Integration of environmental concerns in Cohesion Policy Funds (ERDF, ESF, CF)

Results, evolution and trends through three programming periods (2000-2006, 2007-2013, 2014-2020)

Final report

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APPENDICES

List of abbreviations and acronyms

AIR	Annual Implementation Report
CB	Cross-border
CEPAREMA	Classification of Environmental Protection Activities
CF	Cohesion Fund
COFOG	Classification of the Functions of Government
CP	Cohesion Policy
CPR	Common Provisions Regulation
DG	Directorate General
7th EAP	7th EU Environment Action Programme to 2020
EA	Environmental Authority
EBRD	European Bank of Reconstruction and Development
EIA	Environmental Impacts Assessment
EIB	European Investment Bank
ENEA-MA	The European Network of Environmental Authorities - Managing Authorities for the Cohesion Policy
ER	(SEA) Environmental Report
ERDF	European Regional Development Fund
ESF	European Social Fund
ESIF	European Investment and Structural Fund
EU	European Union
EUR	Euros
FOI	Field of Intervention
GPP	Green Public Procurement
IF	Intervention Field
IP	Investment Priority
IPPC	Integrated Pollution Prevention and Control
ISPA	Instrument for Structural Policies for Pre-Accession
MA	Managing Authority
MS	Member State
NACE	Statistical classification of economic activities in the European Community (Nomenclature statistique des Activités Economiques dans la Communauté Européenne)
OP	Operational Programme
PA	Priority Axis
PAFs	Priority Action Frameworks for Natura 2000
PMC	Programme Monitoring Committee
PT	Priority Theme
RE	Renewable Energy
R&D	Research and Development
SEA	Strategic Environmental Assessment
SD	Sustainable Development
SME	Small and Medium Enterprises

SO	Specific Objective
TC	Territorial Cooperation
TO	Thematic Objective
WP	Work Package

List of EU Member State country codes

AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovakia
UK	United Kingdom

Executive summary

The objective of the study was to analyse the integration of environmental concerns in Cohesion Policy across three programming periods – 2000-2006, 2007-2013, and 2014-2020.

Methodology

In this study, the analysis on integration of environmental concerns is approached from two main angles:

- The contribution of Cohesion Policy to meeting environmental policy objectives (this is referred to as 'vertical integration')
- The wider integration of environmental concerns across the range of sectors and investment priorities covered by Cohesion Policy. This includes analysis of how environmental concerns are integrated as part of the implementation of the horizontal principle of sustainable development (this is referred to as 'horizontal integration').

In terms of investment of Cohesion Policy funds into environmental themes, such investments may be direct or indirect. Direct environmental investments are those in environmental infrastructure (contributing directly to the achievement of EU legislative requirements in areas including drinking water supply, solid waste management and waste water treatment) as well as 'green infrastructure' (protected habitats and species, biodiversity, ecosystems and their services for which specific targets in EU environmental legislation also exist). Indirect investments include those in 'green' energy, transport and production systems; these investments contribute to the 7th EU Environment Action Programme's (7th EAP) broader goal of a transition towards a low-carbon, resource-efficient, safe and sustainable economy.

The study comprised statistical analysis of data on Cohesion Policy spending, literature review of relevant regulatory documents, studies and reports, analysis of a selection of Operational Programmes (OPs) from the 2007-2013 and 2014-2020 programming periods as well as interviews with Managing Authorities in the Member States and a workshop with representatives of the ENEA-MA (The European Network of Environmental Authorities - Managing Authorities for the Cohesion Policy) working group.

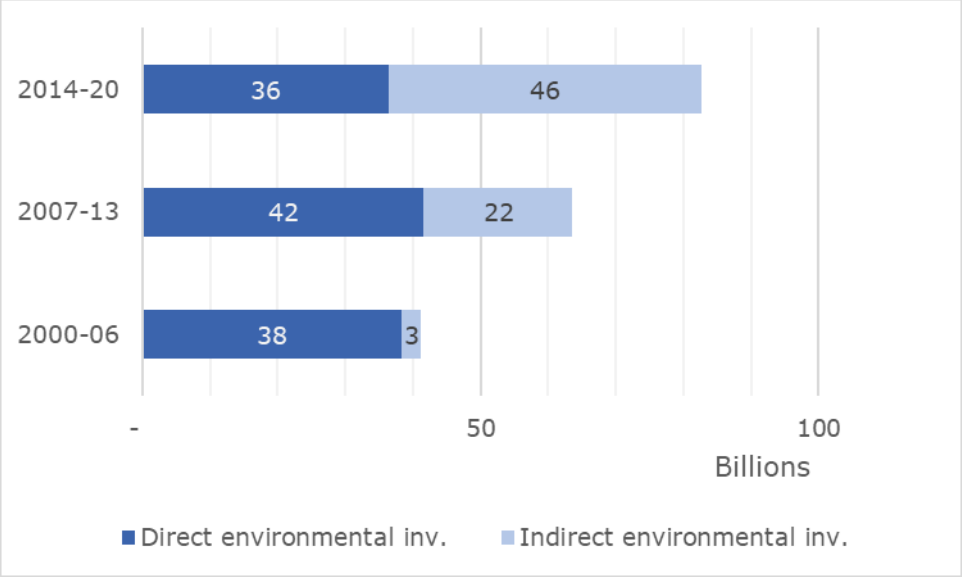
This executive summary presents the main conclusions with regard to vertical and horizontal integration of environmental concerns in Cohesion Policy and reflects on lessons learned and possibilities for improving the integration of environmental concerns in the future.

Main conclusions with regard to vertical integration of environmental concerns in Cohesion Policy

Cohesion Policy provides a key source of financing that Member States have employed for environmental investments. Cohesion Policy is comprised of three main funds: the European Regional Development Fund (ERDF) and the Cohesion Fund (CF), which primarily finance infrastructure and physical investments; and the European Social Fund, which supports investments in human capital. Unless otherwise indicated, this report focuses on financing provided by ERDF and CF.

The total allocations from the European Regional Development Fund and the Cohesion Fund for the environment have increased steadily over the three programming periods considered, growing from about EUR 41 billion in 2000-2006 to EUR 66 billion in 2007-2013 and EUR 82 billion in the current period, 2014-2020 (see Figure 0-1 below)[1]. The EU itself grew over the three periods, with the accession of ten Member States in 2004, two more in 2007 and a thirteenth, Croatia, in 2013. Nonetheless, environmental allocations have also grown as a share of total ERDF and Cohesion Fund resources, from about 25% in the first two periods to just under 32% in the 2014-2020 period.

Figure 0-1 *Allocations to direct and indirect environmental investments from all EU Member States across the three financing periods (EUR billions)*



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020

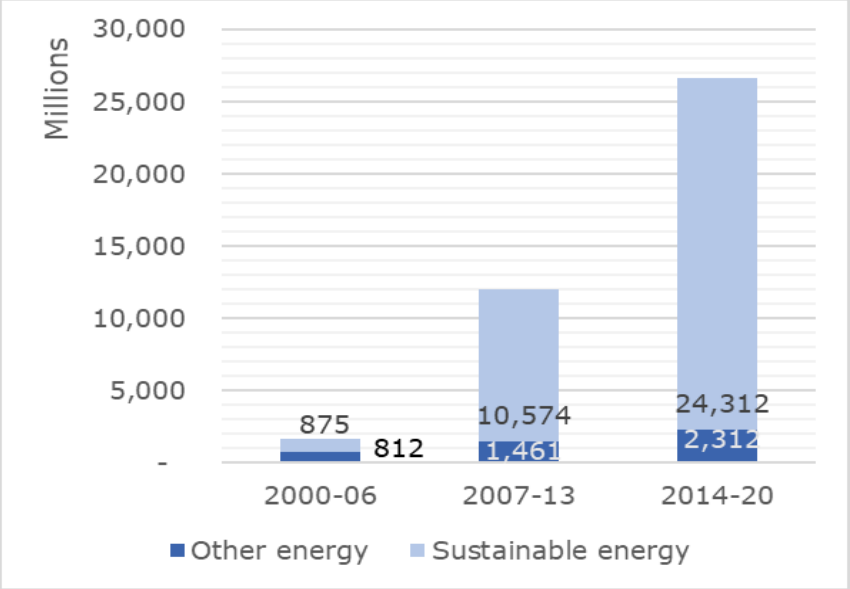
The third major Cohesion Policy fund, the European Social Fund (ESF), invests in human capital. This report does not consider ESF investments, as comparable information on this fund's investments for the environment across the three

[1] The figures in this report are not adjusted for inflation.

programming periods is not available. In the current financing period (2014-2020), a secondary reporting theme was introduced for the ESF to better identify this fund's contribution to cross cutting objectives such as environment: in total EUR 1.1 billion of ESF resources — representing 1.3% of total ESF allocations for the same period — were allocated for activities related to the environment in this period (please see Appendix F for further information on ESF). When compared to total Cohesion Policy allocations (CF, ERDF and ESF), the allocations for environmental investments by CF and ERDF grew from 17.8% of the total in the 2000-2006 period to 23.7% of the total in the 2014-2020 period.

Allocations for direct environmental investments have remained fairly stable over the three periods considered, a bit above or below EUR 40 billion in each period, while those for indirect environmental investments grew sharply. This reflects a 'greening' of Cohesion Policy investments for key sectors including energy and transport: notably, sustainable energy allocations (i.e. energy efficiency and renewable energy) grew from half of all energy allocations in the 2000-2006 period to about 90% in 2014-2020 (see Figure 0-2 below). For the transport sector, allocations for sustainable categories grew from 1% of total sector resources in 2000-2006 to 23% in the 2014-2020 period. In other areas of indirect environmental investments, Cohesion Policy allocations to environmentally related business development and R&D also increased (in contrast, allocations for sustainable tourism decreased).

Figure 0-2 *EU Member State allocations of Cohesion Policy funds to sustainable energy compared to other energy investments across the three financing periods (EUR million)*



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Note: sustainable energy includes spending categories for energy efficiency and renewable energy.

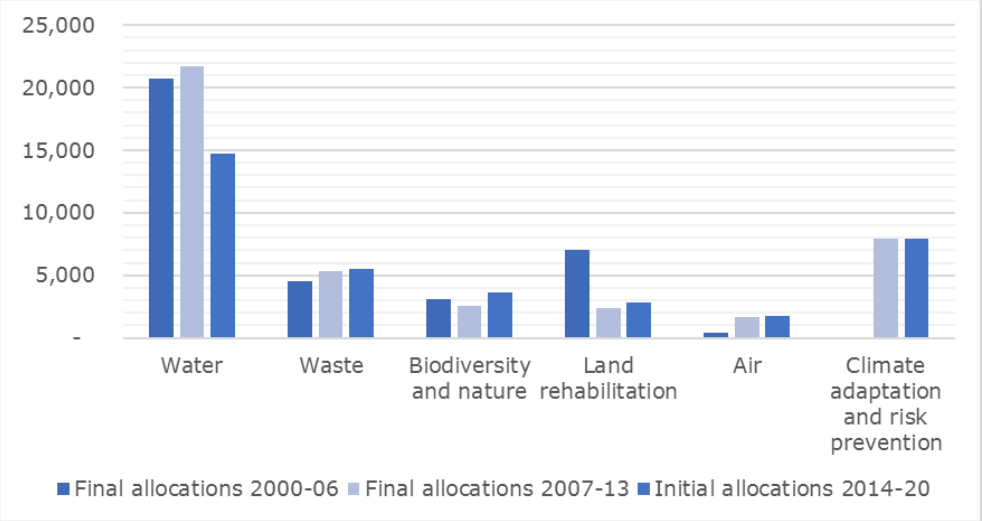
These trends reflect the evolution of the EU financial framework. For the 2014-2020 financing period, an explicit effort was made to align the objectives of Cohesion Policy funds to those of the Europe 2020 Strategy via a focus on thematic objectives. The

Europe 2020 Strategy sets targets to reduce greenhouse gas emissions, increase energy efficiency and increase the share of energy from renewables, and investments for sustainable energy and transport respond to these goals.

When looking at direct environmental investments, the largest shares of financing have been allocated to the *water sector*: EUR 20.7 billion in the 2000-2006 financing period, falling to EUR 14.8 billion in the 2014-2020 period (see Figure 0-3 below). Cohesion Policy resources have supported Member State implementation of EU legislation: over the 2007-2013 period, for example, Cohesion Policy investments improved drinking water supplies for almost 6 million EU citizens and improved waste water treatment for about 7 million. The decline in water allocations may be linked to completion of necessary infrastructure in many Member States (in addition, EIB loans provided a major share of financing for the sector, in particular for the EU-15).

Over the three programming periods, Cohesion Policy allocations for *solid waste management* totalled just over EUR 15 billion. Most of these resources have supported investments in separate collection and in facilities for recycling and recovery of municipal solid waste; Cohesion Policy also supported the proper closure of old landfills that did not meet EU standards.

Figure 0-3 *Comparison of allocations (EUR million) by sector across the three financing periods (all MS aggregated)*



Source: DG REGIO (2016) for 2000-2006 and 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Note: For the financing period 2000-2006, a further amount of EUR 2.4 billion was allocated for 'environmental infrastructure' without information on the specific environmental sector. This amount is not shown in the figure.

Cohesion Policy allocations totalled almost EUR 9.5 billion for *nature and biodiversity* investments over the three programming periods considered. These resources have financed the preparation of management plans for Natura 2000 sites as well as projects for habitat and species protection. Cohesion Policy was the largest single

source of EU support for the Natura 2000 network. The LIFE Programme and the European Agricultural Fund for Rural Development (EAFRD) also provided financing for Natura 2000 and other biodiversity investments. The LIFE Programme allocated EUR 858 million for nature and biodiversity in the 2007-2013 programming period. About 45% of resources under EAFRD were allocated for spending to 'improve the environment and countryside' in the 2007-2013 programming period, of which EUR 518 million were allocated specifically for Natura 2000 measures.

Cohesion Policy allocations for *land rehabilitation* totalled about EUR 12 billion: these investments supported the remediation of contaminated sites and the rehabilitation of brownfield areas for new uses. Spending has declined significantly since the 2000-2006 programming period.

Over EUR 4.5 billion were allocated for *air quality* spending categories across the three programming periods: Member States have used these resources for pollution control at large industrial facilities, for the reconstruction of building heating systems, for public transport improvements and in some cases, also for air emissions from the agriculture sector. In addition, investments for sustainable energy and sustainable transport contributed to air quality goals.

In the 2007-2013 and the 2014-2020 programming periods, Cohesion Policy allocations for *climate action and risk prevention* spending categories totalled EUR 14.4 billion. (The 2000-2006 programming period did not have spending categories for climate; moreover, this amount comprises action for both mitigation and adaptation, as separate categories were introduced only in the 2014-2020 period.) In addition, spending in areas such as sustainable energy and transport supported action on climate, in particular for mitigation. Using the 'Rio markers' approach, total Cohesion Policy allocations for climate reached EUR 55.3 billion in the current, 2014-2020 period alone, about 25% of all resources.

Based on a rough comparison of funding sources, Cohesion Policy financed an estimated 10% of EU total direct environmental investments – including EU, Member State public sector and private sector resources – in both the 2000-2006 period and the 2007-2013 period (data for the current period are not available). The share and the importance of Cohesion Policy in direct environmental investments has been falling for EU-15 Member States over the three programming periods – but growing for the EU-13. In the EU-15, the role of Cohesion Policy declined from an estimated 8% of total financing in 2000-2006 to 4% in 2007-2013. In contrast, for the EU-13, its share rose from about 16% of all financing for direct environmental investments in 2000-2006, though their accession started only part way through this period, to over 25% in the following period. As noted, these are rough estimates, but they underline that Cohesion Policy has played a major role in supporting investments in many Member States and in sectors such as water, waste management and nature protection.

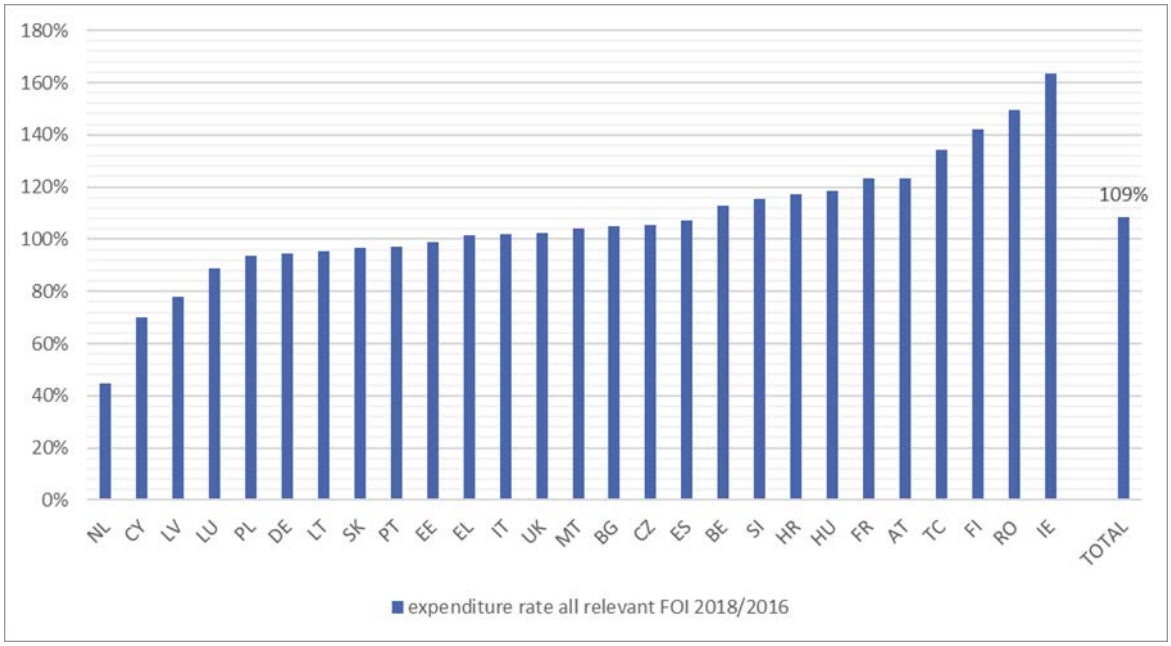
The overall expenditure rate in the financing period 2007-2013 for all EU CP funding in the category of *direct environmental investments* reached 109% at the end of 2017 (compared to the financial allocations recorded in 2016). Figure 0-4 below presents

expenditure rates per country. For most countries, the expenditures are higher than the allocations and demonstrate the importance of the needs beyond the available EU funding: for France, Austria, Finland, Romania, Ireland, expenditures exceed the allocations by more than 20% (this is true also for Territorial Cooperation among Member States).

The lowest absorption rate has been recorded in the Netherlands (45%), followed by Cyprus (70%) and Latvia (78%).

It is worth noting that data on expenditures do not always match data on OP allocations, as it was not an obligation for managing authorities in the 2007-13 period to report exact amounts of spending in relation to EU funding per field of intervention. The expenditures of Cohesion resources by field of intervention were estimated by DG Regional and Urban Policy based on data on total expenditures and on co-financing rates. Therefore, data presented here should be treated as an approximation.

Figure 0-4 Expenditure rates as of September 2018 for all fields of intervention for direct environmental investments as an aggregate



Source: DG REGIO (2016 and 2018)

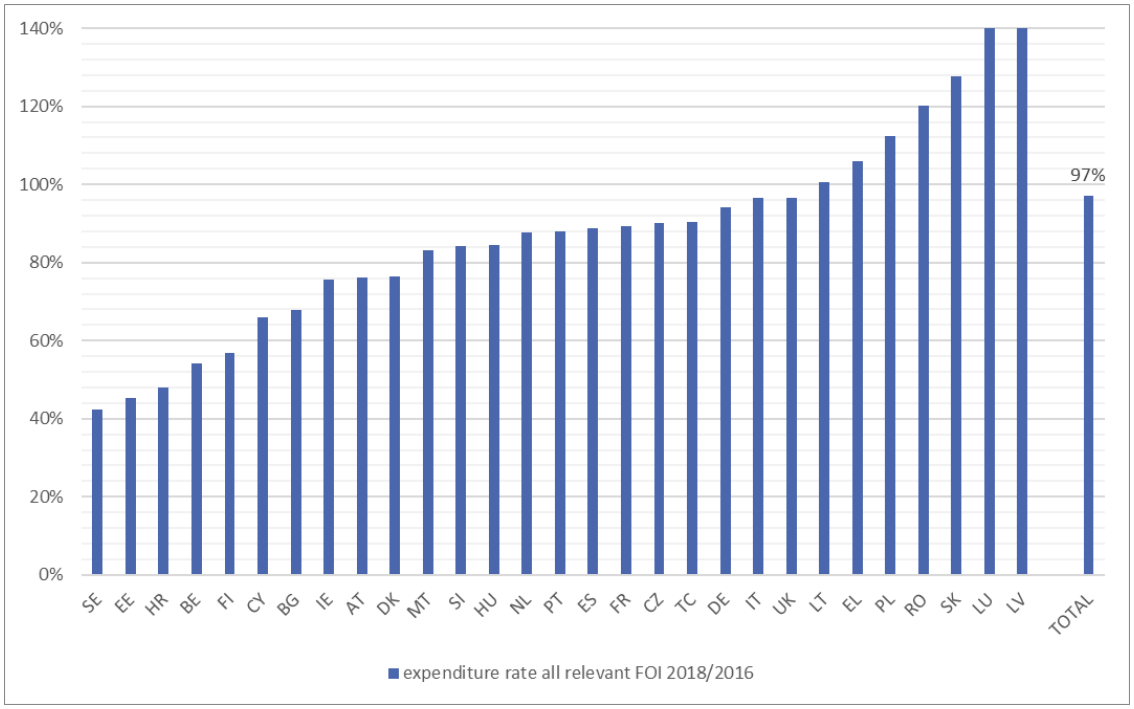
Note: No OP allocations as of 2018 in Sweden (while expenditures of appr. EUR 2 million are reported); no allocations in Denmark

Across the sectors of direct environmental investments, the highest expenditure rate (114%) was recorded in the water sector, followed by the sectors of air protection, (111%), climate and risk prevention (108%), biodiversity (102%), and waste (100%). For land rehabilitation, expenditure rate at the end of 2018 reached 88% of the OP

allocations recorded in 2016; this is the only sector where OP allocations did not reach 100%.

At the end of 2018, the aggregate expenditure rate for *indirect environmental investments* reached 97%, and thus was lower than the expenditure rate for direct environmental investments. The lowest rates (below 60%) were seen for Sweden, Estonia, Croatia, Belgium and Finland. For Greece, Lithuania, Poland, Romania, Slovakia, Luxembourg, and Latvia, the expenditures in 2018 were higher than OP final allocations. Figure 0-5 presents expenditure rates per country.

Figure 0-5 Expenditure rates as of September 2018 for all FOI for indirect environmental investments as an aggregate



Source: DG REGIO (2016 and 2018)

Note: In case of Luxembourg and Latvia, the expenditures reported in 2018 exceed OP allocations of 2016 by over 200% (211% for Luxembourg and 215% for Latvia) and have been cut at 140%; the aggregated allocations for Latvia and Luxembourg are relatively small and constitute approximately 0.6% of total allocations to the selected categories in total.

Across the sectors of indirect environmental investments, the area of business development (promotion of environmentally-friendly products and production processes in SMEs) achieved the highest final expenditure rate, reaching almost 109% of OP allocations in 2016. Renewables and energy efficiency ranked second, with the expenditure rate of 98%. Intelligent transport systems and clean urban transport, grouped under the label of sustainable transport, also achieved a high expenditure rate of 97%. Promotion and development of natural heritage and assets in tourism reached a relatively low level of expenditures as compared to final OP allocations: 78%.

Main conclusions with regard to horizontal integration of environmental concerns in Cohesion Policy

Since the 2000-2006 period, Cohesion Policy OP development and implementation have been increasingly subject to a more comprehensive framework for integrating environmental considerations. This has led a number of Member States and regions to frame sustainable development as a horizontal principle in the OPs. The study shows that there is great variance in how this is approached in practice during the current programming period. A significant number of the OPs reviewed under this study describe how vertical environmental integration has been considered, while actual horizontal integration receives less attention.

One of the possible ways of advancing horizontal integration of environmental concerns is to focus on implementation of green public procurement (GPP). While the use of GPP was fairly limited during 2000-2006 period, some evidence of growing practice in its application was already found in relation to 2007-2013 OPs in some countries, despite the fact that the relevant regulations did not require its deployment. For the 2014-2020 period, the encouragement of use and prioritisation of projects entailing the use of GPP is mentioned in chapter 11 of about half of the OPs reviewed under this study, reflecting perhaps the inclusion of a reference to GPP in the Regulation governing the funds in this period (cf. annex I of the Common Provisions Regulation, Common Strategic Framework, point 5.2 on Sustainable development). The majority of these OPs make a more generic reference to the aspiration of applying GPP horizontally throughout the programme, and the use of GPP in project selection is seldom specified in connection with specific planned activities and Invesmtent Priorities (IPs) of the OPs. Evidence also suggests that the principle, although mentioned in the OPs, is not often followed and implemented in practice. This would indicate that there is a potential for Cohesion Policy to further encourage the establishment of GPP schemes and enhance institutional capacity of Public Administration, for example in ESF OPs.

