.4	21.4	19.4	21.3
Economic Result	-2.1	-18.6	-18.2	2.2	-21.3	-4.5
Number of Employees	3,644	3,609	3,572	3,536	3,449	3,347

Source: SWMEC, s. e.'s annual reports

In order to save finances, it is necessary to optimise operating and capital expenditure including a potential personnel saving. An SWMC audit conducted by the Boston Consulting Group (BCG) analysed the current state and identified key reasons which reduce the level of efficiency of the enterprise. By a gradual implementation of more efficient procedures, the SWMC will be able to reduce its annual operating costs by EUR 20 million by 2020, and by a subsequent EUR 10 million in the following years.

Table 16: The Plan for Increasing the Efficiency of the Slovak Water Management Company, s. e. according to the BCG

Phases	Measures	Time plan
Implementation of the Simplest Measures	Purchase optimisation, elimination of unnecessary activities, rationalisation of the mechanism fleet	2018
Centralisation and Initial Optimisation	Management centralisation, centralisation of the main and supporting activities, increasing performance efficiency	2018-2020
Further Optimisation and Outsourcing	More advanced performance monitoring and analysis, partial outsourcing of simpler and supporting activities	2020-2022

Recently, the SWMC has adopted measures for reducing costs, such as reducing the number of employees by 9% in comparison with the year 2015, establishing a centralised purchasing system in the case of larger tenders, as well as centralised investment management. Certain activities (such as correspondence) underwent standardisation and electronification. It is expected that in the future, progressive approaches, such as control of fuel for equipment and GPS control, will be implemented.

The SWMC has a three-level management structure, beginning with the directorate and followed by branch enterprises and the management of individual water catchment areas, which leads to duplication of activities. The extent of centralisation of executive and supporting functions is minimal. Executive functions such as operation, laboratories, investment activities, as well as supporting activities in the areas of human resources, legal representation, etc. are decentralised. Within its organisational structure, the SWMC applies fragmentation of regional organisation (operating regions, individual water catchment area administrations). Throughout the whole structure, there is the frequent occurrence of small bodies (a manager and two or three subordinates).

No single approach towards standardisation and normalisation of executive activities is applied within the organisation. No system of performance efficiency evaluation is currently used. Cyclical activities without a higher added value are currently performed internally (e.g. grass cutting), which leads to higher costs. There is an excessive prevalence of mostly formal control activities in the SWMC. Every purchase above EUR 3,000 must be approved by the MoE SR, which does not have a fixed time to respond, which leads to a disproportionate prolongation of the whole purchase process. The organisation also shows low advancement of purchase practices.

The fleet of mechanisms is little-used and obsolete, which leads to excessive operating, maintenance and repair costs, also connected to a higher allocation of capacities for operation (e.g. drivers, machine attendants, and mechanics). The SWMC's immovable property is too extensive and not much used. Often, it is not connected with the main activity.

3.1.2 The Water Management Construction, s. e.

This enterprise was founded for the purpose of supporting the development of Slovakia's water management, it ensures the construction, operation, and surveillance of water management, hydroelectric, and engineer objects, as well as the generation and sale of electric energy. It administers the important waterworks Gabčíkovo and Žilina as well as the small hydropower plant Dobrohošť, whose main purposes are using the energy potential of the rivers Danube and Váh and protecting the surrounding areas against major floods.

Table 17: Revenues and Expenditure of the Water Management Construction, s. e.