A key concern for horizontal integration is the framing of indicators and selection criteria. These set the scene for the types of interventions co-funded by Cohesion Policy either directly or indirectly. The 2000-2006 programming period brought about considerable progress in the systematic application of indicators for monitoring and evaluation of all programmes. The concept of core /common indicators to facilitate the process has been introduced in Cohesion Policy since at least the 2000-2006 period though their use has evolved from a "recommendation" to a requirement.

The Regulation governing the 2014-2020 period introduced clear obligations for OP implementation reports and Partnership Agreement progress reports to set out information on, and assess action taken to promote sustainable development, and therefore this can be expected to create an impetus for Managing Auhorities (MAs) to start establishing indicators in that direction. Yet the development of indicators reflecting the horizontal principle on sustainable development is conceptually a challenging exercise, and finding ways to make it operational in the context of OP

implementation even more so. The current list of core indicators comprise no environment-related indicators listed for thematic fields covering non-environment investments, with the exception of indicator "Reduction greenhouse emissions (CO_2 and equivalents, kt)" applicable to investments beyond the environment (e.g. railway related investments). Input from authorities in some Member States during this study called for a set of indicators at the EU level to guide such a process.

The study found that there is a lack of integration between environmental monitoring (generally defined and dealt through Strategic Environmental Assessment process) with OP monitoring (physical, procedural and financial). Already the guidelines from the 2007-2013 period recommended that the monitoring and evaluation of horizontal themes such as sustainable development should be embedded into the general indicator system of a programme and not a separate specific indicator system. The evidence gathered indicates continued low degree of integration: The OPs with thematic objectives relating to the environment (low-carbon economy – TO4, promoting climate change adaptation – TO5, preserving and protecting the environment – TO6) had good coverage of environmental indicators, OPs with thematic objectives on transport (TO7) had medium coverage, but the study found few examples of environmental aspects being reflected in result indicators for other thematic objectives.

In respect to selection criteria, the study found that the guiding principles with respect to selection criteria on sustainable development specified in OPs tend to remain rather generic, but there are examples of OPs which have developed more comprehensive frameworks. Guiding principles on selection criteria are found to have a limited influence on the actual selection criteria used in calls for project applications. Developing more operational criteria mirroring the overall principles of sustainable development is a methodological challenge.

Actual selection criteria are set in a complex and dynamic institutional context – and they change over time. This makes comprehensive analysis of their character a challenge. Findings presented in this study are therefore indicative. Selection criteria for the environmental OPs tend to be related to the relevant national plans and as such provide a good 'steer' for environmental investments. The study found that selection criteria for the indirect environmental objectives tend to be more in the form of 'incentives' (i.e. favouring certain types of investments without requiring them).

Another key instrument to ensure integration of environmental concerns in Cohesion Policy is the Strategic Environmental Assessment (SEA), which was carried out for each OP for the programming periods 2007-2013 and 2014-2020. Here, the study found that there is evidence to suggest that SEAs have an influence on enhancing the consideration of environmental concerns in the OPs – both formally and informally. However, the influence seems often limited to small adjustments of OPs, and the scope for influencing what happens 'downstream' of the OP in relation to project selection, implementation, monitoring and evaluation is not fully exploited. Most SEAs tend to focus on the assessment of environmental impacts rather than on the

procedural aspects of OP implementation and how integration of environmental concerns can be safeguarded during the implementation stage.

The SEAs conducted in an iterative process with the OP drafting – sometimes integrated with the ex-ante evaluation - seem to have the best effect, and the effects here are most likely greater than what can be determined from the formal documentation in the final environmental report and statement. The informal leverage of having the SEA requirement should not be underestimated. However, it must also be recognised that the regulatory framework for Cohesion Policy in itself also provides a strong impetus for integration of environmental concerns.

As a new element in the 2014-2020 period, the Partnership Agreements (not subject to SEA) meant that priorities were already fixed in the initial stage. The OP SEA in that sense came at an advanced stage, where it was too late to have a strong influence.

Lessons learned and possibilities for improving the integration of environmental concerns in the future

The review of Cohesion Policy allocations for direct environmental investments looked for references to EU policy and legislation in selected Operational Programmes for the 2007-2013 programming period. These OPs identified EU and national environmental objectives, though sometimes in a general fashion. In the 2014-2020 programming period, ex ante conditionalities for the water and waste sector, among others, should ensure strong links between OP investment plans and EU policy and legislation. It will be valuable to review the lessons from this approach.

The review identified issues with administrative capacity in some Member States and for some sectors, in particular solid waste management. Public procurement was found to be an issue for several OPs. For nature and biodiversity, the OP reviews found that national institutions in Member States including Bulgaria and Poland had devoted efforts to addressing potential capacity issues. The European Commission has launched an Action Plan for Public Procurement for the 2014-2020 programming period: it would be valuable to ensure that environmental sectors receive adequate attention in this initiative.

The study also looked at the role of Cohesion Policy compared to other sources of finance, which play a role in nearly all the sectors considered. While Cohesion Policy has co-financing rules, Operational Programme allocations may be more effective when their role for a sector is considered alongside that of other resources, such as other EU funds as well as national government and private sector resources. The renewed attention to Priority Action Frameworks (PAFs) for Natura 2000 could address this need for nature and biodiversity investments, ensuring that different EU funds and national resources are used in effective and complementary approaches. A review of the role of Cohesion Policy resources in relation to other EU, national and private sources of funding in the current period, and of good practices in Member States in

terms of ensuring synergies among funding sources, could be valuable in preparing the next programming period, when EU funding may be more limited.

Finally, the OP reviews noted weaknesses in the indicators for some environmental sectors in the 2007-2013 period: for example, the common indicator for waste only counted the number of projects completed. Cohesion Policy indicators were improved for the 2014-2020 period, and it will be useful to review their value in terms of ensuring good links with EU environmental objectives and targets.

New EU requirements, including the Rio markers approach, have focused attention on climate action: it will be valuable to ensure that Cohesion Policy indicators present mitigation and adaptation results from both 'direct' and 'indirect' environmental investments – and indeed, across all OP investment areas.

On a similar note, tracking of results for green jobs creation and contribution to the circular economy will also be important to monitor the policy relevance of Cohesion Policy spending. The study found that there are potentials for establishing methodologies for tracking results and spending on green jobs creation and contribution to the circular economy within the current set-up of indicators. Recommendations for this are detailed in section 4.6 of this report. However, for future better overview, new core indicators could also be considered.

In terms of advancing horizontal integration of environmental concerns, the study has shown that there is a tendency that intentions are expressed in a rather generic way in chapter 11 of the OPs and this is not always followed up in practice with clear selection criteria and indicators that can operationalise the intentions. While requiring a section of the OPs to focus on horizontal integration does help to call attention to the need for considering this, there is also a risk that it becomes more of a box-ticking exercise, which does not necessarily ensure that the potentials for environmental integration of the various elements in the OPs are considered in detail. A key element in working with environmental integration at the more detailed operational level relates to selection criteria and indicators. Member States clearly consider this a methodological challenge and there seems to be scope for EU level action in the field of establishing indicators and guidelines in this area.

Some Member States have worked with selection criteria in a more structured and comprehensive way and there could be scope for more exchange of lessons learned between Member States. Further, focusing on establishment of indicators for environmental concerns could also have a positive influence on the establishment of selection criteria as the challenges in this area are related to the lack of indicators.

The study shows that SEA has value in relation to ensuring horizontal integration of environmental concerns in OPs. However, there also seems to be a scope for further guidance on how SEA can contribute in terms of:

- Recommendations on indicators and monitoring systems to be more integrated with OP monitoring

- Operational suggestions for environmental assessment procedures during OP implementation – in particular of projects not requiring Environmental Impact Assessment (EIA)

Further, on the issue on whether a SEA should be required in the future, it could be considered to require the preparation of SEA for the Partnership Agreements, in addition to – or instead of - the OPs. However, requiring both would add to the administrative burden. One possibility could be to have a formal SEA for the partnership agreement and to have special requirements for analysis of integration of environmental concerns in the ex-ante evaluation (but not a formal SEA).

1 Introduction

This is an update of the final report from the study on integration of environmental concerns on Cohesion Policy. The objective of the study was to analyse the integration of the environmental concerns in Cohesion Policy across three programming periods – 2000-2006, 2007-2013 and 2014-2020.

The study was undertaken during the period June 2016 to June 2017. Subsequently, an update of several tables relating primarily to expenditures in the period 2007-2013 was carried out in November 2018 and these are presented in this updated version of the report. The study was overseen by a Steering Group with representatives of DG Environment and DG Regional and Urban Policy.

The report documents the results of the study and the analyses done. The methodology applied is explained in chapter 2. The integration of environmental concerns were analysed according to two main dimensions: vertical integration and horizontal integration. This is reflected in the structure of the report, where chapter 3 reports on vertical integration and chapter 4 reports on horizontal integration. The executive summary provides the main findings and conclusions across these dimensions and outlines the lessons learned and suggestions for improvement of integration of environmental concerns in Cohesion Policy.

The appendices provide additional details on the methodology employed as well as data overviews supporting the analysis presented in chapters 3 and 4.

2 Methodology

This chapter describes the methodology applied in the study.

2.1 Objectives and scope of the study

2.1.1 Objectives

The study aims to analyse the integration of environmental concerns in Cohesion Policy Funds (in this context meaning the ERDF, the CF and the ESF). The study looks at results, evolution and trends through three programming periods (2000-2006, 2007-2013, 2014-2020).

When assessing the integration of environmental concerns in Cohesion Policy Funds, it is important to keep in mind the overall policy objectives of Cohesion Policy as well as the governance system applied for the implementation of the funding instruments. While the main characteristics (see Text Box 2-1 below) have remained constant throughout the three programming periods under analysis, the objectives and approaches have evolved, thus influencing the scope for integration of environmental concerns.

Text Box 2-1 Cohesion Policy objectives and governance

'Cohesion Policy' is the policy behind the hundreds of thousands of projects all over Europe that receive funding from the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund.

Economic and social cohesion – as defined in the 1986 Single European Act – is about 'reducing disparities between the various regions and the backwardness of the least-favoured regions'. The EU's most recent treaty, the Lisbon Treaty, adds another facet to cohesion, referring to 'economic, social and territorial cohesion'.

The idea is that Cohesion Policy should also promote more balanced, more sustainable 'territorial development' – a broader concept than regional policy, which is specifically linked to the ERDF and operates at regional level.

As an EU instrument under shared management, Cohesion Policy is governed in a multi-level system. The decisions regarding overall budget and priorities for the funds are made by the European Council and European Parliament based on proposals from the Commission. The Member States set up national strategic frameworks and programming documents and are responsible for the implementation of these at the national and regional level with oversight by the European Commission.

Source: http://ec.europa.eu/regional_policy/en/faq

The overall priorities and budgets for the Cohesion Policy Funds have evolved during the three programming periods analysed. At the same time, framework conditions and policy priorities have also changed over the years within the Member States. Environmental priorities and spending in the national and regional programmes have thus been influenced by several factors, and our analysis may point to some of the likely important influencing factors, but the relations are complex and Member State allocations and spending will always need to be seen in the context of the regional development perspectives in the region(s) concerned.

2.1.2 Tasks

The study included six tasks:

- **Task 1: Quantitative assessment of the Cohesion Policy funds.** This task encompassed a review of the available quantitative data on allocations of Cohesion Policy funds over the three programming periods and the preparation of overviews of direct and indirect environmental investments within a number of key sectors.
- **Task 2: Major projects.** This task provided a quantitative overview of allocations to major projects in the three programming periods following a similar approach as that adopted for Task 1.
- **Task 3: Qualitative assessment of the extent to which Cohesion Policy and its funds contributes to environmental implementation of legislation policies and to the fulfilment of environmental policy objectives.** This task looked at the implementation of Cohesion Policy in the period 2007-2013 through an analysis of selected countries and Operational Programmes (OPs) and provided an assessment of the contribution to implementation of environmental policy in a number of environmental themes.
- **Task 4: Mainstreaming sustainable development in the implementation of the Programmes 2014-2020 and 2007-2013.** This task looked across a broader range of sectors supported by Cohesion Policy funds and investigated how environmental concerns have been integrated in the planning process (e.g. through Strategic Environmental Assessment - SEA) and in the implementation process (e.g. through selection criteria). The analysis was based on desk studies of relevant documents as well as studies of a selection of OPs and associated SEAs.
- **Task 5: Case studies on environmental projects or environmental integration.** This task prepared case study presentations for 15 projects within a set of identified sectors. For each project, a two-page fiche was also prepared (see Appendix M).
- **Task 6: Final report.** The results of Tasks 1 to 3 are presented in chapter 3 of this final report, below; those for Tasks 4 and 5, in chapter 4.

2.2 Approach to the analysis of integration of environmental concerns

In this study, the analysis on integration of environmental concerns is approached from two main angles:

- The contribution of Cohesion Policy to meeting environmental policy objectives (this is referred to as 'vertical integration')
- The wider integration of environmental concerns across the range of sectors and investment priorities covered by Cohesion Policy. This includes analysis of how environmental concerns are integrated as part of the implementation of the horizontal principle of sustainable development (this is referred to as 'horizontal integration').

Referring to the tasks as outlined in chapter 1 above, task 3 deals with the first angle in the analysis, whereas task 4 deals with the second angle.

In terms of investment of Cohesion Policy funds into environmental themes, such investments may be direct or indirect. Direct environmental investments are those in environmental infrastructure (contributing directly to the achievement of EU legislative requirements in areas including drinking water supply, solid waste management and waste water treatment) as well as 'green infrastructure' (biodiversity, ecosystems and their services for which specific targets in EU environmental legislation also exist).

Indirect investments include those in 'green' energy, transport and production systems. These investments contribute in terms of supporting the 7th Environmental Action Programme's (7th EAP) broader goal of a transition towards a low-carbon, resource-efficient, safe and sustainable economy.

The table below illustrates the relations between these main dimensions in the analysis done for the study. Horizontal integration goes across all types of investment.

Table 2-1 Analysis of integration

Integration	Key question	Investment
Vertical integration	The extent to which operational programmes or priorities within operational programmes have focused on environmental concerns as the prime objective	Direct environmental investment
Horizontal integration	The extent to which operational programmes or priorities within operational programmes have integrated environmental concerns across different priorities – e.g. through general principles and criteria for selection	Direct environmental investment Indirect environmental investment No environmental investment

2.3 Methodology

This section presents the methodology applied in the study. This is supplemented, where relevant, with additional details in the relevant chapters of the report. While the quantitative analysis aimed at a factual description of data, the qualitative analysis used the approach of specifying key questions, judgement criteria and indicators relevant for objectives.

2.3.1 Methodology for analysis of vertical integration

2.3.1.1 Cohesion Policy allocations and expenditures

Chapter 3 of this report presents a quantitative and qualitative overview of Cohesion Policy investments for the environment. As noted in section 2.2 above, for the quantitative analysis, these investments are classified as either direct or indirect environmental investments. *Direct* environmental investments under the Cohesion Fund and ERDF include investments in waste, water, air, biodiversity, land rehabilitation, climate mitigation and adaptation and risk prevention. *Indirect* environmental investments under CF and ERDF include environment-related investments in energy, transport, tourism and business development/R&D (Appendix C provides a detailed list

and comparison of the specific categories used in Cohesion Policy across the three programming periods addressed[2]).

While this report is based on the categories of spending, an alternative approach would be the use of 'Rio markers' for climate and biodiversity: this approach seeks to capture spending in other categories – for example, spending for energy efficiency that benefits climate action and spending for water protection that benefits biodiversity. Section 3.7.2.3 below on climate change discusses the Rio markers approach, while section 3.4.3.1 notes the possible use of the a Rio markers approach for biodiversity expenditures.

The data presented in this report does not capture allocations under the European Social Fund (ESF), as the methods used to identify environmental allocations under ESF have varied across the three financing periods and are not compatible. Please see Appendix F for further information.

2.3.2 Main sources of quantitative data

Table 2-2 below shows the main data sources used in this report.

Table 2-2 List of data sources

Data sources	Financing perspective	Comments
Databases accompanying the report on ERDF and CF expenditures (SWECO, *Final Report – ERDF and CF Regional Expenditure*, 2008)[3]	2000-2006	The SWECO database reports allocations to the specific fields of intervention at two-digit level.[4] This database does not allow distinguishing more specific (3-digit) intervention fields for sectoral division.
Data received from DG Regional and Urban Policy (received in 2016)	2000-2006	Dataset on ERDF and ESF allocations by country and Field of Intervention. Additional dataset on CF allocations by country and Field of Intervention.
Data received from DG Regional and Urban Policy (2016 and 2018)	2007-2013	Excel spreadsheets containing data on OP allocations across the financing period (updated to 2016, which reflects the final allocations) and expenditures (updated to 2017). Detailed data by Priority Theme (specific sectoral level). The update carried out in 2018 was based on final expenditure data for the period 2007-2013, status reported in September 2018[5].

[2] The categories are called 'fields of intervention' (FOIs) in the 2000-2006 financing period, 'priority themes' (PTs) for the 2007-2013 period, and 'intervention fields' (IFs) for the 2014-2020 period.

[3] http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2000-2006/#4

[4] During the 2000-2006 financing period, Fields of Intervention were organised at 1-digit level (e.g. '3 Basic infrastructure'), 2-digit level (e.g. '34 environmental infrastructure') and 3-digit level (e.g. '344 drinking water'). This approach was not followed in the following financing periods.

[5] According to the information received from DG Regional and Urban Policy in October 2018, the data represented, as closely as possible, the EU amount actually spent by the underlying projects. In this period, Managing Authorities were not obliged to report expenditures but during the closure process they were asked to reconcile the categorisation amounts with what was paid to operations. DG Regional and Urban Policy estimated the amounts of EU funding spent per field of intervention on the basis of this data and co-financing rates per Operational Programme. These amounts do not always match the data on final OP allocations which were received by 2016. The closure of the financial reporting from Member States during drafting this (updated)

Data sources	Financing perspective	Comments
Database on ESIF categorisation (InfoRegio, publicly available) Database on ESIF available in September 2018, reporting the status at the end of 2017[6]	2014-2020	Detailed data allowing analysis per Intervention Field (specific sectoral level)[7].
Eurostat, General government expenditure by function (COFOG) for general government	2000-2006 2007-2013	Data on general government expenditure on environmental protection, disaggregated according to the UN classification at group level.[8]
Eurostat, Environmental protection expenditure in Europe - detailed data (NACE Rev. 2)	2000-2006 2007-2013	Data on total investment expenditures disaggregated according to the (European standard statistical) classification of environmental protection activities (CEPAREMA).
European Investment Bank website[9]		List of projects by sector and by date of signature.
European Bank of Reconstruction and Development website[10]		List of projects by sector and by date of signature/approval.

2.3.3 Key issues concerning the quantitative data

2.3.3.1 Allocations vs expenditures

There are several ways to present EU financing under Cohesion Policy. This report primarily uses data on financial *allocations* under Operational Programmes, since this data is readily available throughout all the three financing perspectives that are under consideration. For the 2007-2013 financing period, data on the level of *expenditures* is available and is presented in an assessment of expenditure rates. The last recorded expenditures data relate to the year 2018 and reflect the final level of spending for the period 2007-2013, which might have continued until the end of 2015 (n+2 rule)[11]. As

report was still ongoing and therefore, some of the reported data might still change; possible changes or corrections were not expected to be significant. Data on financial OP allocations received in 2016 are considered to be final.

[6] https://cohesiondata.ec.europa.eu/EU-Level/ESIF-2014-2020-categorisation-ERDF-ESF-CF-planned-/3kkx-ekfq

[7] For the period 2014-2020, Managing Authorities are obliged to report data on both allocations and total expenditures per spending category. EU contribution is calculated based on co-financing rates.

[8] UN Statistics Division, COFOG: http://unstats.un.org/unsd/cr/registry/regcs.asp?Cl=4&Lg=1&Co=05

[9] http://www.eib.org/projects/loans/list/index.htm?start=2000&end=2016&region=european-union&country=&sector=

[10] http://www.ebrd.com/work-with-us/project-finance/project-summary-documents.html

[11] According to Art. 56 of the Regulation (EC) No 1083/2006 of 11 July 2006, expenditures for the 2007-2013 period shall be eligible for a contribution from the Funds if they have been paid between the date of submission of the operational programmes to the Commission or from 1 January 2007, whichever is earlier, and 31

noted in sections 2.3.2, the 2016 source on OP financial allocations provides data through the end of the 2007-2013 programming period[12]; where allocation and expenditure data are compared, 2016 allocations data are used and 2018 expenditure data.)

Due to a flexibility mechanism, Member States have the opportunity to change their financial allocations, shifting them from one sector to another (the approval of the European Commission is required, however, for changes across priority axes, Operational Programmes and funding instruments). There may be various reasons for re-allocations, including changes in policy priorities and needs, varying interest of stakeholders in the specific types of projects or problems with the absorption capacity in some of the intervention fields. Another possible reason for the reallocations for the 2007-2013 financing period is that, due to the financial crisis, in some Member States the cost of many projects turned out to be lower than anticipated, leaving a surplus budget. Many Operational Programmes lacked a good pipeline of additional projects at a sufficiently advanced stage of preparation where they were ready to finance: as a result, these Operational Programmes shifted resources to other spending areas[13].

In this report, reallocations of the financial resources are analysed only for the 2007-2013 financial period due to lack of the relevant data for other periods. Reallocation data are presented by comparing the allocations to the Operational Programmes recorded in 2016 (i.e. last available data) with the initial allocations recorded in 2008.

The report presents also data on expenditure rates, which can be seen as a potential indicator of absorption capacity. In section 3.1, the expenditure rate is presented as the proportion of the expenditures recorded in 2018 (which can be seen as final[14]) to three different levels of the financial allocations: 1) OP allocations in 2016, 2) OP allocations in 2012 and 3) OP allocations in 2008[15]. This approach shows that the expenditure rates are driven not only by Member States' spending efforts but also by reallocations – these two variables are in fact dependent on each other. Section 3.1 provides also a summary of expenditure rates until the end of 2017 for the period 2014-2020 per Member State and per sector (separately for direct and indirect environmental investments).

December 2015. This is referred to as 'n+2' rule, since the EU funding may be spent until up to two years after the end of the financing period.

[12] According to the information received at DG Regional and Urban Policy in September 2018, the last OP changes regarding financial allocations to the specific Priority Themes had to be reported before the end of eligibility (31/12/2015 in practically all cases).

[13] Martens B., et al (2016), Ex post evaluation of Cohesion Policy Programmes 2007-2013 – Work Package 6 – Environment (study by COWI and partners for the European Commission, DG Regional and Urban Policy), available at:
http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2007-2013/#7

[14] See the explanations to the table with the list of data sources in section 2.3.2.

[15] 2008 and 2018 have been chosen as the points of initial and final allocations. The year 2012 has been chosen as the point in-between these (the years 2009-2011 did not show much difference in allocations as compared to 2008).

2.3.3.2 Data sources for other environmental spending

For environment-related spending other than Cohesion Policy funding, presented in section 3.4, the report uses Eurostat data, specifically from two databases: 1) COFOG (Classification of the Functions of Government) data, and 2) Environmental protection expenditures database. The COFOG database reports governmental spending and gives a good overview of data especially for the sectors of water and waste management. The other database is used to supplement the governmental spending with data reported for the business sector and the specialised producers' sector. While the data is generally good at aggregated level, sectoral data is missing in many cases, in particular for sectors such as protection of ambient air and climate, as well as for protection and remediation of soil, groundwater and surface water. In general, as was encountered in a previous study[16], the compatibility of these data sources with each other and with Cohesion Policy data is not fully clear.

2.3.3.3 Direct and indirect environmental spending

For the purposes of this study, *direct* environmental investments under CF and ERDF are defined as investments in waste, water, air, biodiversity, land rehabilitation, climate mitigation and adaptation and risk prevention. *Indirect* environmental investments under CF and ERDF include environment-related investments in energy, transport, tourism and business development/R&D (Appendix C provides a detailed list of the specific categories[17]).

While the study compares the levels of direct and indirect environmental investments, these two broad categories are somewhat different: most direct environmental investments build infrastructure to address environmental issues, such as waste water treatment plants; indirect environmental investments, on the other hand, involve more environmentally friendly approaches to investments in other sectors – for example, energy efficiency and renewable energy.

2.3.3.4 EU contribution

The data presented in the report focuses on the EU contribution in Cohesion Policy funding, as most of the data sources used do not report on national co-financing rates.

2.3.3.5 EU enlargement

Over the first two periods covered, the EU underwent an enlargement process, with 10 new Member States joining in 2004, Bulgaria and Romania joining in 2007, and finally Croatia in 2013. Comparisons of aggregate spending across the three should be considered in the light of the expanding Union and thus are not fully comparable.

[16] Martens B., et al (2016), Ex post evaluation of Cohesion Policy Programmes 2007-2013 – Work Package 6 – Environment (study by COWI and partners for the European Commission, DG Regional and Urban Policy), available at:
http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2007-2013/#7

[17] The categories are called 'fields of intervention' (FOIs) in the 2000-2006 financing period, 'priority themes' (PTs) for the 2007-2013 period, and 'intervention fields' (IFs) for the 2014-2020 period.

2.3.3.6 Price level

All prices are the current prices for the periods and have not been adjusted for inflation[18].

2.3.4 Qualitative review of OP spending for the environment

Sections 3.2 to 3.7 review the contribution of Cohesion Policy to the implementation of EU environmental policy across six sectors:

- Water
- Solid waste management
- Nature protection
- Land rehabilitation
- Air quality
- Climate change.

These sections focus on spending in the 2007-2013 financing period, though it also draws on information from the 2000-2006 period. The analysis is based on three main sources:

- Quantitative data on Cohesion Policy allocations and expenditures (see sections 2.3.1 to 2.3.3 for further information on data sources)
- A review of 12 Operational Programmes (OPs) in the 2007-2013 period
- A review of literature.

The 12 Operational Programmes reviewed include: ten OPs at national or regional level across seven Member States; and two territorial cooperation programmes. The Programmes and Member States were chosen to provide a broad overview across the EU. In most of the OPs, two environmental sectors were reviewed[19]. The tables below provide an overview of the OPs and their sectors.

The OP reviews were based on information in the Programmes themselves, in the most recent Annual Implementation Reports (AIRs) and in other relevant sources where available (for a few OPs, evaluation reports were available). The OPs' Managing Authorities (MAs) were contacted for further information about the implementation of the OPs.

[18] The cumulative inflation based on the harmonised index of consumer prices (HICP) for EU-28 as reported by Eurostat amounts to 16% for the period 2000-2006 and 15% for the period 2007-2013.

[19] The review of the regional OPs for Veneto and Warminsko-Mazurskie planned to cover biodiversity, but it was discovered that the Managing Authorities of the Veneto OP removed their allocations for this sector over the course of the 2007-2013 programming period while the Managing Authorities of the Warmińsko-Mazurskie OP did not include priorities related to biodiversity in their planning.

Table 2-3 Overview of the OPs reviewed

Member State OPs			
Member State	**Operational Programme**	**Description**	**Proposed focus sectors**
Bulgaria	Environment	National OP	Biodiversity, waste
Czech Rep.	Environment	National OP	Air, waste
Greece	Environment and Sustainable Development	National OP	Air, water
	Attica	Regional OP investing in water and waste management and biodiversity	Water, waste
Germany	Thüringen	Regional OP with a focus on sustainable production, resource efficiency, land use and water protection	Land rehabilitation, water (waste water only)
Italy	Veneto	Regional OP investing in biodiversity and contaminated sites	Land rehabilitation
Poland	Infrastructure and Environment	National OP	Air, biodiversity
	Warminsko-Mazurskie	Regional OP in a less populated region promoting natural assets	Water
Spain	Andalusia	Regional OP	Biodiversity, water
	Cohesion Fund - ERDF	National OP focusing on environment and transport infrastructure	Water, waste

Territorial Cooperation OPs			
Operational Programme	**Member States**	**Notes**	**Proposed focus**
Alpine Space	AT, DE, IT, FR, SI (plus CH)	Priority 3 includes conservation, landscape planning, climate adaptation and risk prevention	Adaption to climate change, biodiversity
Two Seas	BE, FR, NL, UK	Priority 2 on environment addresses pollution, waste, waste water and environmental risks.	Coastal zone management (risk prevention), adaptation to climate change

It was found that the information available varies considerably across sectors and across OPs. For example, information on how OPs took into account EU environmental legislation across different sectors was mostly limited to the OP descriptions, which varied in the level of detail (the OP interviews did not gather useful information on the process to develop sector priorities in the 2007-2013 OPs – the distance in time proved to be too great). For all OPs and sectors, financial information for the 2007-2013 period was taken from Task 1 of this study (based on data provided by DG Regional and Urban Affairs). This information covered spending through 2014. In a few cases, Managing Authorities provided financial information through 2015. OP indicator results were taken from the 2014 AIRs, which were available for most of the OPs reviewed; here too, a few Managing Authorities provided more recent results. The literature search identified

valuable studies and reports for some sectors, such as nature protection, but less information for others, such as land rehabilitation. For adaptation to climate change, the information gathered focused on the role of two territorial cooperation programmes; while it provides insight into their work, it did not yield broad-based results for Cohesion Policy as a whole.

The analysis in sections 3.2 to 3.7 reviews the findings for each of the environmental sectors addressed. These sections provide:

- a brief overview of EU policy in the sector, together with information available on the investment needs for the 2007-2013 period

- a review of Cohesion Policy allocations and expenditures, both overall and for the set of OPs reviewed for the sector

The sections then use the information available to address the following questions for each sector:

- How did OP investments respond to EU requirements?
  The analysis considers whether the OPs cited EU policy and legislation in their planning, as an indicator of the extent to which their priorities reflect EU requirements and strategic directions.

- Did Member States have sufficient administrative capacity?
  Previous studies have identified administrative capacity issues for specific environmental sectors, such as nature and biodiversity[20] and waste[21]. Already in the quantitative analysis (section 3.1), reallocation of resources and expenditure rate – the level of spending compared to allocations – is used as an indicator of possible administrative capacity issues. Sections 3.2 to 3.7 provide further information on this issue, drawing in particular on interviews carried out with OP authorities.

- What role did Cohesion Policy play compared to other sources of finance?
  Where information is available, a brief overview is provided of the importance of Cohesion Policy resources compared to total investments in the sector. Information on total investments is not available for all sectors; moreover, the comparisons are based on EU datasets that use different methods and consequently provide rough estimates rather than detailed indications (see section 2.3.3.2 above).

  One factor that can influence the role of EU resources is the level of co-financing required, and the co-financing rates are described for the OPs reviewed.

[20] European Court of Auditors (2014), Is the ERDF effective in funding projects that directly promote biodiversity under the EU biodiversity strategy to 2020?, Special Report No. 12

[21] Martens B., et al (2016), Ex post evaluation of Cohesion Policy Programmes 2007-2013 – Work Package 6 – Environment (study by COWI and partners for the European Commission, DG Regional and Urban Policy), available at:
http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2007-2013/#7

- What were the results of Cohesion Policy investments?
  The analysis draws on the implementation reports of the OPs reviewed as well as other sources to provide an overview of the results of Cohesion Policy investments for each sector. Other data, such as Eurostat environmental indicators for the sectors, are used where relevant.

  The information gathered on results is at best partial for the 2007-2013 programming period that was the focus of the analysis. Final OP indicator values were available for some but not all OPs reviewed. Moreover, the impacts of projects financed by OPs on the environment may take some years to be evident – this is the case, notably, for nature protection investments. Consequently, environmental indicators may not yet provide a full picture.

2.3.5 Methodology for analysis of horizontal integration

The analysis of horizontal integration of environmental concerns assessed how environmental considerations are integrated in the activities supported by Cohesion Policy, and how environmental considerations are mainstreamed at the programming and implementation stages, with a focus on the information provided in Chapter 11 on horizontal principles of the OPs.

2.3.5.1 Main questions

The main questions addressed in this task are:

- To which extent have environmental concerns been horizontally integrated in the Operational Programmes through horizontal principles, objectives and priorities?
- To which extent were Strategic Environmental Assessments effective as an instrument to ensure that environmental concerns were integrated in the OPs?
- To which extent did the project selection criteria used ensure that environmental concerns were taken into account?

All three programming periods were covered. The periods 2000-2006 and 2007-2013 were primarily covered through a desk review focusing on relevant regulatory documents as well as studies on mainstreaming of environmental concerns in Cohesion Policy in the two periods. For the period 2014-2020 we reviewed 32 selected OPs[22] (Appendix A for the list of reviewed OPs). This review comprised the following main elements:

1 Review of selected OPs to gauge the extent to which environmental concerns have been integrated, by looking into how sustainable development has been taken into account in the framing of the programme – analysing among other things how the principles of green public procurement (GPP) and the polluter pays principle have been applied. Each OP was reviewed according to a fixed template (see Appendix B).

[22] The selection includes a total of 6 ERDF + ESF multifund OPs in CZ, DE, EL, LT, PL.

2 Review of available SEA documents (for the selected OPs) to analyse their influence on integration of environmental concerns. The review followed three main lines of enquiry: 1) The extent to which SEAs influenced the OP priorities, 2) The extent to which SEAs influenced selection criteria, and 3) the extent to which SEAs influenced monitoring programmes and indicators.

3 Review of selection criteria applied to some of the reviewed OPs to assess the extent to which they have supported the integration of environmental concerns.

4 Discussions with Managing Authorities and Environment Authorities through telephone interviews and a dedicated workshop session with participants from the European Network of Environmental Authorities-Managing Authorities (ENEA-MA) in February 2017.

In addition to the main questions addressed, Task 4 also included an activity to reflect on methodologies for assessing the contribution of Cohesion Policy to the creation of green jobs and the circular economy. The results of this activity are reported separately in section 4.6.

2.3.5.2 Selection of OPs

The following table provides an overview of the number of OPs by fund, as well as by Member States covered by our review.

Table 2-4 Overview of selected OPs: number by fund and Member State

Number of OPs by Fund and type	Number of OP by Member State covered - excl. ETCs
19 ERDF/CF national or regional OPs 5 ERDF European Territorial Cooperation programmes 6 ERDF + ESF multifund national or regional OPs in CZ, DE, EL, LT, PL 2 ESF OPs, 1 national and 1 regional	BE (1), BG (3), CZ (3), DE (2), ES (3), EL (2), IE (1), IT (5), MT (2), LT (1), PL (4)

The following criteria were used for for the selection of OPs to be reviewed:

- All types of OPs (sectoral, regional and interregional)
- All types of regions (less developed, transition, and more developed regions)
- Covering as many MS as possible to ensure geographical diversity, e.g. representation of both EU15 and EU13
- Sectoral coverage: Coverage of all three types of OPs, including OPs with fields of intervention with direct environmental investments and indirect environmental investment as well as with no direct or indirect environmental investments with particular focus on energy, industrial and transport investments.
- Some OPs should cover the creation of green jobs in order to assess the ways that MS have sought to tap into the significant potential for creating new jobs and

supporting green employment as part of the transition towards a green and resource and energy efficient economy

- Some OPs should have a focus on circular economy.

The table in Appendix A lists the selected OPs by Member State and key subjects addressed (GJ=Green jobs, CE=circular economy, E=Energy, T=Transport, I=Industrial).

2.3.6 Project fiches

The study produced a set of 15 project descriptions, which illustrate the integration of environmental concerns within the following areas: water management, waste management, eco-innovation, resource efficiency and circular economy, biodiversity, Natura 2000, urban management, industrial rehabilitation, soil rehabilitation, sustainable tourism, green jobs, environmental education and training, air quality, transport, energy and climate.

A long list of projects was identified based on document reviews, interviews and the ENEA-MA workshop. Based on this, a selection of projects was made based on the following criteria:

- Coverage of as many areas as possible of the above
- Broad coverage of EU Member States
- Representation of Interreg projects
- Representation of both major and non-major projects

The project fiches are found in Appendix M.

3 Cohesion Policy spending for the environment

This section reviews direct and indirect Cohesion Policy investments for the environment. Section 3.1 provides a quantitative overview of the allocations across the three programming periods considered: 2000-2006, 2007-2013 and 2014-2020. The subsequent sections (Sections 3.2 to 3.7) review Cohesion Policy investments across six environmental policy sectors:

- Water
- Solid waste management
- Nature protection
- Land rehabilitation
- Air quality
- Climate change.

Each of these sections presents quantitative spending data along with results from the reviews of selected OPs and information from literature. As noted in sections 2.2 and 2.3 above, the information available varies across the sectors. Further information can be found in the appendices:

- Appendix D and Appendix E describe major projects
- Appendix F reviews data on the European Social Fund's support for Environment
- Appendix G and Appendix H present the absolute amounts of OP allocations for direct environmental investments by Member State and spending category.

3.1 Overview of allocations for direct and indirect environmental investments

This section provides quantitative data on Cohesion Policy spending on direct and indirect environmental investments, which is presented at aggregated level. More specifically, the data refers to allocation amounts for each financing period. The figures in this section present final allocations for the financing periods 2000-2006 and 2007-2013, and initial allocations for the financing period 2014-2020[23]. Furthermore, the last sub-section (3.1.8) provides a summary of expenditure rates in the period 2014-2020 per Member State and per sector (separately for direct and indirect environmental investments).

3.1.1 Total direct and indirect environmental investments

This section presents an overview of total direct and indirect environmental investments across periods, both in percentage terms (compared to the overall Cohesion Policy allocations) and in EUR million.

As noted in previous sections, for the purposes of this study *direct* environmental investments under CF and ERDF include investments in waste, water, air, biodiversity,

[23] At the time when the report is prepared (mid-2017) data on final allocations for the financing period 2014-2020 are not available for obvious reasons.

land rehabilitation, climate mitigation and adaptation and risk prevention. *Indirect* environmental investments under CF and ERDF include environment-related investments in energy, transport, tourism and business development/R&D (Appendix C[24]).

While this report is based on the categories of spending, an alternative approach would be the use of 'Rio markers' for climate and biodiversity: this approach seeks to capture spending in other categories – for example, spending for energy efficiency that benefits climate action and spending for water protection that benefits biodiversity. The Rio markers approach is discussed in section 3.7 on climate change.

The data presented in this report does not capture allocations under the European Social Fund (ESF), as the methods used to identify environmental allocations under ESF have varied across the three financing periods and are not compatible. Please see Appendix F for further information.

3.1.1.1 Comparing direct and indirect environmental investments

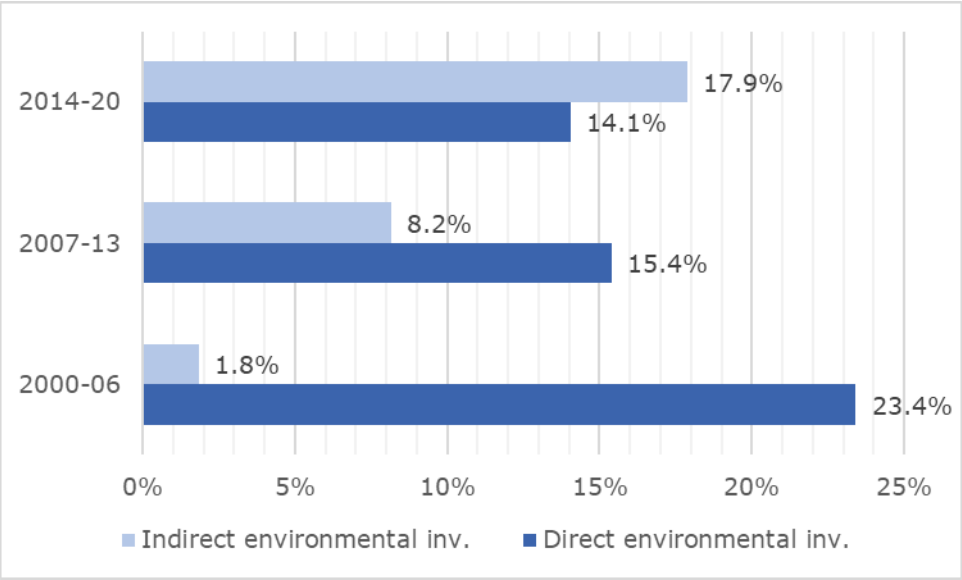
As can be seen in Figure 3-1a and Figure 3-1b, while direct environmental investments as a share of total Cohesion Policy allocations have declined over the three financing periods; the opposite is true for indirect environmental investments. The share of direct environmental investments fell from 23.4% of total ERDF and Cohesion Fund spending in the 2000-2006 period to 14.1% in the 2014-2020 period, while indirect environmental investments rose from 1.8% to 17.9% across these periods (Figure 3-1b shows the shares in terms of the total also considering ESF – please note that only environmental investments from ERDF and Cohesion Fund are considered in this report, as comparable information on ESF investments for the environment is not available – please see Appendix F for further information on ESF).

In terms of total amounts, however, the decline in direct environmental investments is much less drastic. Direct environmental investments under ERDF and the Cohesion Fund amounted to EUR 38.2 billion in 2000-2006, EUR 41.6 billion in 2007-2013 and EUR 36.4 billion in the current period. In contrast, indirect environmental investments increased from EUR 3 billion in 2000-2006 to EUR 22 billion in 2007-2013 and EUR 46.3 billion in the current period (see Figure 3-2).

Overall, while direct environmental investments have been fairly stable in absolute terms, indirect environmental investments have grown sharply across the three periods.

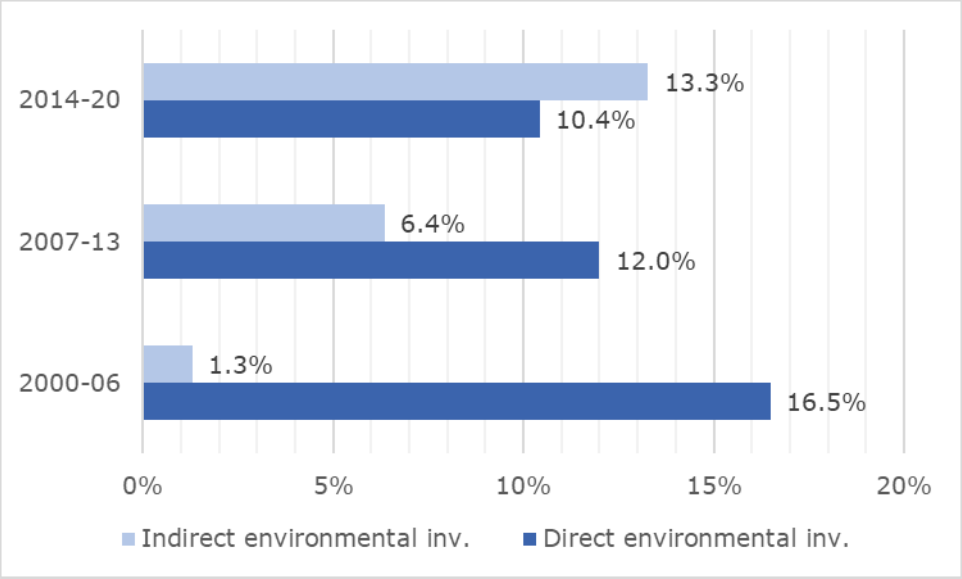
Figure 3-1a Allocations to direct and indirect environmental investments across the three financing periods (% of total ERDF and Cohesion Fund allocations)

[24] The categories are called 'fields of intervention' (FOIs) in the 2000-2006 financing period, 'priority themes' (PTs) for the 2007-2013 period, and 'intervention fields' (IFs) for the 2014-2020 period.



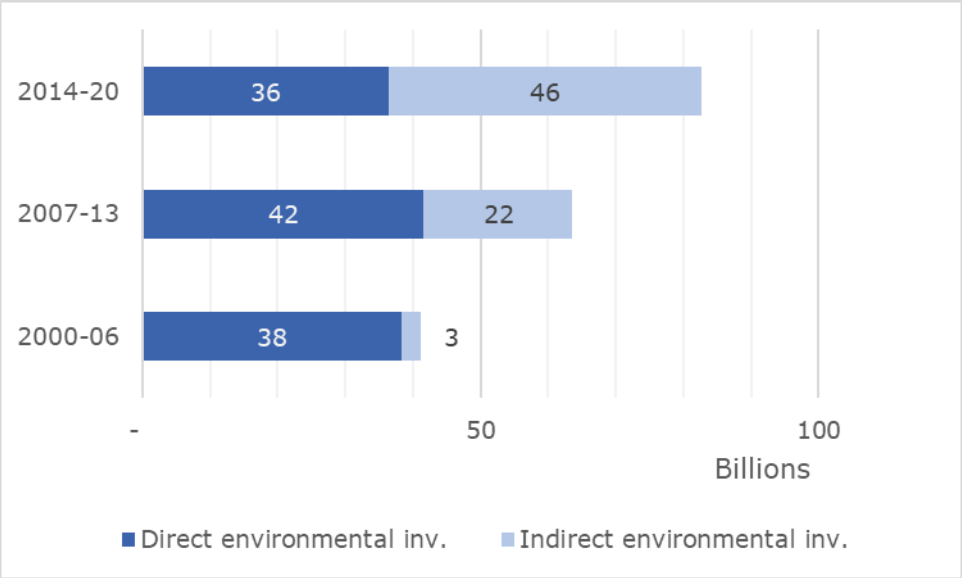
Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020

Figure 3-1b Allocations to direct and indirect environmental investments across the three financing periods (% of total ESF, ERDF and Cohesion Fund allocations)



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020
Note: The Youth Employment Initiative, launched in 2015, is included in total allocations for the 2014-2020 period.

Figure 3-2 Allocations to direct and indirect environmental investments from all EU Member States across the three financing periods (EUR billions)



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020

An important factor linked to the increasing importance of indirect environmental investments under Cohesion Policy funds in the 2007-13 programming period is the 'Lisbon earmarking' system for EU-15 Member States ('Lisbon earmarking' was introduced through Article 9(3) of Council Regulation (EC) No 1083/2006).[25] The earmarking requires that a certain share of Cohesion Policy funds, i.e. 60% for Convergence objective regions and 75% for Regional competitiveness and employment objective regions, is allocated to the priority themes corresponding to the Lisbon objectives. The EU-13 Member States that joined the EU in 2004 and after, however, were not subject to these earmarking rules. The Regulation provides a list of these priority themes, which include many areas of intervention that contribute indirectly to environmental protection and are classified in this report as indirect environmental investments. Such categories include, *inter alia*, renewable energy, energy efficiency, clean urban transport and assistance to SMEs for the promotion of environmentally friendly technologies. At the same time, none of the priority themes identified as direct environmental investments were included in the 'Lisbon earmarking' list. Ten Brink *et al.* (2010) highlight that the earmarking to the Lisbon strategy objectives downscaled the efforts to integrate environmental issues in the Cohesion Policy and reaffirmed the relative importance of economic objectives over environmental ones[26]. The 2007-2013

[25] COUNCIL REGULATION (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999

[26] Ten Brink, P. Medhurst, J. Hjerp, P. and Medarova-Bergstrom, K. (2010) Cohesion Policy and Sustainable Development-Cohesion Policy Performance, Supporting Paper 2. A report for DG Regio, September 2010.

ex-post evaluation of the Cohesion Policy delivery system (2016)[27] found that the 'Lisbon earmarking' supported the inclusion of European objectives, such as R&D and innovation, into the Operational Programmes. However, the report highlights that the 'Lisbon earmarking' was not sufficient to increase the thematic concentration of Operational Programmes, which needed to be further supported.

For the 2014-2020 financing period, an explicit effort was made to align the objectives of Cohesion Policy funds to those of the Europe 2020 Strategy, which replaced the Lisbon Strategy: funds in the current period are structured around 11 thematic objectives, which are directly derived from the Europe 2020 objectives.[28] The Europe 2020 Strategy sets targets to reduce greenhouse gas emissions, increase energy efficiency and increase the share of energy from renewables[29]: the latter two areas of action in particular are included in indirect environmental investments. Moreover, for the 2014-2020 period, the ERDF Regulation requires that the ERDF investment priorities should reflect the 'thematic concentration' principle. More developed regions, transition regions and less developed regions should allocate respectively 80%, 60% and 50% of their resources to innovation and research, the digital agenda, support for SMEs and the low-carbon economy. The low-carbon economy represents an additional specific area of investment, to which more developed, transition, and less developed regions should allocate respectively 20%, 15%, and 12% of their ERDF resources.[30] These requirements also foster indirect environmental investments (a point acknowledged by participants in the workshop held with members of the ENEA network in February 2017). Consequently, these trends should not be considered as a simple 'shift' from direct to indirect environmental investments.

3.1.1.2 Relative roles of ERDF and the Cohesion Fund

In the 2000-2006 financing period, the Cohesion Fund provided 43% of total direct environmental investments while ERDF accounted for 57%. For the 2007-2013 financing period[31], direct environmental investments were split between the two funds in the following way: 7% of allocations under Cohesion Fund, 37% under ERDF and 56% under a combination of ERDF and Cohesion Fund. For the 2014-2020 financing period, the split was 43% CF and 57% ERDF, the same as in the 2000-2006 period.

[27] KPMG and Prognos (2016), Delivery system – Work Package 12, Ex post evaluation of Cohesion Policy programmes 2007-2013, focusing on the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund (CF).

[28] Haase, D., 2015, *The Cohesion Policy dimension of the implementation of the Europe 2020 Strategy*, European Parliament, Directorate-General for Internal Policies, p. 13.

[29] Reducing GHG emissions by 20% compared to 1990, 20% increase in energy efficiency and 20% share of energy from renewables. European Commission, 2011, Europe 2020 targets, viewed at http://ec.europa.eu/europe2020/targets/eu-targets/index_en.htm

[30] Regulation (EU) No 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006, Official Journal of the European Union, L 347/289, 20.12.2013, Article 4, available at http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013R1301&from=EN.