	2010	2011	2012	2013	2014	2015
Revenues	111.1	97.9	119.3	116.9	92.4	92.2
<i>Revenues on the Basis of the Gabčíkovo Hydroelectric Power Plant Operation Contract</i>	85.7	71.3	94.2	86.0	61.5	62.4
<i>Sale of Purchased Electricity Including Deviations</i>	8.2	7.5	7.3	6.9	5.2	10.2
Expenditure	107.8	103.2	117.1	114.1	90.3	91.3
<i>Repairs and Maintenance</i>	15.0	15.3	18.5	16.1	8.1	5.5
<i>Other Services</i>	20.1	19.5	20.8	22.3	26.1	25.9
<i>Long-term Asset Depreciation</i>	31.4	30.1	30.4	29.7	28.6	28.8
<i>Personnel Costs</i>	5.3	6.1	7.0	7.7	0.8	10.8
<i>Financial Costs</i>	11.6	10.6	9.9	10.5	6.6	5.7
Economic Result	3.3	-5.3	2.2	2.8	2.2	0.9
Number of Employees	215	230	225	221	224	289

Source: WMC, s. e.'s annual reports

The economic result is positive, but with a downward trend. Revenues of the Water Management Construction, s. e. mainly come from the income from the generation and sale of electric energy from the Gabčíkovo Hydroelectric Power Plant, which increased by almost 2% compared to the previous year, but decreased by 35% compared to the annual average during the 2010-2014 period. The highest costs are the costs of intermediate consumption, which include repairs and maintenance alongside other services. Long-term asset depreciation is another significant item. Within an expenditure revision, the state enterprise Water Management Construction should also be subject to a similar audit than the SWME.

4 Availability of Data for Revisions

Availability of data is more or less limited. In the majority of cases, there is space for improvement of monitoring and subsequent reporting. In several cases, missing data were identified, which are currently not collected despite the fact that considerable finances are channelled into the areas in question. The last group consists of data which are registered within the given organisation, but which are not available to the public or outside the department.

It is desirable that in the future, data collection is broadened and its quality is increased, and that a place is created for their continuous publishing, which will not only allow for a domestic overview, but also for a better international comparison.

Table 18: Availability of data for revisions

Area		Specification	Under the Authority of
Non-existing data			
Flood protection	FRMP	Likelihood forecast of floods	MoE SR's Directorate for Water Protection, SWMC
	Indicators of newly-built measures	Flow rate, other indicators – with the aim of not worsening the condition in comparison with the original one	
	Floods	Smallest possible area (micro-basin, municipality, ...), costs, cause of floods	WRI
Waste	Specification of waste collection centres	Area, capacity, amount of sorted waste	MoE SR's Department of Waste Management
Data which partially exist but need a qualitative improvement			
In General	Demonstrating the allocation of resources from the Structural Funds	Broadening of the records of expenses from the Structural Funds to include the targeted use of resources on the basis of specific actions	ITMS/project management
Environmental Fund	Resources/projects of the EF	Monitoring of result indicators of supported and rejected projects	EF
Ambient Air	Improving the quality of pollutant concentrations reporting	Better monitoring (increasing the number of monitoring stations) and modelling (continuous update of the calculation methodology)	SHMI
Wastewater Management and Drinking Water Supply	Access to the sewage system	Reporting on the access to the existing public sewage and water systems	MoE SR's Directorate for Water Protection, WRI
Flood Protection	FRMP	Prioritisation criteria: simplified rank determination in the final ranking	MoE SR's Directorate for Water Protection, SWMC
		Unifying the methodology of the threatened/protected population calculation	
	Existing and proposed anti-flood measures	Across-the-board use of the <i>Flood damage assessment methodology</i>	WRI
Waste management	Statistics of processing facilities	Publishing the costs of implementation of measures	MoE SR's Directorate for Water Protection, SWMC
		Continuous creation of a publicly available table of proposed and implemented measures	
Waste management	Statistics of processing facilities	Regular reporting of the facilities' capacities	MoE SR's Department of Waste Management
Existing Data that Are Not Available			
In General	Environmental Fund audit	Results of internal and external audits	MoE SR
	Efficiency assessment	Analysis of supported projects through measurable indicators, the extent of original goal fulfilment	EF
Nature Protection	Cost statistics	Report on expenses and management of protected areas divided by activities and protection zones	SNC SR