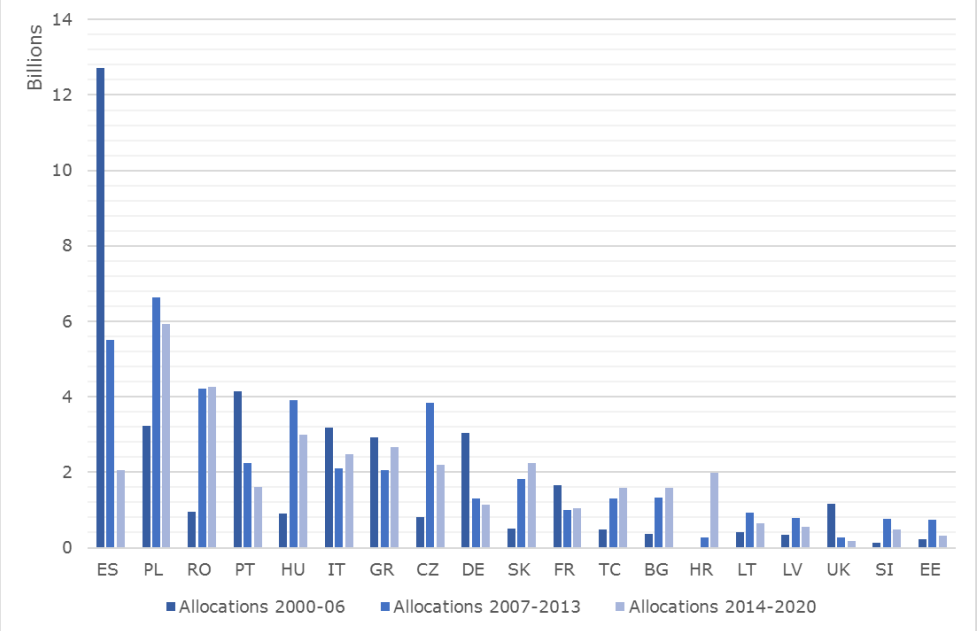
[31] Database of the cumulative allocations to selected projects and expenditure at NUTS3 level broken down by the 86 priority, annex to 'Geography of Expenditure - Final Report - Work Package 13 Ex post evaluation of Cohesion Policy programmes 2007-2013, focusing on the European Regional Development Fund (ERDF) and the Cohesion Fund (CF)'

For indirect environmental investments, the contribution of the ERDF has been much higher. During the 2000-2006 financing period, the ERDF financed 98% of indirect environmental investments, while only 2% were financed by the Cohesion Fund. For the 2007-2013 period, the Cohesion Fund financed 4% of indirect environmental investments, compared to 60% of ERDF and 36% of a combination of the two funds. In the current period, 2014-2020, the Cohesion Fund provides 22% of the financing versus 78% from ERDF.

3.1.1.3 Direct and indirect environmental investments by Member State

Figure 3-3 and Figure 3-4 below show Member States' total allocations (both CF and ERDF) to direct environmental investments across the three financing periods (Figure 3-4 shows allocations below EUR 1 billion over the three periods).

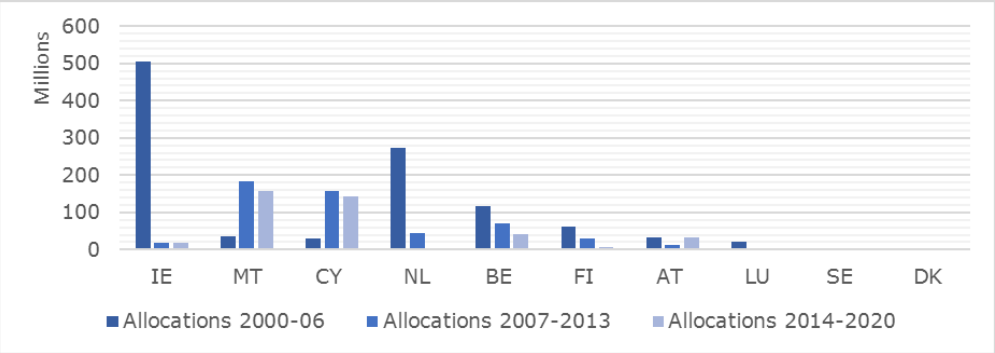
Figure 3-3 Direct environmental investments (allocations in EUR billion) across the three programming periods by Member State (Member States with at least EUR 500 million allocations in one period)



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020

Note: TC = Territorial Cooperation. The terms to indicate projects between different countries have varied across the three financing periods. Here and throughout this report, for the period 2000-2006 'TC' presents the sum of cross-border and inter-regional allocations, while for the periods 2007-2013 and 2014-2020 'TC' presents the allocations under the three strands of European Territorial Cooperation, i.e. cross-border, transnational and interregional cooperation.

Figure 3-4 *Direct environmental investments (allocations in EUR million) across the three programming periods by Member State (for Member States with allocations of EUR 500 million and below in each period)*



Source: see Figure 3-3

The general trend highlighted by this figure is a shift from the EU-15 Member States[32], notably Spain, Italy, Portugal, Ireland, Greece and France, to the new EU-13[33] Member States, like Poland, Slovakia and Czech Republic. Emblematically, Spain had the largest allocation to direct environmental investments in the 2000-2006 financing period, EUR 12.7 billion, while Poland had the largest allocation in 2007-2013, receiving EUR 6.6 billion. It should be noted that ten of the EU-13 Member States acceded to the EU in 2004 and consequently were eligible for CF and ERDF only for the latter part of the 2000-2006 financing period; two others, Bulgaria and Romania, acceded in 2007; and Croatia in 2013.[34]

Overall, across the three financing periods, Spain has been the largest recipient of CP funds for direct environmental investments receiving EUR 20.3 billion in total, followed by Poland with EUR 15.8 billion and Romania with EUR 9.4 billion. However, as shown in Figure 3-5, on a per capita basis Estonia has allocated the highest EU amount of Cohesion Policy funds to direct environmental investments, with EUR 956 total per capita over the three financing periods. Over the three periods, Spain allocated EUR 466 total per capita, Poland EUR 415 and Romania EUR 464. In general, the Member States with smaller populations and lower GDP per capita (e.g. Estonia, Malta, Slovakia, Latvia) have benefited the most from Cohesion Policy funds in terms of per capita allocations to direct environmental investments.

Several EU15 Member States have had comparatively low levels of Cohesion Policy allocations for direct environmental investments.

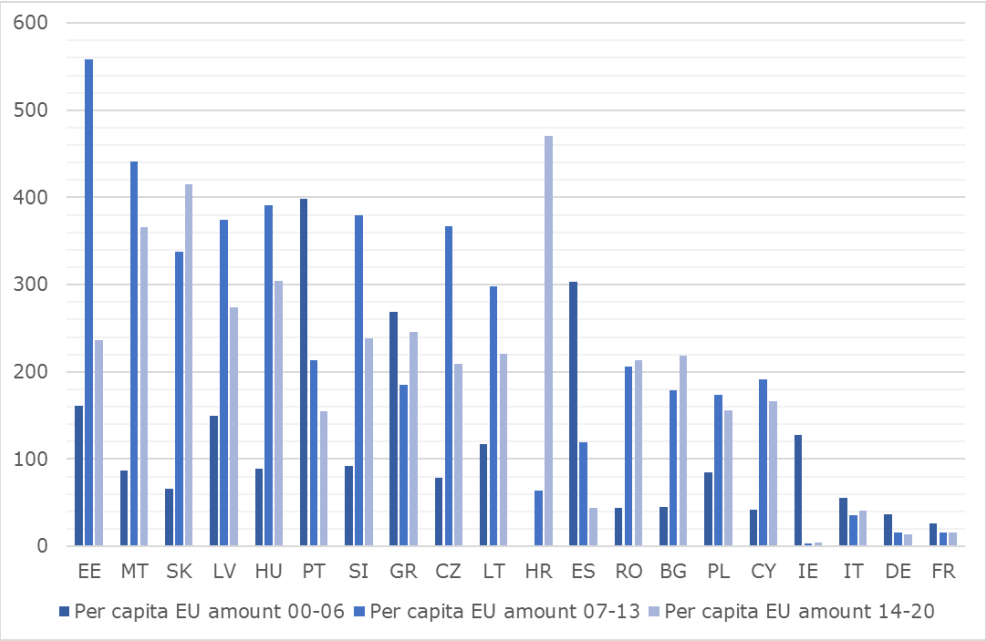
Figure 3-6 focuses on the Member States with low levels of per capita allocations across the three financing periods. All these Member States show a decreasing trend from the financing period 2000-2006 until the current period and in some cases (i.e. Luxembourg, Netherlands, Denmark and Sweden) no allocations to direct environmental investments at all.

[32] EU-15 countries include: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.

[33] EU-13 countries include: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovenia and Slovakia.

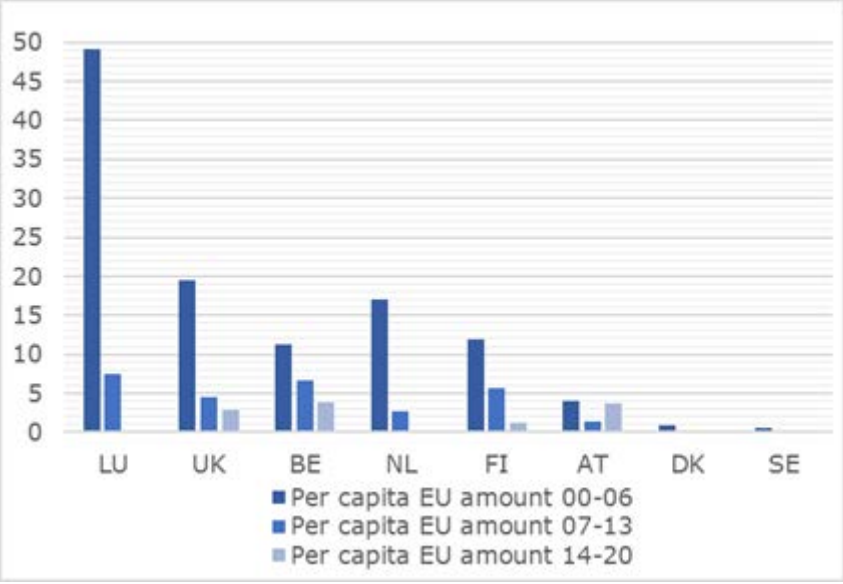
[34] The SWECO (2008) database does not report data for ISPA financing. Therefore, allocations data for the 2000-2006 financing period does not include ISPA funds.

Figure 3-5 *Per capita allocations (EUR) to direct environmental investments across the three programming periods by Member State (Member States above EUR 50 per period)*



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Affairs (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020; Eurostat, Population by age and sex.
Note: The per capita amounts are calculated by dividing the allocation amount by the average population in the period 2000-2006, 2007-2013 and 2014-2015, respectively.

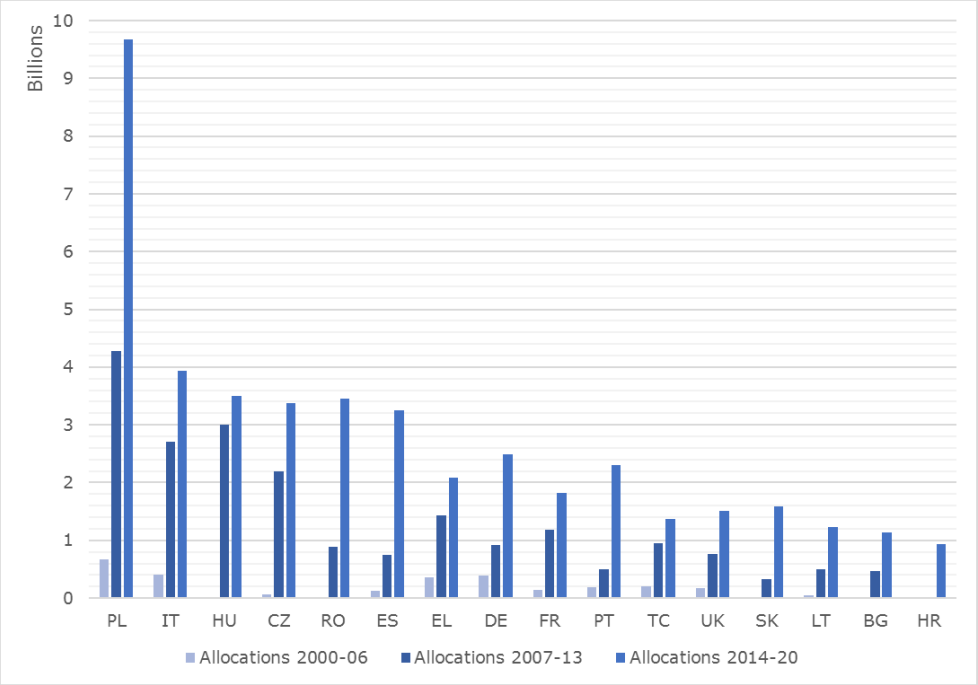
Figure 3-6 *Per capita allocations (EUR) to direct environmental investments across the three programming periods by Member State (Member States below EUR 50 per period)*



Source: see Figure 3-5
Note: The per capita amounts are calculated by dividing the allocation amount by the average population in the period 2000-2006, 2007-2013 and 2014-2015, respectively.

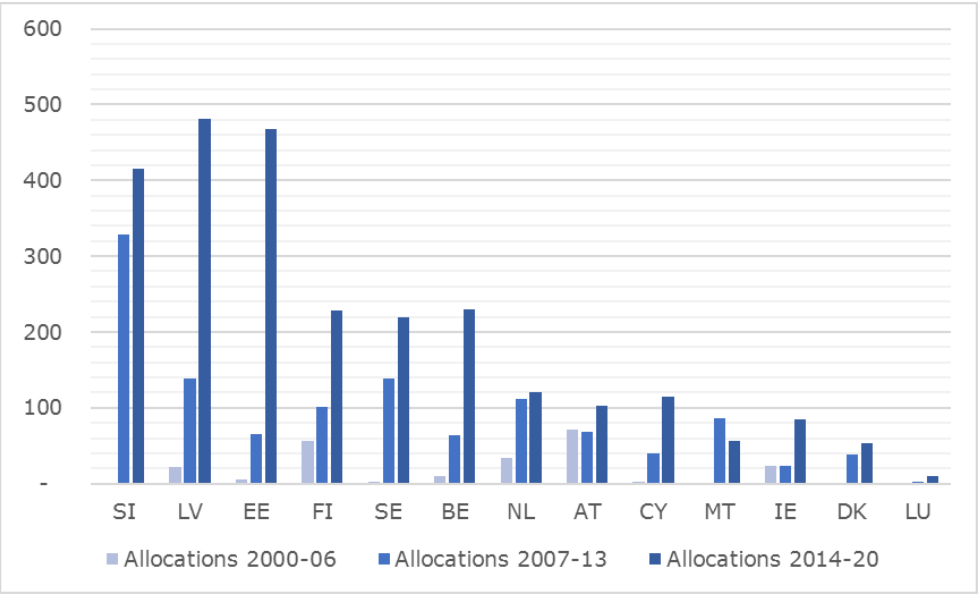
All EU-28 Member States have increased their CF and ERDF allocations to indirect environmental investments across the three financing periods analysed in this report, as shown in Figure 3-7. For many, the difference between the 2000-2006 financing period and the 2014-2020 period is of an order of magnitude. As already mentioned, the introduction of 'Lisbon earmarking' probably played a major role in this trend.

Figure 3-7 *Indirect environmental investments (allocations in EUR billion) across the three programming periods by Member State*



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020

Figure 3-8 *Indirect environmental investments (allocations in EUR million) across the three programming periods by Member State (for Member States with less than EUR 500 million allocations in each period)*



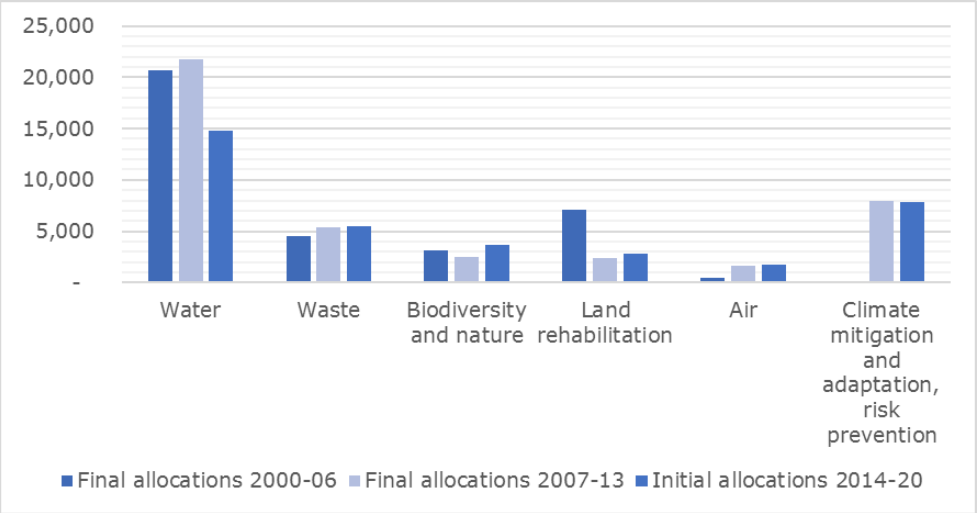
Source: see Figure 3-7

3.1.2 Direct environmental investments: comparison of sectors

This sub-section presents allocations to specific sectors directly related to environment under CF and ERDF through the three financing periods: 2000-2006, 2007-2013 and 2014-2020. (Sections 3.2 to 3.7 below provide further quantitative and qualitative details on each sector.)

Figure 3-9 shows the comparison of final allocations for the financing period 2000-2006 and 2007-2013[35] to initial allocations for the financing period 2014-2020. Data on initial allocations for the financing period 2007-2013 are also presented in section 3.1.3 on re-allocations.

Figure 3-9 Comparison of allocations (EUR million) by sector across the three financing periods (all Member States aggregated)



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.
Note: For the financing period 2000-2006, a further amount of EUR 2.4 billion was allocated for 'environmental infrastructure' without specifying the environmental sector. This amount is not shown in the figure.

Figure 3-9 shows a decrease in allocations to the water sector between the previous two and the current financing period, dropping from EUR 20.7 billion in the 2000-2006 financing period to EUR 14.8 billion during the 2014-2020 financing period. Similarly, allocations to land rehabilitation have decreased from the 2000-2006 financing period (EUR 7 billion) to the current one (EUR 2.8 billion). On the contrary, allocations to waste projects have increased slightly since 2000-2006. Allocations to air projects have increased throughout the three financing periods, while those for biodiversity and nature have varied. It should be noted that the categories of climate change and risk prevention were not envisaged in the 2000-2006 financing period and were introduced in the 2007-2013 period. These investments may have been categorised under other categories during the 2000-2006 financing period. During the last two financing periods, allocations

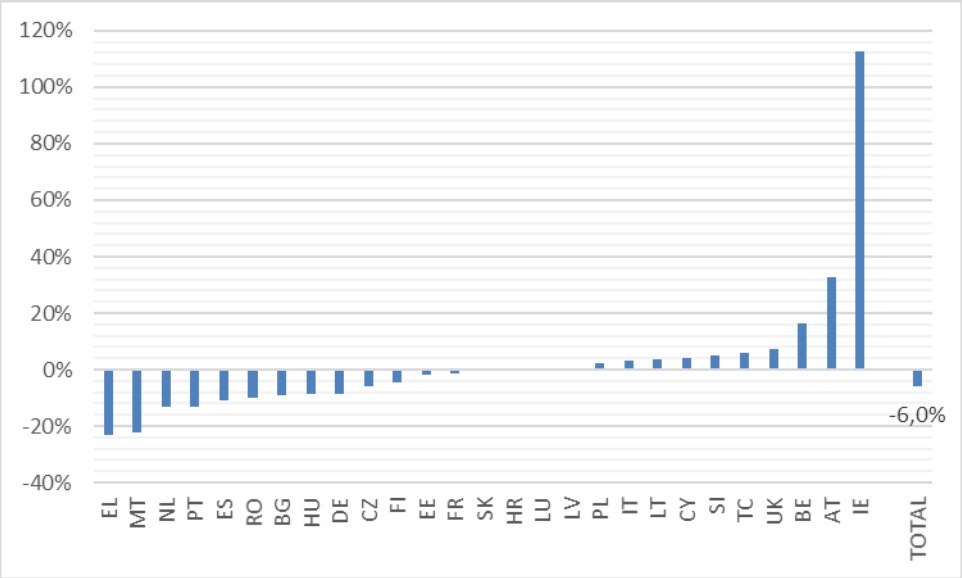
[35] Figure 3-9 presents the latest available data (2016) on final allocations for the financing period 2007-2013. However, these figures could still change during the upcoming months.

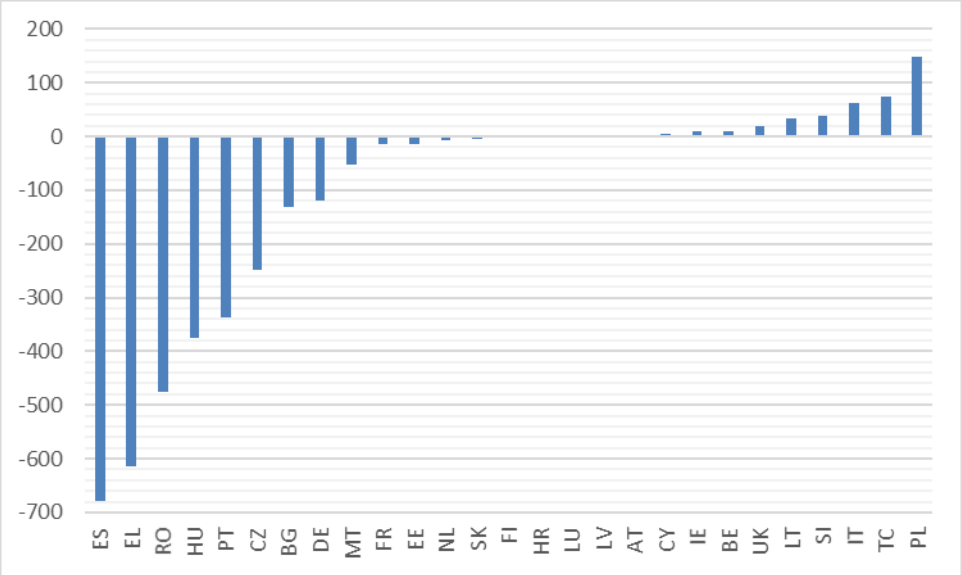
to climate change action and risk prevention have been rather stable at around EUR 7.9 billion.

3.1.3 Direct environmental investments: reallocations

This section presents reallocations of funding in the 2007-2013 financing period. It compares Operational Programme allocations recorded in 2016 with the initial allocations recorded in 2008[36].

Figure 3-10 OP reallocations 2007-2013: direct environmental investments as an aggregate





Source: DG REGIO (2016)

Note: Neither allocations nor expenditures were reported in any FOI in Denmark

[36] While data presented in this section refer to the financing period 2007-2013, data on OP allocations for the beginning of this period was recorded in 2008 while data for the final allocations was recorded in 2016. The source of all the data presented in this section is DG REGIO (2016).

3.1.3.1 Overview

Figure 3-10 above presents changes in allocations to Operational Programmes for all fields of intervention (FOIs) relating to direct environmental investments as an aggregate across the Member States. While the first graph shows the percentage change by Member State, the second graph shows absolute numbers (in EUR millions).

Overall, the total 2016 allocations to the category of direct environmental investments were 6% lower than the 2008 allocations. The total decrease in allocations (the second graph) equals EUR 2.67 billion. Thirteen Member States reduced their direct environmental allocations while nine Member States increased them. The changes in most cases did not exceed 20%; Ireland is an outlier, with over a 100% increase in allocation across the period. It should be noted, however, that the initial allocation for Ireland was relatively low, EUR 8 million. Also in Austria, with an increase over 30%, the absolute value of the EU funding was relatively low and grew from EUR 9 million to EUR 12 million[37].

In absolute terms, the highest drop in financial allocations to the priority themes classified as direct environmental investments was observed in Spain and Greece (in both countries the change exceeded EUR 600 million). The absolute amounts of allocations for direct environmental investments, by Member State and FOI, can be found in Appendix G.

Reallocations by sector

Figure 3-11 below shows reallocations within the specific sectors of direct environmental investments in the financing period 2007-2013 (as an aggregate for all Member States). The data shows the difference between the OP allocations recorded in 2016 and the OP allocations recorded in 2008 as a rate of the allocations recorded in 2008. The first graph presents the reallocations in relative terms while the second graph presents absolute numbers (in EUR millions).

The sector of land rehabilitation saw the most significant decrease in allocations, over 30% (over 1 billion in absolute terms). However, the allocations to this sector constituted only about 8% of total allocations to direct environmental investments in 2008, and 6% in 2016.

The waste sector saw a 14.8% decrease in allocations in the programming period[38] (over EUR 900 million in absolute terms).

Air quality sector dropped by 7.9%; however, this sector represented only about 4% of total allocations for direct environmental investments and therefore in absolute terms this decrease was comparatively small (about EUR 140 million).

[37] All direct environmental investments in Austria were in the sector of risk prevention

[38] This share is higher than the share reported in Martens et al (2016), as the current report uses updated information on OP allocations as of 2016, while the previous report used data as of 2014.

Figure 3-11 OP reallocations 2007-2013 for sectors of direct environmental investments

Source: DG REGIO (2016)

The biodiversity sector had a 5.8% decrease in allocations, with the absolute amount equal to approximately EUR 157 million.

Total reallocations in the water sector resulted in a 2.1% decrease[39], though in absolute terms this was about EUR 0.5 billion, as allocations to this sector represented more than 50% of total direct environmental investments.

The area of climate change and risk prevention is the only category of direct environmental investments which had an increase in allocations across the 2007-2013 period: total allocations increased by over EUR 96 million, equivalent to 1% of the original amount.

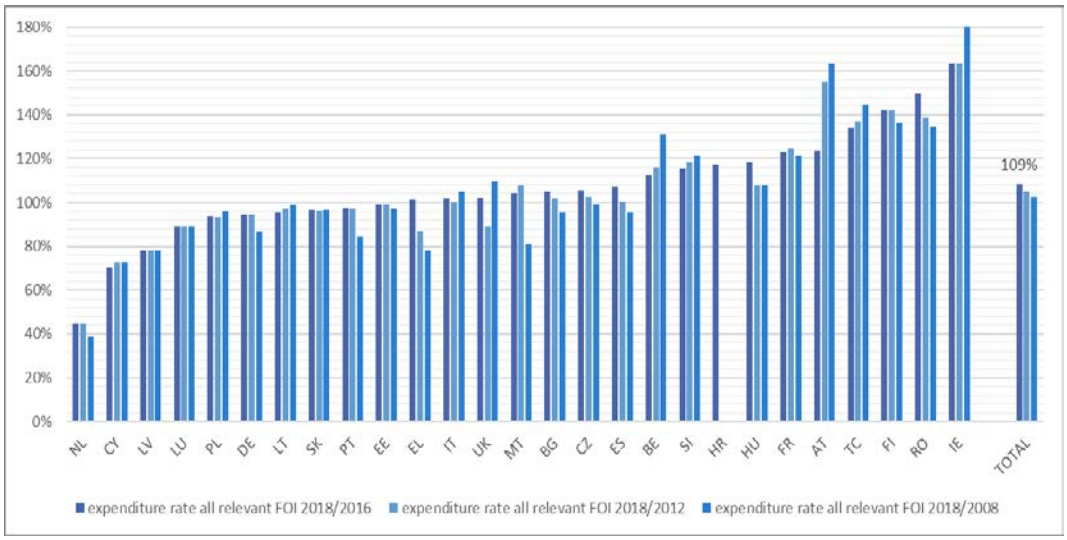
[39] This is again slightly greater than the reallocations reported in Martens et al (2016) due to the use of an updated dataset.

3.1.4 Direct environmental investments: expenditure rates

This section focuses on the rate of spending of Cohesion Policy funding for 2007-2013. In general, Cohesion Policy resources could be spent up to two years after the end of this period, i.e. to the end of 2015 (see section 2.3.3)[40].

Figure 3-12 below presents the expenditure rates for total direct environmental investments across Member States. The figure presents expenditures recorded by September 2018 in comparison with 1) OP allocations in 2016, 2) OP allocations in 2012 and 3) OP allocations in 2008[41]. The OP allocations have in many Member States changed over the years (absorption problems being one of the possible reasons of such decisions).

Figure 3-12 Expenditure rates recorded in 2018 for direct environmental investments as an aggregate



Source: DG REGIO (2016 and 2018)

Note: No OP allocations as of 2018 in Sweden (while expenditures of appr. EUR 2 million are reported); no allocations nor expenditures in any FOI in Denmark; expenditure rate in Ireland for 2018/2008 exceeds 300% and has been cut in the figure at 180% (total expenditure in Ireland in 2018 amounted to EUR 27.8 million).

The overall expenditure rate for all EU CP funding in the category of direct environmental investments reached 109%[42] in September 2018 (compared to 2016 allocations). For most countries, the expenditures are higher than the allocations: for France, Austria,

[40] This section presents data on final allocations received from DG Regional and Urban Policy in 2016 and expenditures available in September 2018; consequently, this summary provides a full picture for the 2007-2013 programming period. More information about the methodology and data sources can be found in sections 2.3.2 and 2.3.3.

[41] 2014 has been chosen as the final (or close to final) allocations year, and 2008 as the year when the initial allocations were recorded. 2012 has been chosen as the year in-between these (the years 2009-2011 did not show much difference in allocations as compared to 2008).

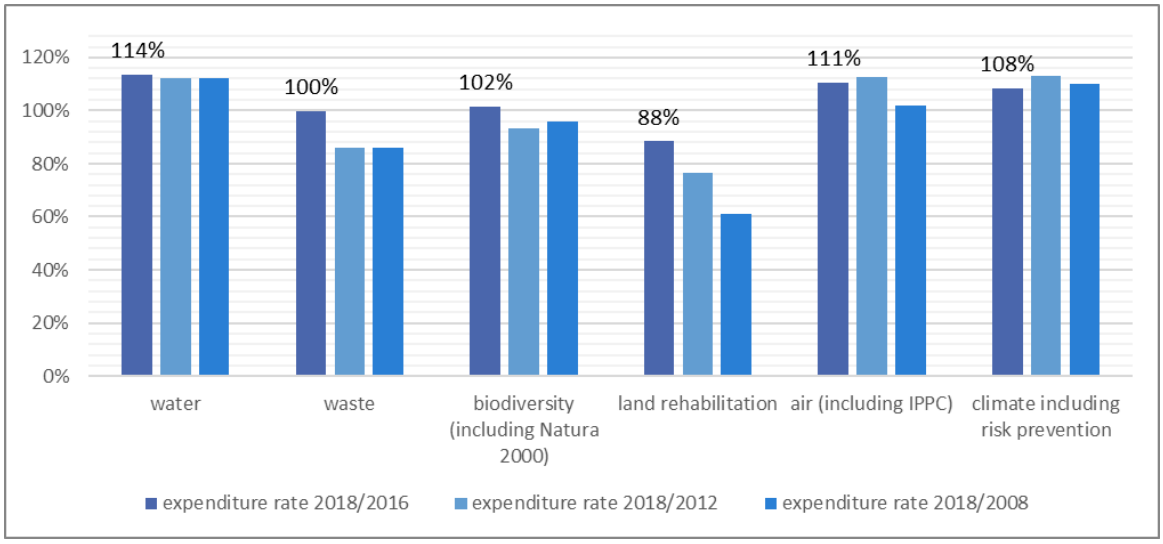
[42] As indicated in the section on methodology (2.3.2), final expenditure data should be treated as an approximation and therefore, it may happen that the expenditure rates exceed 100%.

Finland, Romania, Ireland, expenditures exceed the allocations by more than 20% (this is true also for Territorial Cooperation among Member States). The lowest absorption rate has been recorded in the Netherlands (45%), followed by Cyprus (70%) and Latvia (78%). As noted in the methodology, data on expenditures do not always match data on OP allocations, as this was not an obligation for managing authorities in the 2007-13 period, and should be treated as an approximation.

3.1.4.1 *Expenditure rates by sector*

Figure 3-13 below presents the rate of expenditure for the specific sectors of direct environmental investments in the financing period 2007-2013 (as an aggregate for all Member States): the results provide a potential indicator of the capacity of Member States and their regions to absorb Cohesion Policy resources (capacity issues are discussed for each sector in sections 3.2 to 3.7). The expenditure data recorded in 2018 can be seen as final data for the period 2007-2013.

Figure 3-13 Expenditure rates for the period 2007-2013 recorded in 2018 for sectors of direct environmental investments



Source: DG REGIO (2016 and 2018)

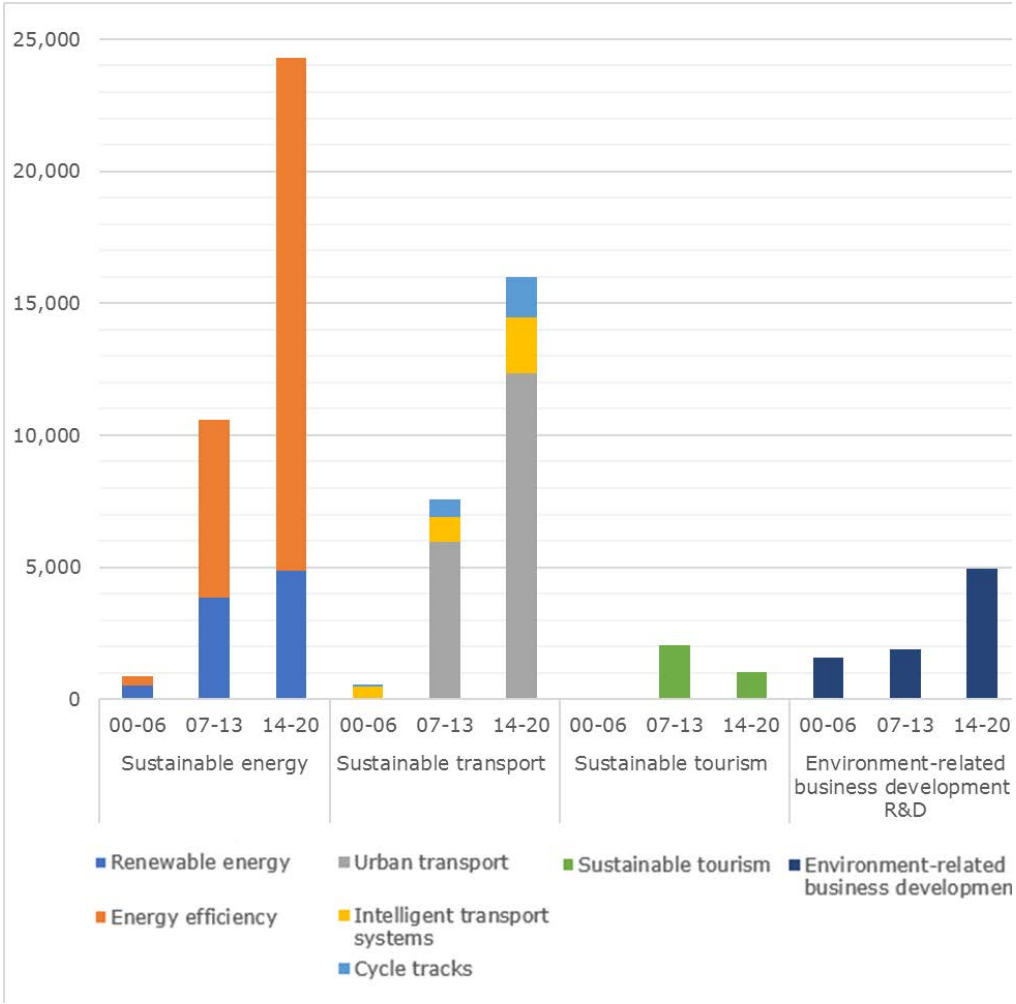
The highest expenditure rate (114%) was recorded in the water sector, which is also the sector with relatively the highest allocations in the category of direct investments. Four other sectors – biodiversity, climate and risk prevention, air protection including IPPC, and waste – reached a slightly lower level of expenditures (102%, 108%, 111%, and 100%, respectively). For land rehabilitation, expenditure rate at the end of 2018 reached 88% of the OP allocations recorded in 2016; this is the only sector where OP allocations did not reach 100% despite the fact that this sector was affected with the largest decrease in allocations, as shown above in section 3.1.3.1.

3.1.5 Indirect environmental investments: comparison of sectors

Following the same approach as for direct environmental investments, allocations to indirect environmental investments are compared across the three financing periods.

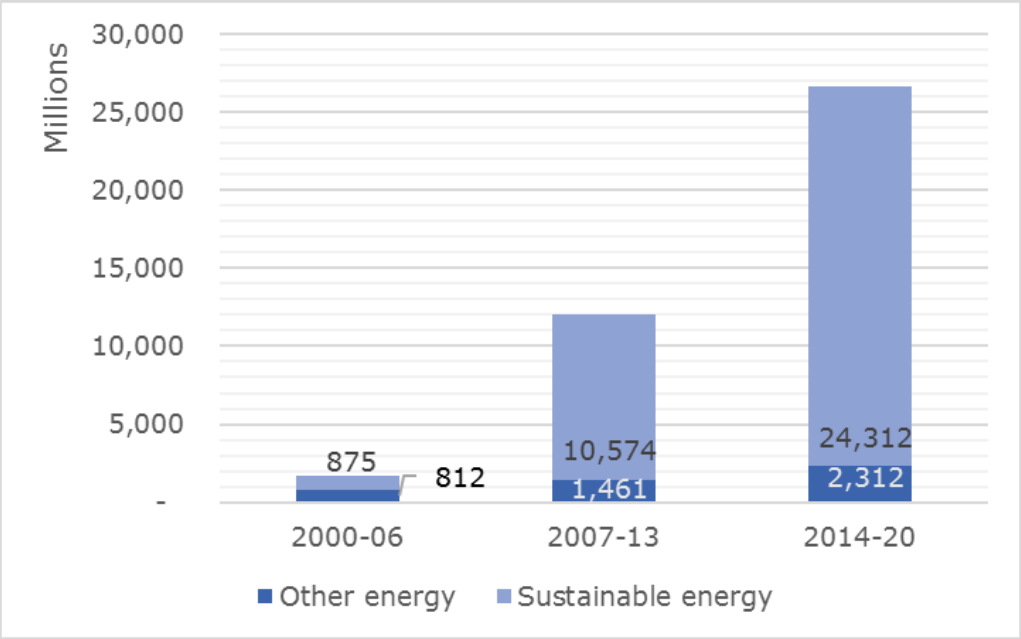
Figure 3-14 highlights a strong increase in allocations for sustainable energy and sustainable transport over the three financing periods. The increase seems mainly determined by higher allocations to energy efficiency and urban transport. In relative terms, allocations to sustainable energy increased more than allocations to sustainable transport across the three financing periods. The sustainable energy share of overall energy allocations increased from 52% (EUR 875 million) in the financing period 2000-2006, to 88% (EUR 10.6 billion) in 2007-2013 and 91% (EUR 24.3 billion) in 2014-2020 (see Figure 3-15).

Figure 3-14 Indirect environmental investment: Comparison of allocations (EUR million) by sector across the three financing periods (all Member States aggregated)



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

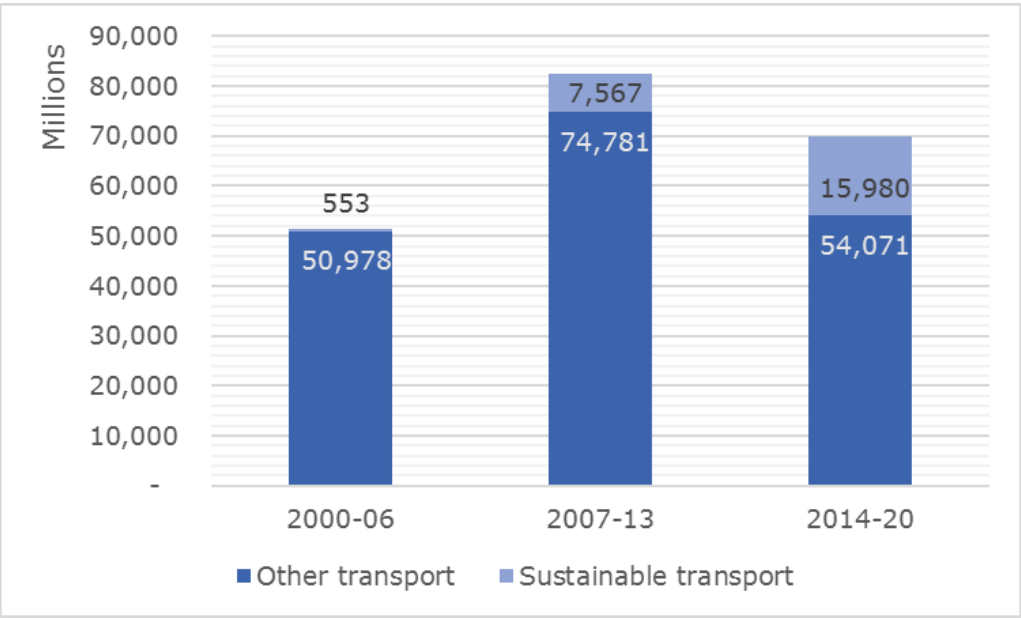
Figure 3-15 EU Member State ERDF and Cohesion Fund allocations to sustainable energy compared to other energy investments across the three financing periods (EUR million)



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Note: sustainable energy includes energy efficiency and renewable energy, as indicated in Appendix C.

Figure 3-16 EU Member State ERDF and Cohesion Fund allocations to sustainable transport compared to other transport investments across the three financing periods (EUR million)

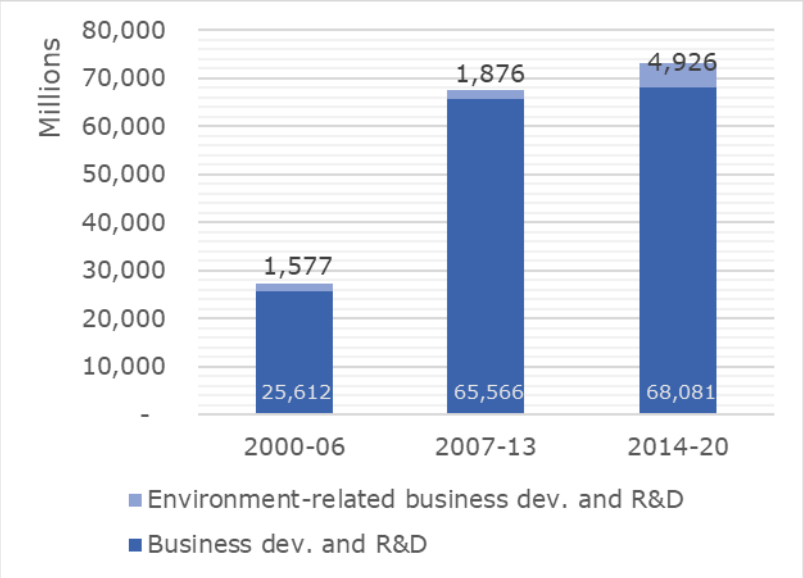


Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Allocations to sustainable transport[43] represented 1% of transport allocations in the financing period 2000-2006, 9% (EUR 7.6 billion) in 2007-2013 and 23% (EUR 16 billion) in 2014-2020 (see Figure 3-16).

Environment-related investments in the business sector have also gained importance in the current financing period (2014-2020). However, it should be noted that this might be due to the changes in the categorisation of Cohesion Policy funds: for the financing period 2014-2020, there are more categories related to environment in the business/R&D sector compared to previous financing periods – see Appendix C for details. It should also be highlighted that environment-related business development and R&D allocations represent a very small share (ranging from 3% to 7% in the three financing periods considered) of the overall allocations to business development and R&D (see Figure 3-17).

Figure 3-17 EU Member State ERDF and Cohesion Fund allocations to environment-related business development and R&D compared to business development and R&D across the three financing periods (EUR million)



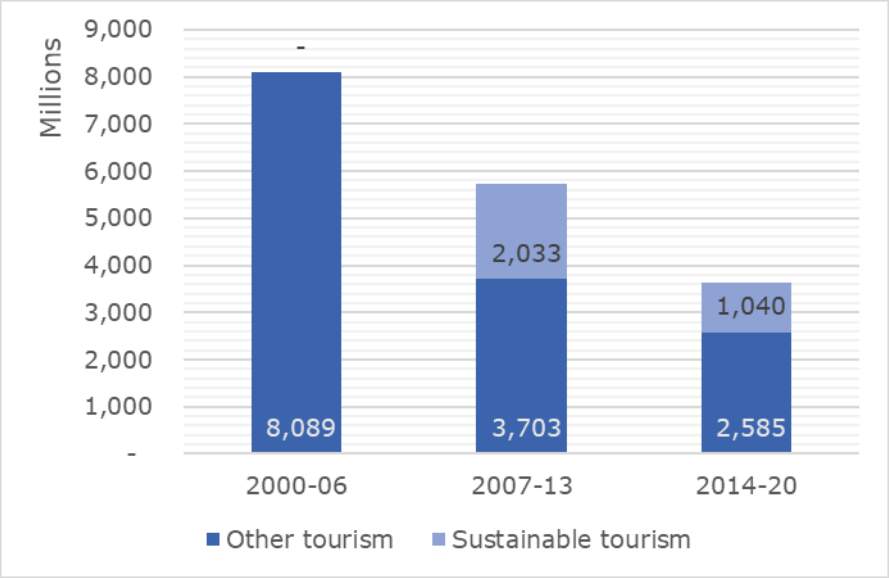
Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.
Note: The amounts presented for Business development and R&D do not include ESF allocations, which are equal to EUR 794 million in 2000-2006. During the financing period 2014-2020 there were no ESF allocations to this sector. For the 2007-2013 financing period, the data available did not provide information on ESF allocations.

Allocations to sustainable tourism decreased from EUR 2 billion (35% of ERDF and Cohesion Fund spending on tourism) in 2007-2013 to EUR 1 billion (29% of ERDF and

[43] The category of sustainable transport is defined here to include clean urban transport systems, intelligent transport systems and cycle tracks. It does not include rail, inland waterways, roads, seaports, airports and multimodal transport are not included under 'sustainable transport'. For details see Appendix C.

Cohesion Fund spending on tourism) in 2014-2020[44] (see Figure 3-18). While in the financing period 2007-2013 there were two broad categories for environmental activities in tourism ('promotion of natural assets' and 'protection and development of natural heritage'), the current financing period presents just one more specific category ('development and promotion of tourism potential of natural areas'). The changes in categorisation reduce comparability of data across periods for this sector. It should also be stressed that in the financing period 2000-2006, there were no applicable categories for sustainable tourism.

Figure 3-18 EU Member State allocations of Cohesion Policy funds to tourism compared to sustainable tourism across the three financing periods (EUR million)



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.
Note: The amounts for 'Other tourism' do not include ESF allocations, which are equal to EUR 198 million in 2000-2006. During the financing period 2014-2020 there were no ESF allocations to this sector. For the financing period 2007-2013, the data available did not provide information on ESF allocations.

Overall, the largest share of the growth of indirect environmental investments has been due to investments in energy efficiency and urban transport: this could be related, as mentioned in section 3.1.1, to the 'Lisbon earmarking' introduced in the financing period 2007-2013, and to the EU policy priorities, in particular for sustainable energy and climate action, reflected in the ERDF thematic concentration requirement (see Section 3.1.1).

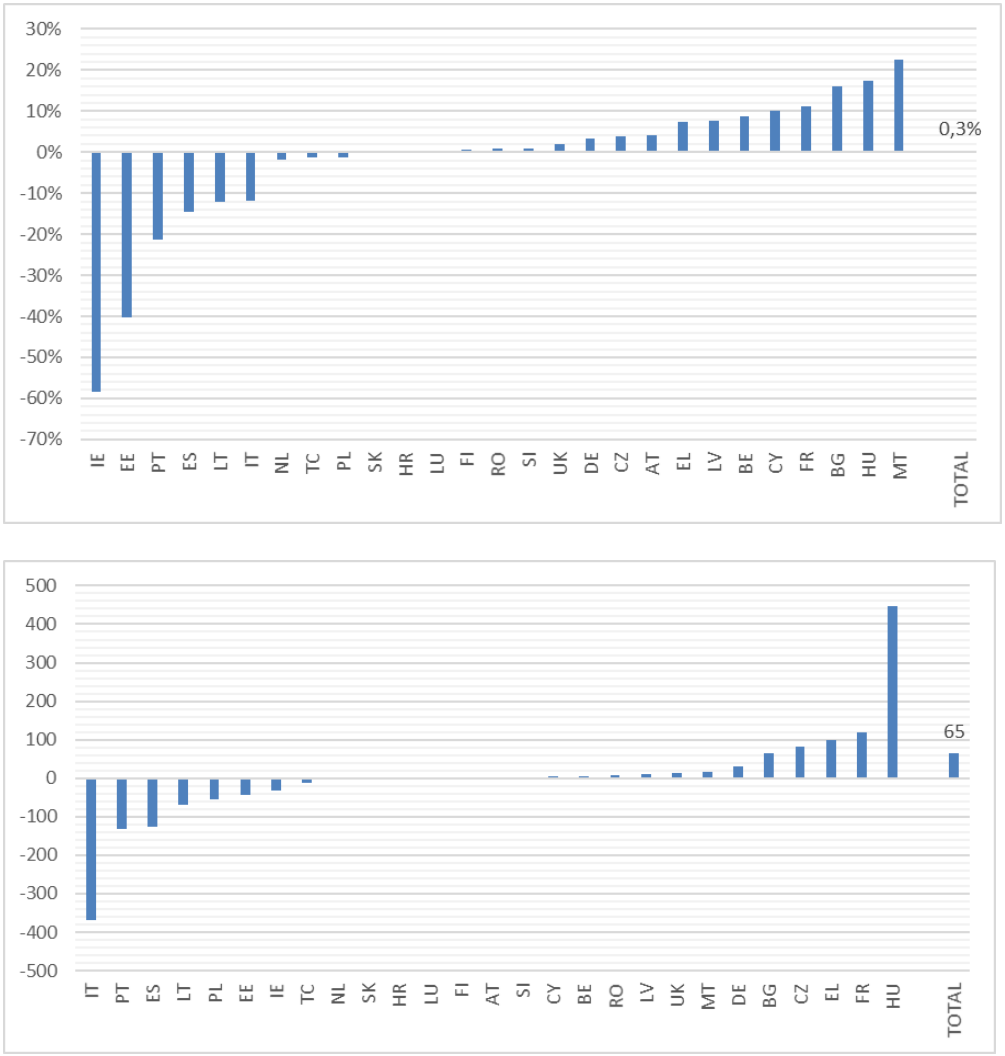
3.1.6 Indirect environmental investments: reallocations

Figure 3-19 below presents changes in allocations to Operational Programmes for all FOI during the financing period 2007-2013 relating to indirect environmental investments as an aggregate across the Member States. As for direct environmental investments, the allocations to the Operational Programmes recorded in 2016 are compared with the initial

[44] The priority themes and investment priorities considered for tourism in the financing periods 2007-2013 and 2014-2020 are listed in Appendix C.

allocations recorded in 2008. While the first graph shows reallocations in relative terms, the second one presents absolute numbers (in EUR millions).