Appendix 1: Overview of Result Indicators

Overview of Result Indicators

Area	Indicator	SR	Sample Average	V3	Sample	Definition
Wastewaters	Connection of population to wastewater treatment plants	54.7	75.5	57.1	OECD	The level of wastewater treatment weighted by the rate of the connected population. (%)
Ambient Air Quality	The PM _{2.5} status achieved	18.6	14.5	20.6	EU	The median of the measured concentrations of PM _{2.5} in ambient air (µg/m ³)
Nature Protection	The percentage of endangered species	25.2	24.0	29.0	OECD	The arithmetic means of the percentages of the individual endangered species in their total count in the country. Note: Comparability of the values of individual countries is relatively limited due to a lack of context of natural conditions as well as the different extent of biodiversity.
Greenhouse Gas Emissions	Total greenhouse gas emissions in proportion to GDP	0.27	0.29	1.08	OECD	Greenhouse gas emissions needed to produce a unit of GDP. The data relate to the total emissions of CO ₂ , CH ₄ , N ₂ O, HFC, PFC, SF ₆ , and NF ₃ in proportion to GDP. The data do not include indirect CO ₂ (i.e. emissions generated in the process of product manufacturing, e.g. of cars). (kg/thousands of USD)
Waste Recycling	The extent of communal waste recycling	14.9	36.0	34.8	EU	The proportion of the amount of communal waste recycled to the total communal waste generated. (%)

Appendix 2: Subordinate Organisations

Name	Tasks	Registered Office	Average Annual Expenditure 2013 – 2016 (in Thousands of EUR)	Average Annual Expenditure from the SB (in Thousands of EUR)
Slovak Environment Agency	Environmental risk management Assessment of the state of the environment The intermediate authority under the managing authority of the OP QE Monitoring and control of finished projects under the Operational Programme Environmental informatics and environmental services Care for the urban and rural environment (the Village Restoration Programme) Environmental education (the Enviromagazín magazine, the Ekotopfilm festival)	Banská Bystrica	6,706	5,687
Slovak Environmental Inspectorate	Pollution prevention and control State supervision in the area of environmental care	Bratislava	4,759	4,718
Slovak Mining Museum	A museum focused on mining activity	Banská Štiavnica, Handlová	1,695	1,192
Slovak Museum of Nature Protection and Speleology	A museum focused on nature protection and speleology	Liptovský Mikuláš	2,852	2,728
Slovak Hydrometeorological Institute	State hydrological and meteorological network administration Monitoring of the condition of ambient air and waters Forecasting	Bratislava	22,280	18,099
State Nature Conservancy of the Slovak Republic	Nature and landscape protection (e.g. national park administration) Preparation of strategic materials concerning nature and landscape protection (conservation and care programmes) Operation and opening of caves for the public	Banská Bystrica	17,818	12,816
State Geological Institute of Dionýz Štúr	Scientific and research activities in the area of geology	Bratislava	10,055	7,411
Water Research Institute	Scientific and research activities in the area of waters	Bratislava	5,282	2,665
Bojnice ZOO	Animal husbandry under human care and animal research Animal rescue centre	Bojnice	3,502	2,229

Appendix 3: List of Abbreviations

BCG	Boston Consulting Group
BIS	Budgetary Information System
BS	Basic scenario
CBA	Cost-benefit analysis
CBOs	Contributory and budgetary organisations
CEA	Cost-effectiveness analysis
EC	European Commission
EEA	European Economic Area
EEC	European Economic Community
EF	Environmental Fund
ESA	European System of Accounts
EU	European Union
FRMP	Flood risk management plan
IEP	Institute for Environmental Policy
IFP	Institute of Financial Policy
IS	Information system
ITMS	IT monitoring system
MCA	Multi-criteria analysis
MoE SR	Ministry of Environment of the Slovak Republic
MoF SR	Ministry of Finance of the Slovak Republic
NEIS	National Emission Information System
NP	National park
OP E	Operational programme 'Environment'
OP QE	Operational Programme 'Quality of Environment'
PAB	Public administration budget
PCA	Protected countryside area
PE	Population equivalent
PM	Particulate matter
PO	Permanent office
PPP	Purchasing power parity
R	Reality
S&R	Science and Research
s. e.	State Owned Enterprise
SB	State budget
SDR	Spatial Data Registry
SEA	Slovak Environment Agency
SEI	Slovak Environmental Inspectorate
SGIDŠ	State Geological Institute of Dionýz Štúr
SHMI	Slovak Hydrometeorological Institute