Figure 3-19 OP reallocations 2007-2013 to all FOI for indirect environmental investments as an aggregate (in % and in EUR million)



Source: DG REGIO (2016)

The overall allocations for indirect environmental investments remained practically unchanged (0.3% increase). Fifteen Member States had a net increase in their allocations for indirect environmental investments while ten Member States shifted allocations away from these sectors. The highest decrease (by over 50%) was found in Ireland, but in absolute terms the change was not high (a shift from EUR 54.4 million to EUR 22.6 million).

The absolute amounts of OP allocations for indirect environmental investments, by Member State and category, can be found in the Appendix H.

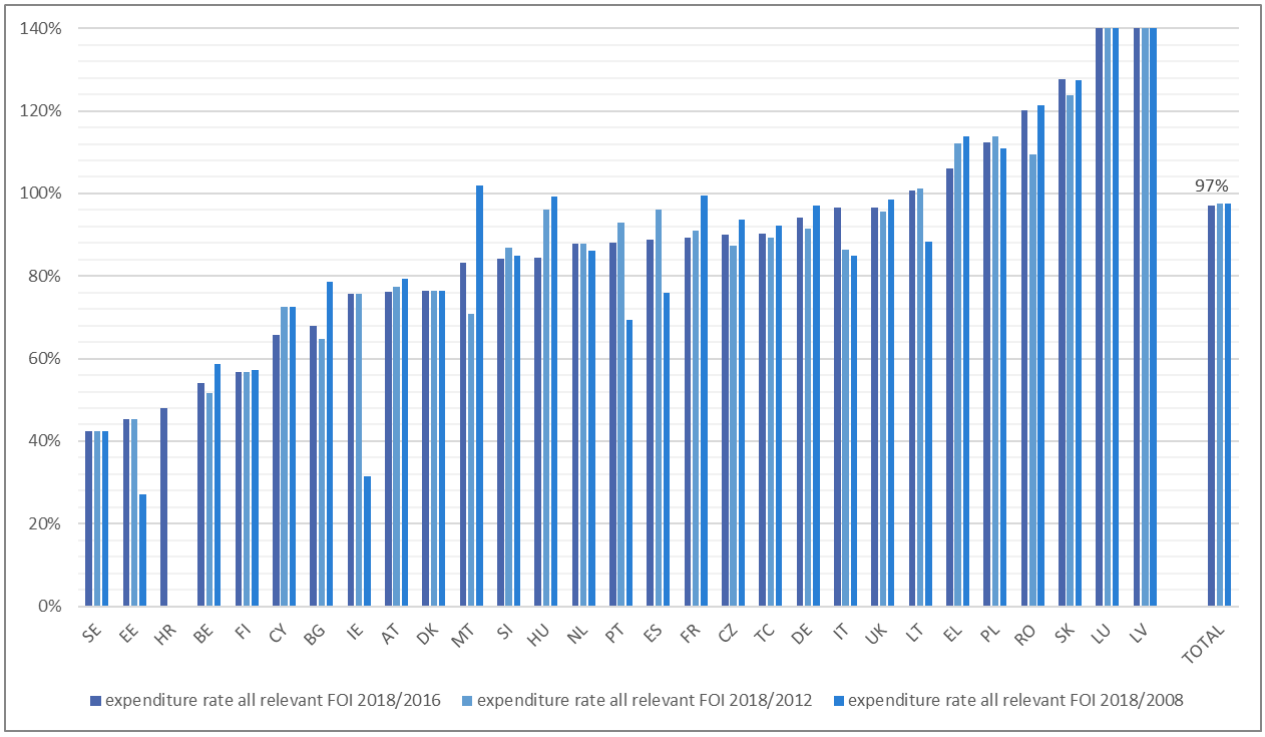
3.1.7 Indirect environmental investments: expenditure rates

This section focuses on the pace of spending of Cohesion Policy funding in indirect environmental investment categories. As noted previously, spending could be undertaken through the end of 2015, and the most recent data on expenditures was obtained from DG Regional and Urban Policy in September 2018. Consequently, this overview provides a complete picture of the spending and absorption capacity for the whole 2007-2013 financing period.

3.1.7.1 Overview

Figure 3-20 below presents the expenditure rates for indirect environmental investments as an aggregate across Member States. As for direct investments, the figure presents the expenditures recorded in 2018 in comparison with 1) OP allocations in 2016, 2) OP allocations in 2012 and 3) OP allocations in 2008.

Figure 3-20 Expenditure rates recorded in 2018 for all fields of intervention for indirect environmental investments as an aggregate



Source: DG REGIO (2016 and 2018)

Note: In case of Luxembourg and Latvia, the expenditures reported in 2018 exceed OP allocations of 2016 by over 200% (211% for Luxembourg and 215% for Latvia) and have been cut at 140%; the aggregated allocations for Latvia and Luxembourg are relatively small and constitute approximately 0.6% of total allocations to the selected categories in total.

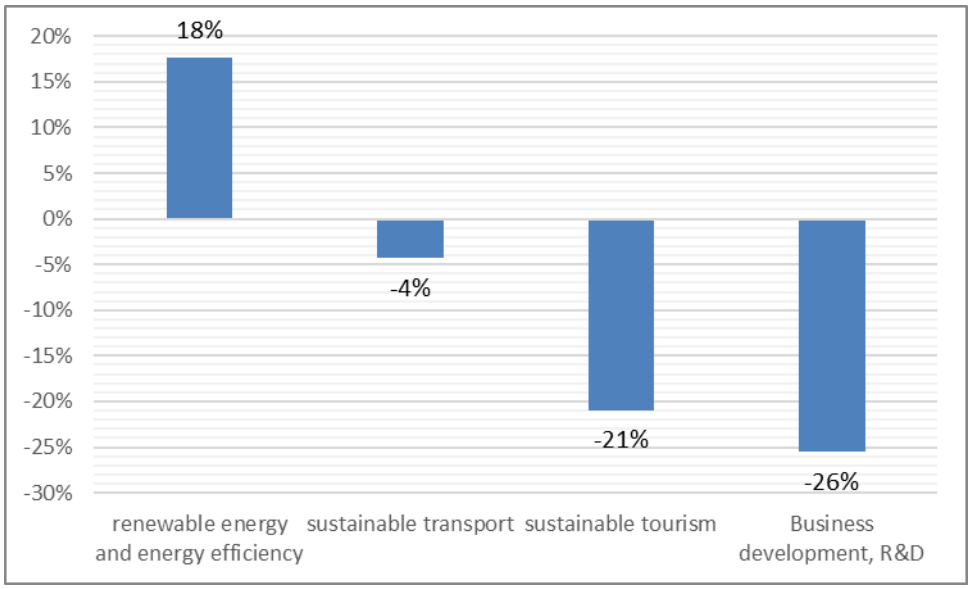
In 2018, the aggregate expenditure rate for indirect environmental investments, 97%, was slightly lower than that for direct environmental investments, 109% (comparing data on expenditures obtained in 2018 with 2016 allocations). The lowest rates (below 60%) were seen for Sweden, Estonia, Croatia, Belgium and Finland. Greece, Lithuania, Poland, Romania, Slovakia, Luxembourg, and Latvia recorded higher expenditures in 2018 than

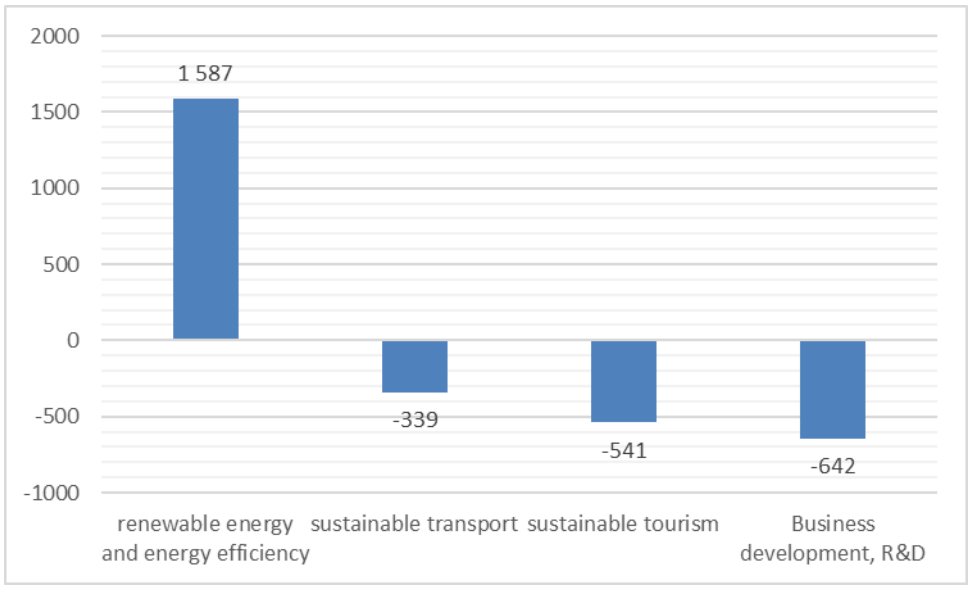
OP final allocations (in Luxembourg, however, the total allocation for all categories of indirect environmental investments was only about EUR 3 million).

3.1.7.2 Reallocations by sector

Figure 3-21 below shows reallocations for the sectors of indirect environmental investments in the 2007-2013 financing period (as an aggregate for all Member States; the difference relates to final allocations as of 2016 versus the initial allocations recorded in 2008). While the first graph shows reallocations in relative terms, the second presents absolute numbers (in EUR million).

Figure 3-21 OP reallocations 2007-2013 for sectors of indirect environmental investments (percent of initial allocations and EUR millions)



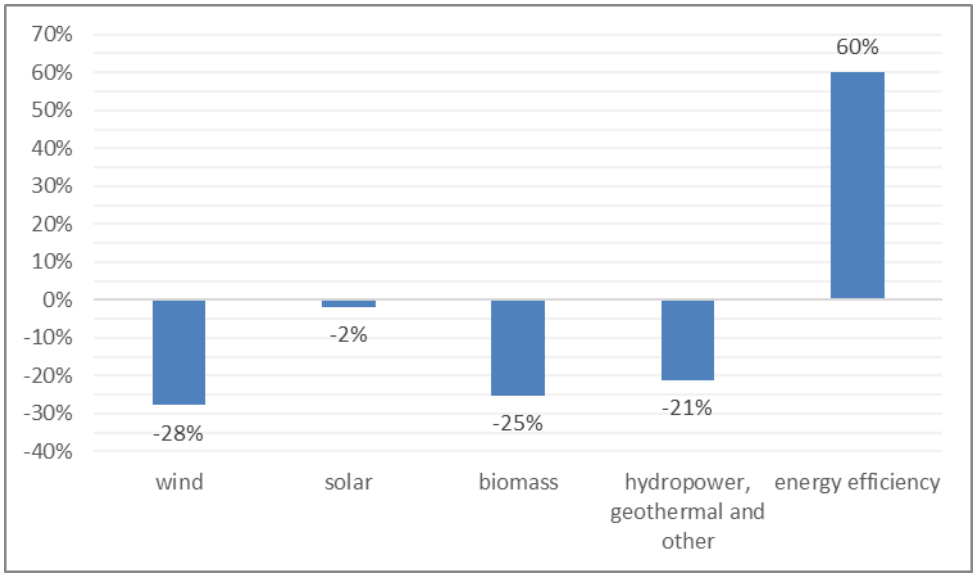


Source: DG REGIO (2016)

For sustainable transport (comprised of categories for clean urban transport, intelligent transport systems and cycle tracks), funding allocated to the OPs decreased by 4% (i.e. approximately EUR 340 million), as seen in Figure 3-21. Allocations to the tourism sector decreased by 21%, about EUR 0.5 billion (this sector represented only 10% of the whole category of indirect environmental investments). The most significant drop in allocations (by 26%) occurred in the field of business development and promotion of environmentally-friendly production, equivalent to EUR 642 million.

For renewables and energy efficiency, allocations during the period 2007-2013 increased by about 18%. In absolute terms, allocations grew by more than EUR 1.5 billion. This sector is the largest contributor to the category of indirect environmental investments (comprising over 40% of the total allocations to this category), and thus it is worth to look also at reallocations its specific sub-categories. Figure 3-22 presents a detailed picture of this sector. It can be seen that while overall allocations for energy efficiency increased by 60%, allocations for renewables decreased. The highest drop in allocations occurred in the sector of wind energy, 28%, while the lowest reductions, only 2% overall, were in the sector of solar energy.

Figure 3-22 OP reallocations in the sector of energy



Source: DG REGIO (2016)

Further details on indirect environmental investments are presented in section 3.8 below.

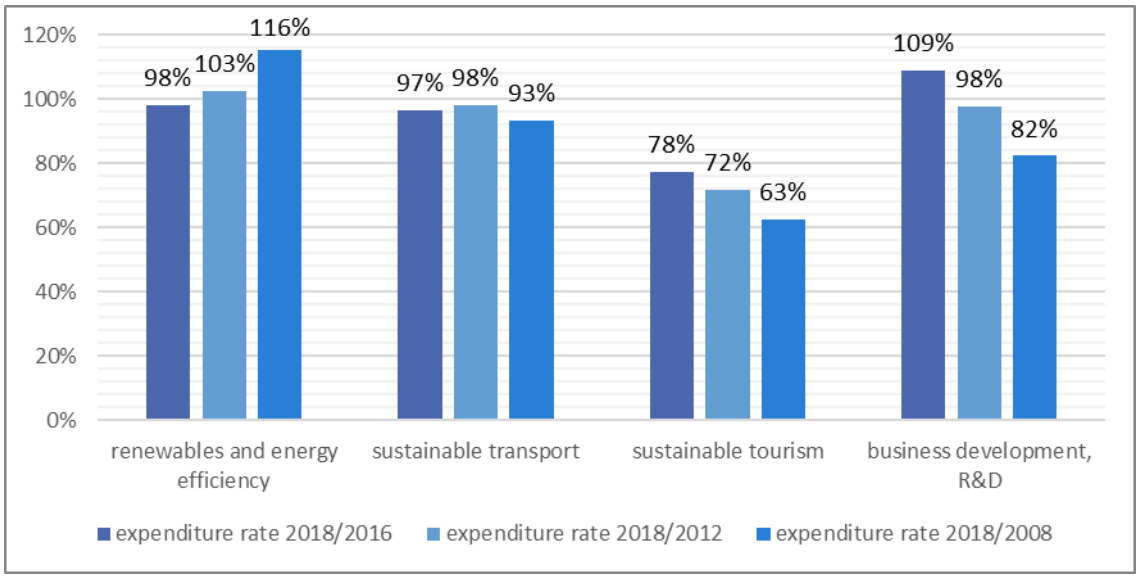
3.1.7.3 Expenditure rates by sector

Figure 3-23 below presents the expenditure rates for specific sectors of indirect environmental investments, aggregated across all Member States: these rates compare expenditures reported in 2018 with Operational Programme allocations reported for 2016, 2012, and 2008.

The area of business development (promotion of environmentally-friendly products and production processes in SMEs) achieved the highest final expenditure rate, reaching almost 109% of OP allocations in 2016 and over 80% of the lower OP allocations in 2008. (As noted above, however, about one-quarter of the resources originally allocated to business development were subsequently reallocated to other spending areas.)

Renewables and energy efficiency ranked second, with the expenditure rate of 98% (and this sector received an increase in allocations over the period). Intelligent transport systems and clean urban transport, grouped under the label of sustainable transport also achieved a high expenditure rate of 97%. Promotion and development of natural heritage and assets in tourism reached a relatively low level of expenditures as compared to OP allocations: 78% (and resources were allocated away from these spending areas).

Figure 3-23 Expenditure rates for the specific sectors of indirect environmental investments, 2018



Source: DG REGIO (2016 and 2018)

3.1.8 Preliminary expenditure rates in the financial period 2014-2020

This section presents data on expenditure rates in the period 2014-2020 as of end of 2017, based on data available in DG Regional and Urban Policy in September 2018.

Overview

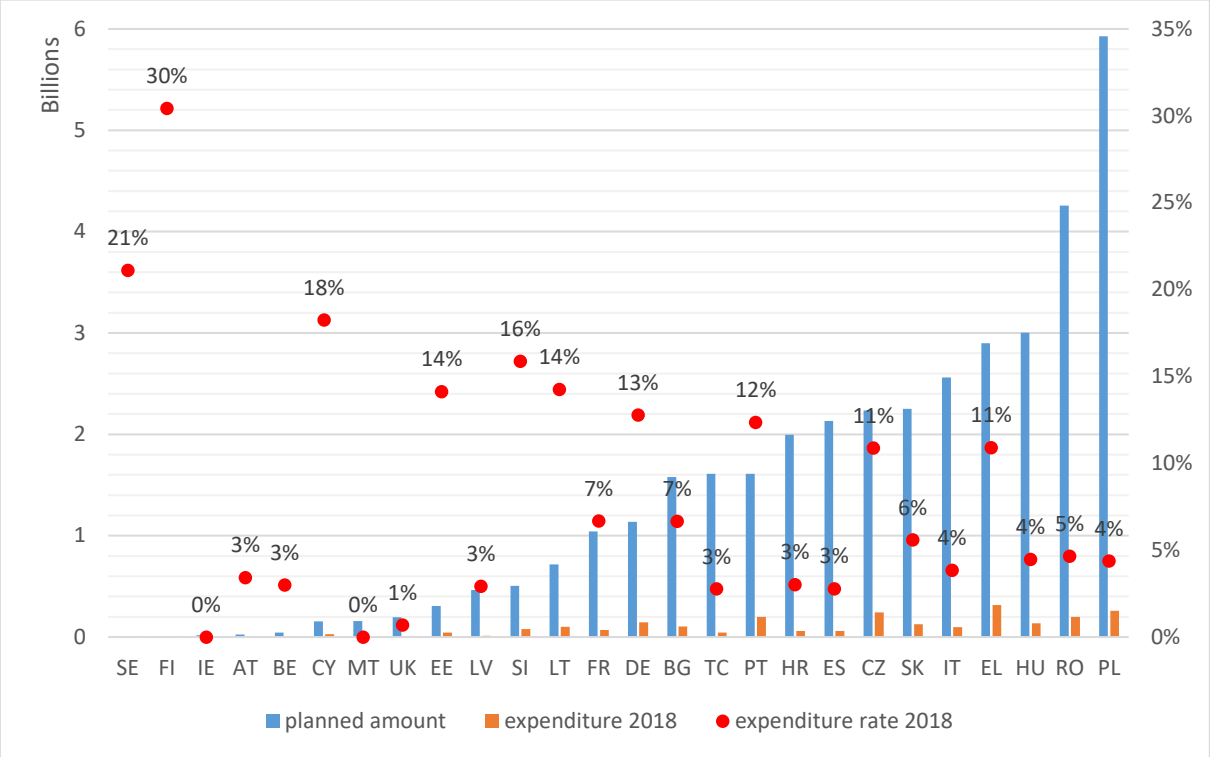
An aggregate expenditure rate for environmental investments including both direct and indirect investment categories at the end of 2017 amounted to 6%. While this indicates a very low absorption of funding half-way of the financing period 2014-2020, it can be noted that bulk of financial allocations to Cohesion Policy programmes is typically used in the last few years of each financing perspective. As pointed out in the Sythesis Report of Ex-post evaluation of Cohesion Policy Programmes 2007-2013[45], there is a lag between the spending on the ground and payments being claimed and made by the Commission. The same study reports that in most countries, the rate of payments made by the

[45] Applica and Ismeri Europa, Ex post evaluation of Cohesion Policy programmes 2007-2013, focusing on the European Regional Development Fund (ERDF) and the Cohesion Fund (CF), August 2016, https://publications.europa.eu/en/publication-detail/-/publication/e9182ca7-7a40-11e6-b076-01aa75ed71a1/language-en, p. 94.

Commission in the 2007-13 period did not really pick up until 2012. Our analysis shows that the expenditures for environment registered by DG Regio by the end of 2014 amounted to only 68% (for direct and indirect environmental investments combined), and only at the end of 2017 reached (and even exceeded) 100%. At the same time, the Synthesis Report for 2007-2013 mentioned above shows that in 2010, i.e. four years after the beginning of the previous financing period, the absorption rate for all the spending categories reached approximately 20%. Using this for comparison, the expenditure rate of only 6% for environmental investments four years after the beginning of the current financing period raises some concern.

Figure 3-24 below presents the allocations, expenditures and expenditure rates in 2014-2020 period for *direct environmental investments* as an aggregate across Member States. The figure presents the expenditures as a share of the OP allocations, both recorded in 2018 (status at the end of 2017). The highest expenditure rates for the aggregate direct environmental investments have been found in Finland (30%), Sweden (21%) and Cyprus (18%).

Figure 3-24 Allocations, expenditures and expenditure rates as of end 2017 for all fields of intervention for direct environmental investments as an aggregate



Source: Database on ESIF available in September 2018, reporting the status at the end of 2017[46]

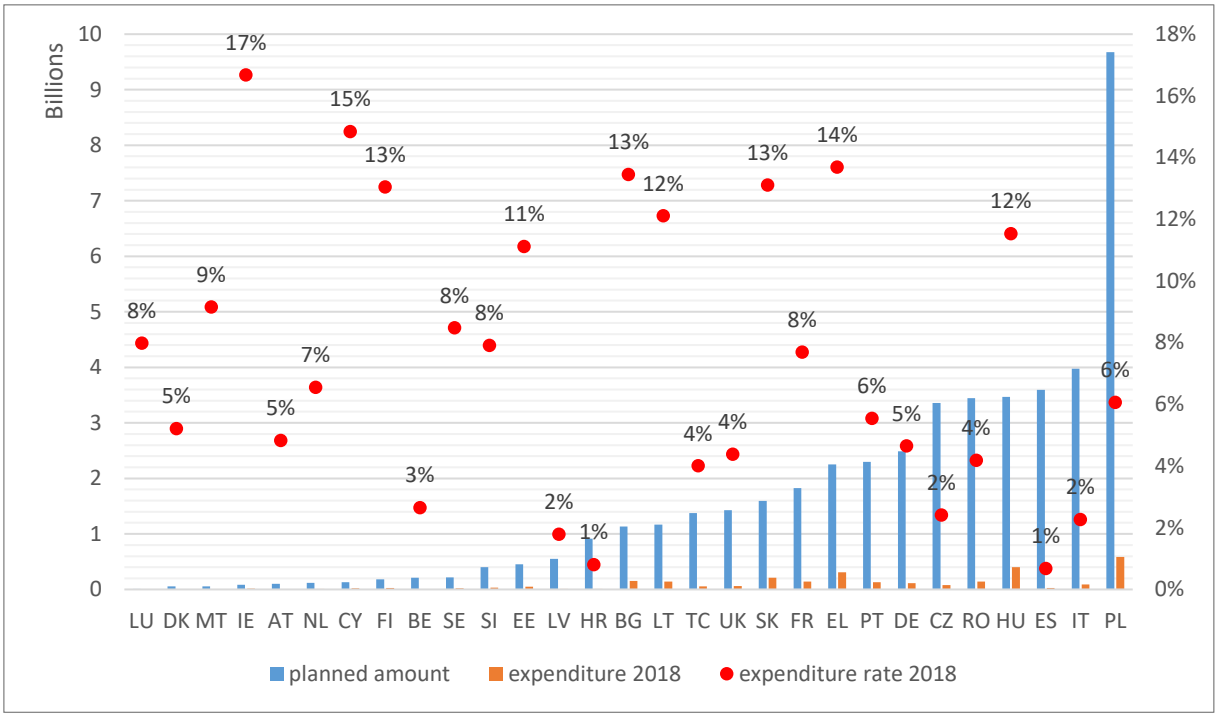
Note: Allocations and expenditures in billion euros on the left axis, expenditure rate on the right axis

Figure 3-25 below presents the, allocations, expenditures and expenditure rates in 2014-2020 period for *indirect environmental investments* as an aggregate across Member

[46] https://cohesiondata.ec.europa.eu/EU-Level/ESIF-2014-2020-categorisation-ERDF-ESF-CF-planned-/3kkx-ekfq

States. The figure presents the expenditures as a share of the OP allocations, both recorded in 2018 (status at the end of 2017). The highest expenditure rates have been found in Ireland (17%), Cyprus (15%), and Greece (14%).

Figure 3-25 Allocations, expenditures and expenditure rates as of end 2017 for all fields of intervention for indirect environmental investments as an aggregate



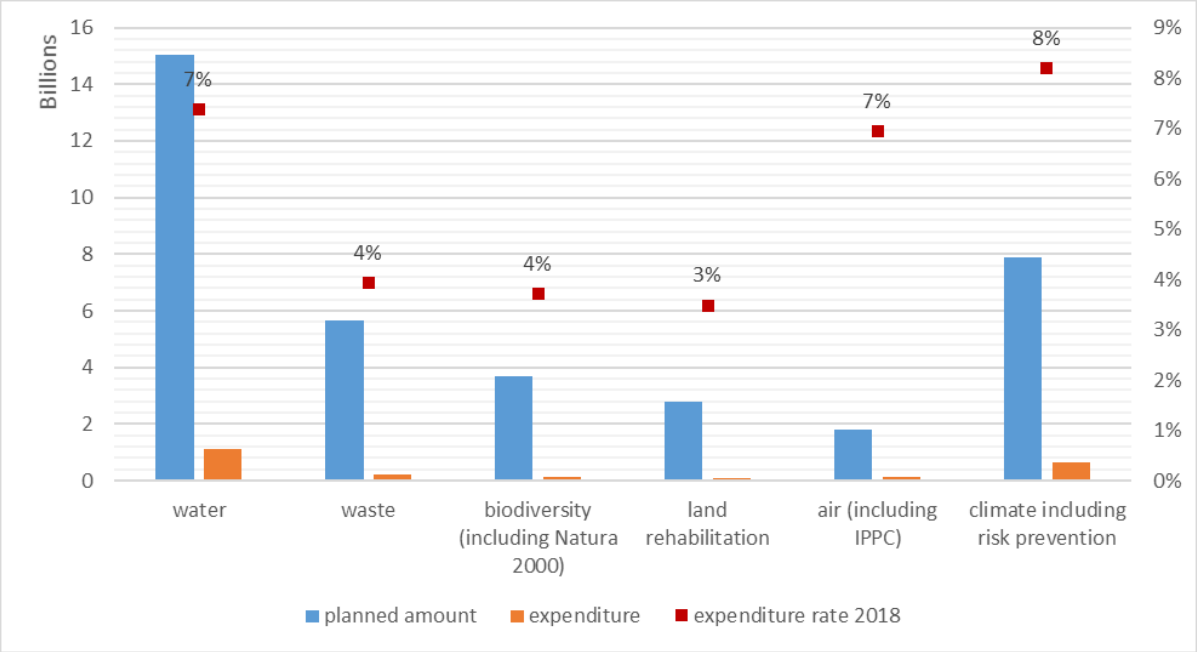
Source: Database on ESIF available in September 2018, reporting the status at the end of 2017

Note: Allocations and expenditures in billions euros on the left axis, expenditure rate on the right axis

Expenditure rates per sector

Figure 3-26 below presents expenditure rates as of end 2017 per sector for direct environmental investments. These rates have been calculated as shares of expenditures to financial allocations, both recorded in 2018 (status at the end of 2017). The highest absorption has been achieved in the sector of climate protection and risk prevention (8%), followed by the water and air sectors (both 7%). The lowest expenditure rate was registered in the sector of land rehabilitation.

Figure 3-26 Expenditure rates for the specific sectors of direct environmental investments, end 2017

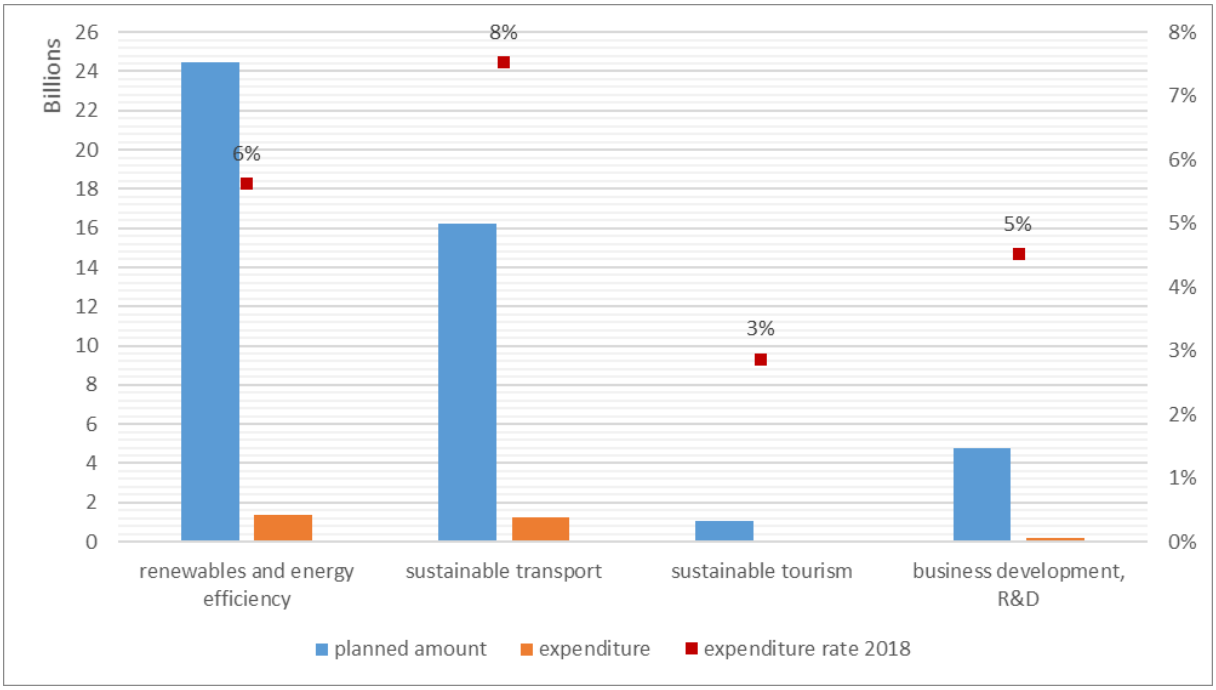


Source: Database on ESIF available in September 2018, reporting the status at the end of 2017

Note: Allocations and expenditures in billions euros on the left axis, expenditure rate on the right axis

Across the sectors of indirect environmental investments, the highest expenditure rate (8%) was found in sustainable transport, followed by the sector of renewables and sustainable energy (6%). The lowest expenditure rate (3%) was noted in sustainable tourism (see Figure 3-27 below).

Figure 3-27 Expenditure rates for the specific sectors of indirect environmental investments, end 2017



Source: Database on ESIF available in September 2018, reporting the status at the end of 2017

Note: Allocations and expenditures in billions euro on the left axis, expenditure rate on the right axis

3.2 Water sector

3.2.1 EU policy framework and estimates of investment needs

The Urban Waste Water Treatment Directive (UWWTD) calls for the collection and treatment of waste water in all agglomerations of more than 2000 population equivalent (p.e.), setting requirements for treatment levels linked to the size of agglomeration and the sensitivity of the receiving waters. For the EU-15 Member States, these deadlines had to be met by the end of 2005; the EU-13 had a series of deadlines that extended to 2015 for most Member States, though longer for Romania and Croatia[47].

The Drinking Water Directive (98/83/EC) sets standards for water quality, while the Water Framework Directive sets overall environmental objectives for inland and coastal water bodies.

Fulfilling the provisions of Drinking Water Directive and the UWWTD requires significant investments, especially in the EU-13 and southern EU-15 Member States. A 2006 study

[47] For Romania and Croatia, the deadlines of UWWTD extend to 2018 and 2023 depending on the article.

estimated that, to implement the Drinking Water Directive in the Member States with the greatest needs at that time[48], about EUR 9.0 billion would need to be invested in the period 2007-13[49]. For the same Member States, the study estimated that EUR 17.6 billion would be needed in 2007-2013 for sewerage connections and waste water treatment to meet EU requirements. These estimates should, however, be considered as only a rough indication of the resources required.

3.2.2 Cohesion Policy allocations and expenditures

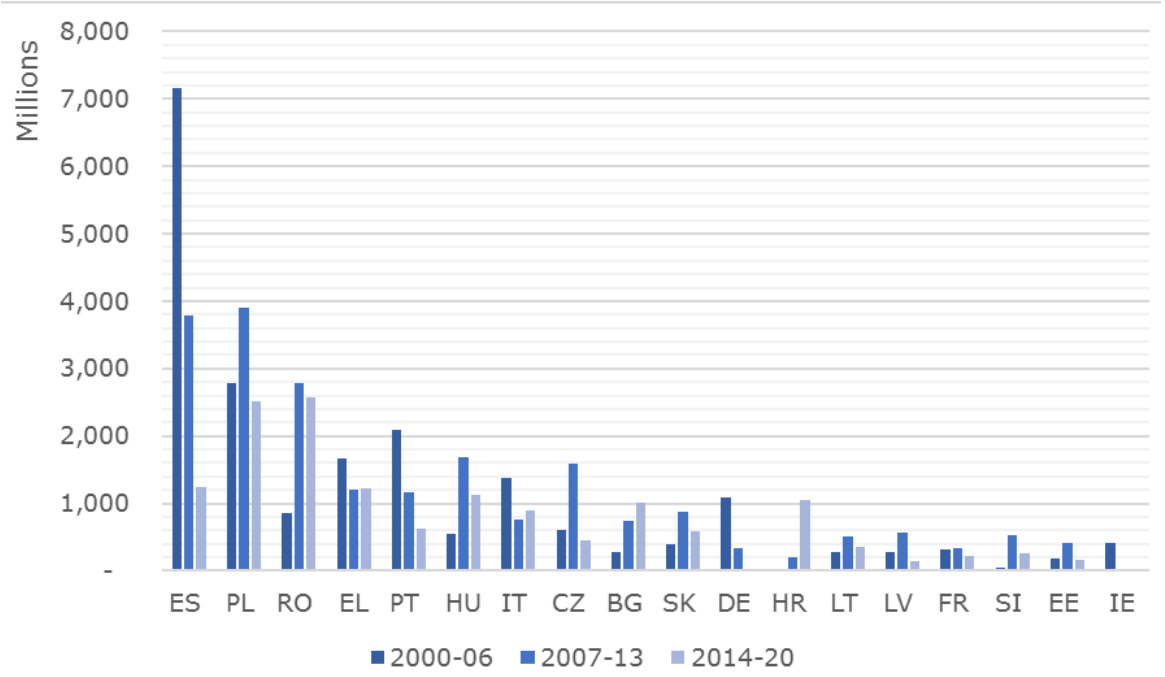
The water management sector is the most investment-heavy environmental sector in the Cohesion Policy. In the 2000-2006 programming period, financial allocations to the water sector amounted to EUR 20.6 billion and made up 54% of Cohesion Policy resources devoted to environment (taking into account direct environmental investments only). The share of this sector fell to 52% in the 2007-2013 period, and dropped further to 41% of direct environmental investments in the 2014-2020 period.

Available data on Cohesion Policy funds shows that, throughout the three financing periods, Spain has allocated the highest amount (EUR 12.2 billion) of Cohesion Policy funds to water projects, followed by Poland (EUR 9.2 billion) and Romania (EUR 6.2 billion) (see Figure 3-28). Overall, the majority of Member States decreased funding allocations to water projects between the 2007-2013 and 2014-2020 periods (see Figure 3-28 and Figure 3-29). However, this does not apply to Greece, Italy, Bulgaria, Croatia and Malta, where allocations to water projects increased between the two periods (Croatia joined the EU in July 2013 and therefore had very limited contributions for the financing period 2007-2013).

[48] The study covered 15 Member States: Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia, Greece, Portugal and Spain.

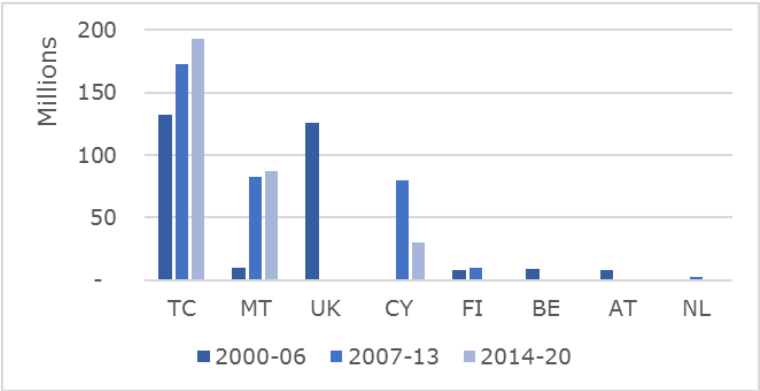
[49] GHK and partners, Strategic Evaluation on Environment and Risk Prevention – Synthesis Report (report for DG Regional Policy), November 2006.

Figure 3-28 *Allocations (EU amount in EUR million) to water sector under ERDF and CF by Member State across the three financing periods (allocations to Member States of EUR 200 million or above per period)*



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

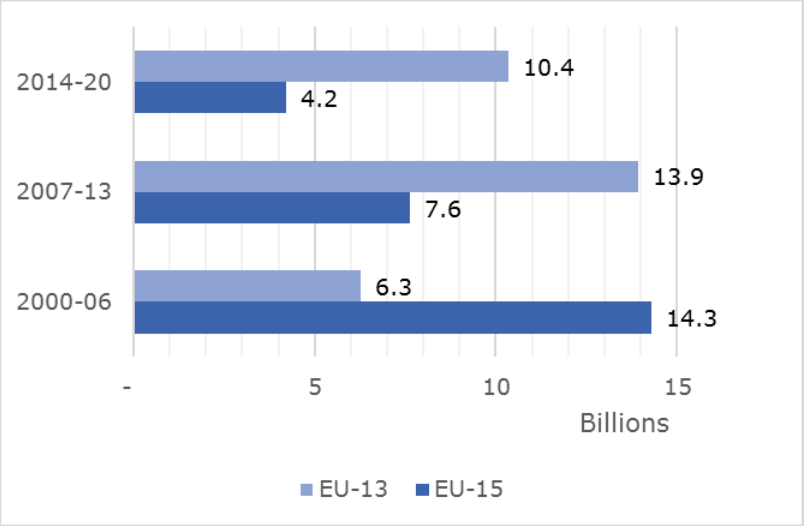
Figure 3-29 *Allocations (EU amount in EUR million) to water sector under ERDF and CF by Member State below (allocations less than EUR 200 million in each period)*



Source: see Figure 3-28

Generally, in EU-15 countries funding allocations to the water sector have decreased progressively across the three periods, starting from the financing period 2000-2006, while EU-13 countries have experienced an increase of allocations to water projects between the financing period 2000-2006 and 2007-2013, though for the EU-13 that joined in 2004, the financing period 2000-2006 included only the years 2004-2006. EU-13 allocations decreased in the period 2014-2020 (see Figure 3-30). For individual Member States, however, trends vary.

Figure 3-30 Allocations (EU amount in EUR billion) of EU-15 versus EU-13 countries to water projects under ERDF and CF across the three financing periods



Source: see Figure 3-28 above

The information gathered does not identify the causes for this decline. Nonetheless, recent implementation reports for the Drinking Water Directive[50] and the Urban Waste Water Treatment Directive[51] show that many Member States have achieved good progress in meeting EU requirements over the three periods considered. This suggests that the high investment needs have to some extent been met during the first programming period and therefore less financing was needed in the later periods. However, further evidence would need to be collected to substantiate this.

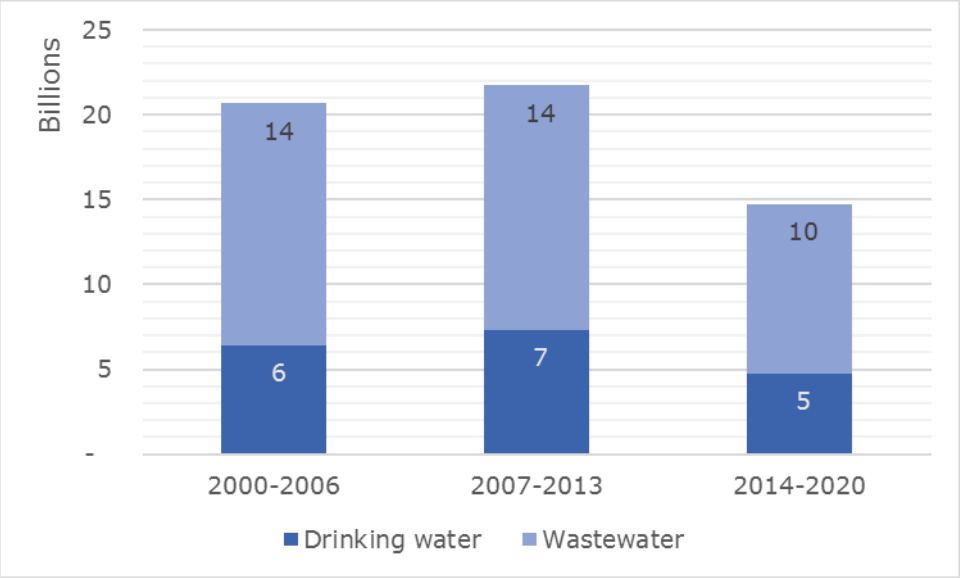
The water sector includes investments in waste water treatment and drinking water. While these are separate spending categories, previous work[52] has shown that many investment projects cover both areas; for this reason, the two categories are combined in many figures in this study. When looking at the separate categories, however, it can be seen that the proportion of allocations to drinking water projects compared to wastewater projects have remained fairly constant across the three financing periods: the allocations to waste water investments were approximately two times higher than the allocations to drinking water investments (see Figure 3-31).

[50] European Commission, Synthesis Report on the Quality of Drinking Water in the EU examining the Member States' reports for the period 2011-2013 under Directive 98/83/EC, COM(2016) 666 final, 20.10.2016

[51] Eighth Report on the Implementation Status and the Programmes for Implementation (as required by Article 17) of the Urban Waste Water Treatment Directive (91/271/EEC) (COM (2016) 105 final)

[52] Martens B., et al (2016), Ex post evaluation of Cohesion Policy Programmes 2007-2013 – Work Package 6 – Environment (study by COWI and partners for the European Commission, DG Regional and Urban Policy), available at:
http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2007-2013/#7

Figure 3-31 *Aggregated allocations (EU amount in EUR billion) of EU Member States to drinking water and wastewater projects under ERDF and CF across the three financing periods*



Source: see Figure 3-28

3.2.3 Responding to EU objectives

3.2.3.1 Total allocations

As noted in the previous sections, the water sector accounted for just over half of all direct environmental allocations in 2000-2006 period and the 2007-2013 period, falling to just over 40% in the 2014-2020 period: the sector has been a key focus of Cohesion Policy environmental investments. Nearly all OP resources have financed drinking water and waste water treatment infrastructure, including supply and sewerage networks; however, as explained below, in the 2014-2020 period there has been greater attention to other types of water investments.

3.2.3.2 OPs reviewed

For the water sector, six OPs in four Member States were reviewed (see the table below): their allocations for water ranged from EUR 52 million in Poland's Warminsko-Mazurskie regional OP to just under EUR 1 billion for the Andalusia OP (where water received about half of all environmental allocations) and over EUR 1.5 billion for Spain's national OP for the Cohesion Fund and ERDF.

Table 3-1 Overview of the OPs reviewed and their allocations to water

Country	OP / Cooperation Programme	Allocations in 2014 (EUR million)	Share of OP allocated to water
Germany	Thuringia	1,478	10%
Greece	Attica	2,238	6%
	Environment and Sustainable Development	1,720	40%
Poland	Warminsko-Mazurskie	1,070	5%
Spain	Andalusia	6,844	14%
	Cohesion Fund and ERDF	4,900	32%

Source: Milieu calculations based on DG REGIO (2016)

Table 3-2 OP objectives for water: policy documents cited in the Operational Programmes reviewed

Country	OP	EU Policy	National Strategic Reference Framework	National policy documents	Regional policy documents
Germany	Thuringia	✓			✓
Greece	Attica		✓		✓
	Environment and Sustainable Development	✓			
Poland	Warminsko-Mazurskie			✓	✓
Spain	Andalusia	✓	✓	✓	✓
	Cohesion Fund and ERDF	✓	✓	✓	

Source: OPs and information from interviews with Managing Authorities

Four of the six OPs reviewed cited key EU legislation (e.g. the UWWTD and the Water Framework Directive) in the framework of their investment planning. The Attica regional OP cited text on water issues in Greece's National Strategic Reference Framework (which in turn made references to the UWWTD and the Water Framework Directive), and the Warminsko-Mazurskie regional OP in Poland relied instead on references to national and regional policy documents (these, in turn, refer extensively to the need of reaching compliance with EU water sector legislation).

The six OPs reviewed focused largely on improvements in waste water treatment, and to a lesser extent on investments for drinking water. The investments extended sewer networks and drinking water networks and built or improved waste water treatment plants (see table below for more details).

Table 3-3 Key investment priorities for water

Country	OP	Key investment priorities
Germany	Thuringia	• Sewage treatment plants • Sewer networks
Greece	Attica	• The construction of sewerage networks and the corresponding waste water treatment in Eastern Attica in four agglomerations above 15,000 p.e. (Rafina Artemida, Nea Makri, Koropi) • Implementation of the Water Framework Directive planning in the Region (e.g. studies at local level, regional water services infrastructure and operational funding)
	Environment and Sustainable Development	• Sewerage and wastewater treatment plant projects, mainly in agglomerations of 2000 – 15000 p.e. • Completion of the National Database on Waste Water Treatment Plants (WWTPs) • Actions to address water scarcity conditions in areas with adequacy problems, to control and limit leakages of water supply networks, to improve the efficiency and quality of drinking water, and to reuse of municipal wastewater
Poland	Warminsko-Mazurskie	• Water and waste water treatment investments in agglomerations with a population equivalent (p.e.) below 15,000 (larger investments were implemented within the framework of OPIE). • Preference given to projects establishing water and waste water infrastructure in new settlements and developments. Priority given also to projects for the Great Mazurian Lakes.
Spain	Andalusia	• Evaluation and improvement of sewerage networks and drinking water treatment plants to mitigate water losses • Development of desalination plants • Improvement of waste water treatment, expansion and re-modelling of waste water treatment plants.
	Cohesion Fund and ERDF	• Improvement of water reservoirs and potable water treatment stations • Construction of desalination plants • Regulation and collection of water and construction/improvement of collecting infrastructures (e.g. dams, wells) • Renovation of water supply networks • Improvement of irrigation channels • Construction/improvement of WWTPs • Improvement of collectors and discharge outlets (e.g. storm tanks) and sewage network.

Source: Operational Programmes and interviews with Managing Authorities

3.2.3.3 Water investments in the 2014-2020 programming period

A recent study reviewed water sector priorities in the Operational Programmes for the 2014-2020 period.[53] Investments for drinking water and waste water treatment retain the lion's share of sector allocations. In the new financing perspective, an additional category of spending is distinguished: 'water management and drinking water

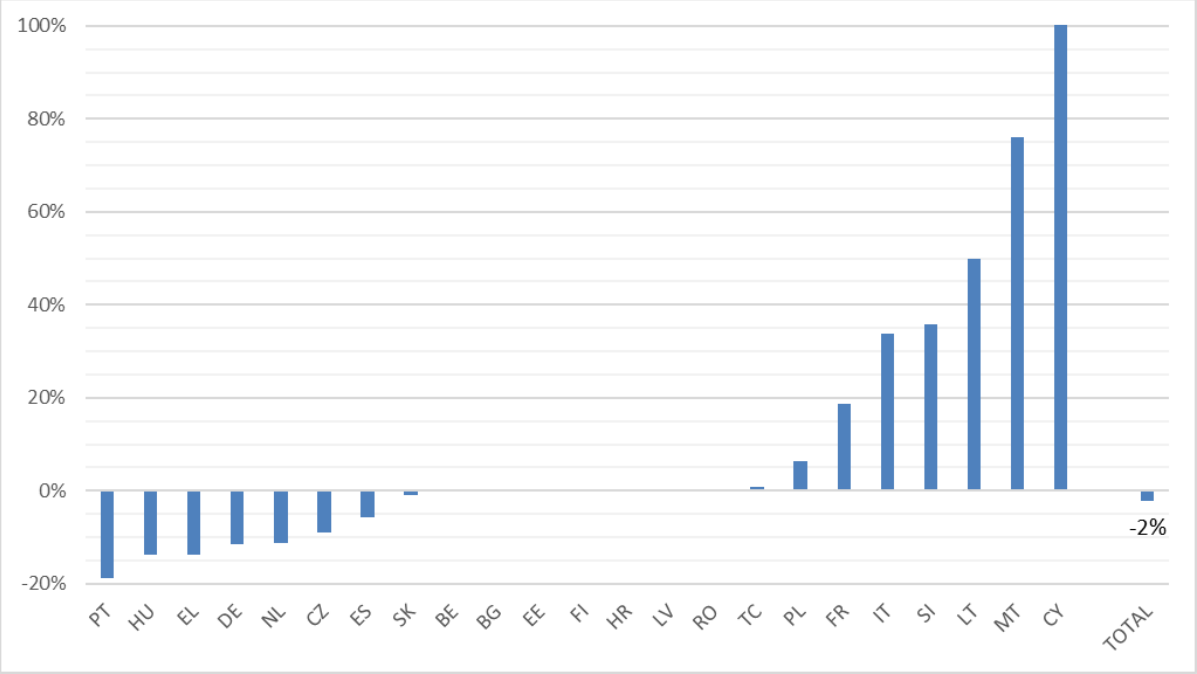
[53] Markowska and Gancheva (2017), European level report: Evaluation of the Contribution of Operational Programmes to the implementation of EU water policy, http://ec.europa.eu/environment/water/pdf/EU_overview_report_%20operational_programmes%20.pdf .

conservation' (Intervention Field 21). Under this category, OPs plan a broad range of investments: the box below presents a few examples.