SMM

SMNP&S

SNC SR

Slovak Mining Museum

Slovak Museum of Nature Protection and Speleology

State Nature Conservancy of the Slovak Republic

Appendix 4: Overview of Assessed Expenditure

	2010 R	2011 R	2012 R	2013 R	2014 R	2015 R	2016 R
Anti-flood Measures (042)	33.7	31.1	36.2	37.5	19.7	120.1	37.1
State Budget	24.1	12.4	17.0	14.9	3.4	26.0	18.8
EU Resources + Co-financing	8.7	18.3	16.9	21.9	14.7	91.9	16.1
Environmental Fund	0.9	0.4	2.3	0.7	1.6	2.3	2.2
Waste Management (051)	38.0	78.4	76.7	51.4	32.7	93.3	42.7
EU Resources + So-financing	36.6	74.0	76.4	49.4	30.1	81.5	27.3
Environmental Fund	1.4	4.4	0.3	2.0	2.6	11.8	15.4
Wastewater Treatment and Drinking Water Supply (052+063)	80.3	185.0	150.8	157.3	140.1	325.6	168.8
State Budget	0.0	4.7	0.0	0.0	0.0	0.0	0.0
EU Resources + Co-financing	51.6	151.0	125.4	144.0	126.0	311.7	145.3
Environmental Fund	28.7	29.3	25.4	13.3	14.1	13.9	23.4
Nature and Landscape Protection (054)	9.6	14.5	13.2	18.4	16.9	32.1	11.1
State Budget	3.9	9.6	7.6	7.3	5.6	9.0	4.3
EU Resources + Co-financing	4.4	4.5	5.0	9.7	9.8	22.0	5.4
Environmental Fund	1.3	0.4	0.5	1.4	1.5	1.0	1.5
Pollution Reduction (053)	31.8	85.6	34.4	28.5	14.9	70.6	57.1
Ambient Air Protection	29.2	81.6	30.3	23.9	10.1	65.9	52.2
<i>State Budget</i>	9.0	5.2	5.0	5.0	3.9	5.0	2.3
<i>EU Sources + Co-financing</i>	19.1	75.4	25.2	17.5	5.1	46.3	32.3
<i>Environmental Fund</i>	1.1	1.0	0.0	1.3	1.1	14.5	17.6
Slovak Environmental Inspectorate	2.7	4.1	4.1	4.6	4.8	4.7	4.9
<i>State Budget</i>	2.6	4.1	4.1	4.6	4.7	4.7	4.8
Other*	31.6	32.7	31.4	38.2	41.9	73.0	30.9
State Budget	19.0	23.5	23.2	24.5	16.1	24.4	15.9
EU Resources + Co-financing	5.6	8.5	7.6	13.1	25.1	47.7	14.0
Other	6.4	8.2	7.8	7.9	13.5	15.4	10.1
Environmental Fund	0.7	0.7	0.6	0.7	0.7	0.9	1.0
SWMC, s. e.'s Expenditure	135.5	119.0	120.6	122.0	122.3	115.7	-
Total	360.6	546.4	463.3	453.3	388.4	830.4	347,7**

*Including expenditure on the operation of contributory organisations

**The total does not include the expenses of the SWMC, s. e.

Source: BIS