Text Box 3-1 Examples of water sector interventions in the category 'water management and drinking water conservation' planned in the period 2014-2020

- Measures aiming at the elimination of leakages and limiting losses in water networks are cited in the OPs of seven Member States: Portugal, Cyprus, Czech Republic, Greece, Spain, and Croatia.
- Spanish OPs aim at the expansion and improvement of water metering systems.
- Water re-use measures are mentioned in the OPs in Italy, Cyprus, Greece, Slovenia, and Spain.
- Water monitoring measures are planned in Malta, Portugal, Italy, Bulgaria, Greece, Hungary, Slovakia, Croatia, and Lithuania (as well as in several Cooperation Programmes).
- The OP for the Sustainability and Efficiency in the Use of Resources in Portugal will finance studies to define ecological flows and to improve and complement the criteria for classifying water bodies; the same OP envisages the acquisition of equipment for the mathematical modelling of water quality.
- Estonia' plans measures for water bodies that are failing to reach the WFD objectives.
- A few Member States plan to use OP financing for the development or updating of the strategic documents related to water management. This is the case of Bulgaria, where the focus is on conducting studies and assessments with a unified methodology for the River Basin Districts and Lithuania, where the OP also envisages the updating of the River Basin Management Plans for 2016-2021.

Figure 3-32 Reallocations in the 2007-2013 financing period, water sector



Source: DG REGIO (2016)

Note: Austria, UK and Luxembourg did not allocate CP funding in the water sector; in case of Cyprus, the allocations in 2016 appear to be 833% higher than those of 2008 (from EUR 8.5 billion to EUR 79.3 billion); the figure has been capped at 100%

3.2.4 Administrative capacity

This section first reviews the reallocations and expenditure rates for the water sector. As noted in section 3.1, reductions in allocations and low rates of expenditure can be

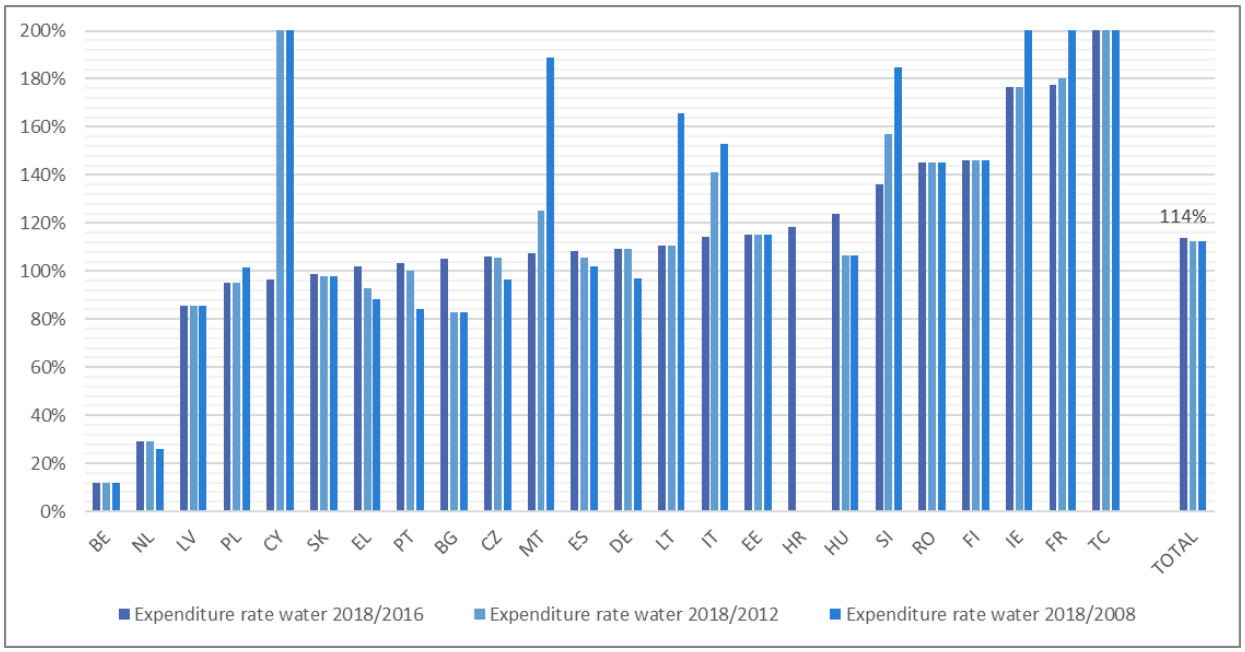
indicators of administrative capacity issues. The section then considers information gathered from the OPs reviewed.

3.2.4.1 Reallocations and expenditure rates in the 2007-13 programming period

Overall, allocations to the water sector fell by 2.1% between the beginning and the end of the 2007-13 programming period (see Figure 3-32 above) due to reallocation of funding by the Member States. Eight Member States increased their allocations to this sector, while eight others decreased their allocations.

The overall expenditure rate for the water sector recorded in 2018 was 114% (compared to 2016 allocations), the highest of the six sectors for direct environmental expenditure. In most Member States, expenditure exceeded 100% of 2014 allocations (see Figure 3-33). For two Member States, however – Belgium and the Netherlands – expenditure was below 30%.

Figure 3-33 Expenditure rates in the 2007-2013 financing period, water sector



Source: DG REGIO (2016 and 2018)

Note: No OP allocations for Austria, Denmark, Sweden, Finland, and Luxembourg; the Y axis has been cut at 200%; the following MS exceeded this limit: Cyprus (899% for both 2018/2012 and 2018/2008 rates), France (210% for 2018/2008), Ireland (176% for 2018/2012 and 331% for 2018/2008), and Territorial Cooperation (279% for 2018/2016, 299% for 2018/2012, and 292% for 2018/2008). TC allocations in 2016 constituted approximately 0.8% of total OP allocations to the selected categories.

3.2.4.2 OPs reviewed

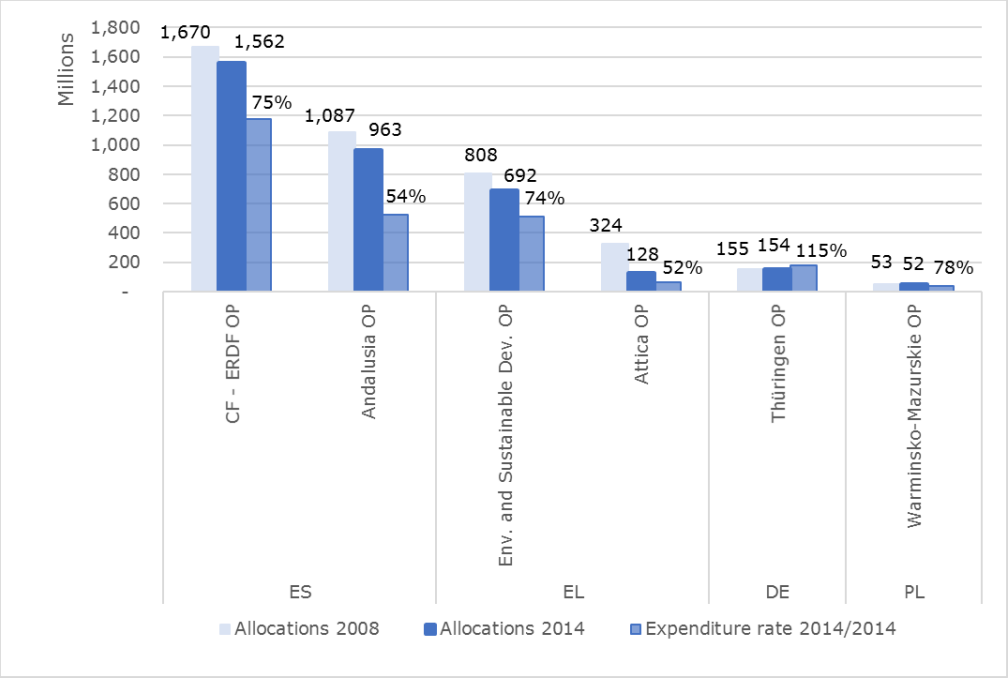
The implementation of the six OPs reviewed faced some challenges in the period 2007-2013. In Greece, for example, the national OPESD faced delays in tendering, due in part to legal actions by companies bidding for study and construction contracts, and the Attica

regional OP had difficulties with local acceptance of proposed waste water sites. In Spain, the Andalusia regional OP had delays due to a restructuring of competence for water management between regional and basin authorities.

By 2014, four of the six OPs had reduced their allocations for water investments, though it is not clear to what extent administrative capacity issues played a role. Reductions were largest for the Attica regional OP in Greece, where allocations fell by 60% between 2008 and 2014. Expenditure rates were low for the two regional OPs reviewed – just over 50% in 2014 (compared to 2014 allocations) in both Andalusia and Attica.

Across the EU as a whole, the 2014 expenditure rate for the sector was 73% (compared to 2014 allocations), above the average for direct environmental investments. The OP for Cohesion Fund and ERDF in Spain as well as the OP ESD in Greece had expenditure rates just above this level, and expenditure rates were higher in the Warminsko-Mazurskie OP in Poland and in Thuringia, Germany. More details on the level of allocations and expenditure rates in the water sector for the selected OPs are presented in Figure 3-34.

Figure 3-34 Allocations (EUR million) to water measures in 2008 and 2014, and expenditure rates (%) for the case study OPs



Source: DG REGIO (2016) and Milieu calculations based on DG REGIO (2016)

In Spain (CF-ERDF OP), in 2014 some funding was re-allocated from the water sector to the waste sector. The expenditure rates for drinking water and waste water investments in 2014 were relatively high and amounted to 87% and 71%, respectively, with the overall rate (combining both priority themes) was 75% in 2014. Similarly, the allocations for investments in the water sector in the Andalusia ROP also decreased over the 2007-2013 period. The expenditure rate for the drinking water sector was 53% and for the waste water management investments 62%, with the overall rate of 54% in 2014. The main reasons for the re-allocations out of this sector in Spain were the economic crisis and the budgetary constraints of public administrations.

In Greece, the initial allocations to the priority themes related to water management also decreased in both OPs under assessment. Following the re-allocations, expenditure rates for drinking water and waste water investments in 2014 were relatively high and amounted to 83% and 72% respectively, with the overall expenditure rate for the water sector equal to 74% in 2014.

In Thuringia, allocations were made only to the priority theme 46 on waste water. In 2008, these allocations were EUR 155 million and by 2014 they decreased slightly to EUR 154 million. Nonetheless, the expenditure rate was high and in 2014 it reached 115%. No problems with administrative capacity in this sector were encountered: on the contrary, the authorities spent the available funds available for waste water investments quickly and they were still able to accommodate funds that were left over in other sectors targeted by the OP.

In Poland (Warminsko-Mazurskie OP), the expenditure rate for water investments registered at the end of 2014 was equal to 78% and according to the representative of the relevant Managing Authority, by the end of 2015 it reached approximately 100%. While no administrative capacity issues were identified, two constraints potentially affected the effectiveness of projects in this sector. First, due to the low concentration of the population in the Warmińsko-Mazurskie Region, in some localities it was difficult to achieve the criterion of connecting 120 persons per km of sewerage network, a nation-wide efficiency requirement imposed by a regulation of the Minister of Environment[54]. Second, according to an evaluation report[55], the selection criteria of the OP were formulated in such a way that they prioritised collective systems and could not finance individual waste water treatment systems, which could have addressed waste water issues in low-density areas of the region more efficiently.

3.2.4.3 The role of Cohesion Policy compared to other sources of financing

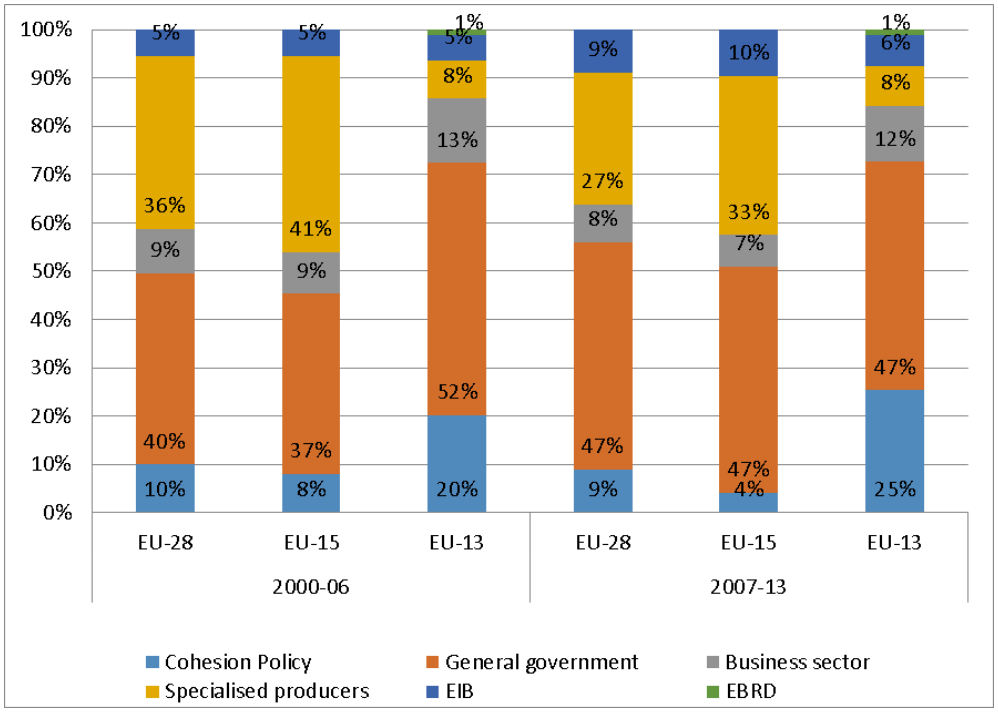
Cohesion Policy funding is a major source of financing for water investments, especially in EU-13. In comparison to other financing sources, Cohesion Policy contributed on average an estimated 25% of the investments in the water sector for the EU-13 countries in the period 2007-2013, where the main financing source for such investments was the national public sector (see Figure 3-35 below) . This percentage is, however, lower for EU-15 countries (4% in 2007-2013) where significant financing came from the governments or specialised producers[56].

[54] Rozporządzenie Ministra Środowiska z dnia 22 lipca 2014 w sprawie sposobu wyznaczania obszaru i granic aglomeracji, O.J. of 2014, item 995.

[55] EGO 2015, Evaluation of impact of the Regional Operational Programme Warmia and Mazury 2007-2013 on development and modernisation of network connections of the Warmińsko-Mazurskie voivodship. (Ocena wpływu Regionalnego Programu Operacyjnego Warmia i Mazury na lata 2007-2013 na rozwój i modernizację połączeń sieciowych województwa Warmińsko-Mazurskiego).

[56] Specialised producers are entities providing environmental services: in this sector they are mainly companies delivering drinking water and waste water treatment services. These may government-owned companies (e.g. owned by local or regional governments), private companies, or have mixed public and private ownership. In some cases, municipal departments may be counted in this category.

Figure 3-35 Comparison of financing sources for water, 2000-06 and 2007-13



Source: own calculations based on DG REGIO, (2016) for Cohesion Policy; Eurostat, General government expenditure by function (COFOG) for general government; Eurostat, Environmental protection expenditure in Europe - detailed data (NACE Rev. 2) for business sector

The role of Cohesion Policy varies across Member States, and in some it appears particularly important. The table below provides rough estimates of the shares of Cohesion Policy funding in total investments in the water sector for selected Member States, based on the results reported in the ex-post evaluation study[57]. For Estonia, Latvia and Hungary, Cohesion Policy provided at least half of all investments for the sector; for at least six other Member States, the share of Cohesion Policy exceeded 35% of all investments. As for the figure above these estimates should be treated with caution as they are based on data sources that use differing methods (see sections 2.3.2- 2.3.3 and Appendix I for further details).

[57] Martens et al (2016), Ex post evaluation of Cohesion Policy Programmes 2007-2013 – Work Package 6 – Environment (study by COWI and partners for the European Commission, DG Regional and Urban Policy), available at:
http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2007-2013/#7

Table 3-4 Estimates of the share of CP funding in overall funding for the water sector, selected Member States

Member State	Share of Cohesion Policy funding in total expenditures for the water sector
Estonia Latvia Hungary	> 50%
Lithuania Bulgaria Malta Romania Portugal Slovakia	> 35%
Slovenia Poland	> 25%

Source: own calculations based on COWI and Milieu, 2016

EIB loans played an important role in the water sector in the 2007-2013 period: they provided approximately EUR 2.5 billion per year, higher than financing from Cohesion Policy.[58] EIB loans play a particularly important role in the EU15: the largest recipients in this period included Finland, Germany, Italy and Spain. In addition, EBRD loans provided relatively small amounts of financing for three EU-13 Member States – Bulgaria, Croatia and Romania.[59]

3.2.5 Results of Cohesion Policy investments

Across the EU, Cohesion Policy investments in the 2007-2013 period improved drinking water supplies for almost 6 million EU citizens and improved waste water treatment for about 7 million[60], thus strengthening implementation of the Drinking Water Directive and the UWWTD (these statistics are based on indicators reported in 2014 and thus the final levels should be higher).

3.2.5.1 The OPs reviewed

Progress towards achieving the relevant indicators for water investments in the OPs covered, however, was mixed. In particular, the fulfilment of the indicators of the OP Cohesion Fund and ERDF (Spain) and the ROPs for Andalusia (Spain) and Attica (Greece) lagged considerably. This is likely due in part to delays in expenditure. Moreover, water investments are often large projects that may take time to become operational. The

[58] Eurostat data are based on expenditure rather than financing and thus do not include loans: these amounts should be reflected in the spending by government and by specialised producers.

[59] More information for 2007-2013 can be found in: Martens et al (2016), Ex post evaluation of Cohesion Policy programmes 2007-2013, focusing on the European Regional Development Fund (ERDF) and the Cohesion Fund (CF), Environment Work Package 6.

[60] Ex post evaluation of Cohesion Policy programmes 2007-2013, focusing on the European Regional Development Fund (ERDF) and the Cohesion Fund (CF) (CF), Work Package 1, Synthesis Report

tables below present results for two core indicators relating to the water sector from the OPs reviewed.

Table 3-5 Selected indicator results based on OPs reviewed: Additional population served by drinking water supply projects

Country	OP	Target	Achievement	Year of reporting
Germany	Thuringia	n/a	n/a	
Greece	Attica	30,000	93.2%	2015
	Environment and Sustainable Development	914,480	298%	2015
Poland	Warminsko-Mazurskie	19,000	113%	2015
Spain	Andalusia	3,080,721	6%	2014
	Cohesion Fund and ERDF	n/a	n/a	

Table 3-6 Selected indicator results based on OPs reviewed: Additional population served by waste water projects

Country	OP	Target	Achievement	Year of reporting
Germany	Thuringia	210,000	49%	2014
Greece	Attica	72,000	33%	2015
	Environment and Sustainable Development	719,322	61%	2015
Poland	Warminsko-Mazurskie	35,000	99%	2015
Spain	Andalusia	n/a	n/a	
	Cohesion Fund and ERDF	n/a	n/a	

Source: AIR for the WMROP 2015 (Poland), Information provided by the Ministry of Economy, Development and Tourism, Unit 'Evaluation of Environmental Sector Operations' (Greece Environment and Sustainable Development)[61], LKN ANALYSIS Ltd, 2015, 3rd Deliverable Project Director EVDEP Attica Region for the closure of the OP Attica 2007-2013, unpublished report (Greece Attica), AIR for the OP Cohesion Fund and ERDF 2014 (Spain), AIR 2014 for Andalusia ROP (Spain), Thuringia AIR 2014 (Germany)

It can be seen that in several cases, the common indicators have not been reported, which makes a more comprehensive analysis of indicator results difficult. Moreover, as indicators refer to different years, it is not possible at this point to draw conclusions across the OPs. In the new financing period (2014-2020), the reporting requirements are made much stricter, which should improve the feasibility and quality of future evaluations.

[61] Interview with a representative of the Ministry of Economy, Development and Tourism, Unit 'Evaluation of Environmental Sector Operations' (Greece) - Special management service of OP "Transport Infrastructure, Environment and Sustainable Development", April 2017.

While investments focused on drinking water and waste water treatment infrastructure, they also covered a range of other activities. The text box below an overview of the water investments made by the OP for Environment and Sustainable Development in Greece.

Text Box 3-2 Water investments in Greece

The national OP for Environment and Sustainable Development financed a broad range of investments in the water sector in the 2007-13 programming period. Key areas included:

- Sewerage networks and wastewater treatment plants in particular for smaller agglomerations (2000 – 15000 p.e.)
- completion of the National Database on Waste Water Treatment Plants
- actions to address water scarcity, including addressing leakages in water supply networks
- improvements in the efficiency and quality of drinking water
- waste water reuse projects
- monitoring of water supplies
- water conservation projects and integrated management
- management of point and non-point source pollution in areas protected by Directive 2000/60/EC (such as drinking water supply areas)

3.2.5.2 Compliance with the Drinking Water Directive

Reporting on compliance with the Drinking Water Directive shows that drinking water quality improved in many Member States over the 2007-2013 programming period (ref Table 3-7). For large water supplies, all Member States considered in the ex-post evaluation study of 2016 reported that over 99% of their samples were compliant with the Directive in 2011/13 in terms of microbiological indicators; for the 2005/7 period, in contrast, five of these Member States were in the lower category of 95-100% compliance (data were not available for Italy in the earlier period, nor for Croatia in either period). Chemical indicators for large water supplies also show improvement: all Member States report for 2011/13 compliance at the level between 99 and 100% while five of the Member States had compliance potentially below 90% in the 2005/7 period. The table below provides more details.

While it is not possible to indicate the extent to which these results are due to Cohesion Policy, many of the improvements that are seen in the EU-13 and in southern EU-15 Member States happened in countries where OP allocations for the water sector were relatively high. This is the case for Estonia, Hungary, Lithuania and Romania, where a significant improvement of chemical indicators for measuring water quality coincides with

relatively high amounts of Cohesion Policy funding per capita allocated in the water sector[62].

Table 3-7 Reporting on compliance with the Drinking Water Directive per Member State

Member State	Microbiological indicators		Chemical indicators	
	2005/7	2011/13	2005/7	2011/13
BG	99-100	99.25	95-100	99.5
CY	95-100	99.01	90-100	99.9
CZ	99-100	99.91	99-100	99.2
DE	99-100	99.88	95-100	99.9
EE	100	99.99	<90-100	99.8
EL	99-100	99.64	95-100	99.5
ES	99-100	99.62	95-100	99.8
FI	99-100	100	95-100	99.6
FR	99-100	99.84	95-100	99.8
HU	95-100	99.71	<90-100	98.6
IE	99-100	99.97	95-100	99.5
IT	:	99.2	:	99.6
LT	100	100	<90-100	99.3
LV	100	99.92	95-100	100
MT	100	100	95-100	99.9
PL	95-100	100	95-100	100
PT	99-100	99.57	95-100	99.9
RO	99-100	99.69	<90-100	99.7
SI	95-100	99.25	99-100	100
SK	95-100	99.52	99-100	100

Source: COWI and Milieu, 2016 and European Commission, Synthesis Report on the Quality of Drinking Water in the EU examining the Member States' reports for the period 2011-2013 under Directive 98/83/EC, COM(2016) 666 final, 20.10.2016

Note: due to differences in reporting, values from 2005/7 and those from 2011/13 are not fully comparable. The lower values for each period are highlighted in blue while the values of 99% or higher compliance are marked red. Selection of Member States according to the ex-post evaluation study (only the Member States with financial allocation of Cohesion Policy in 2007-2013). Data are not available for Croatia.

3.2.5.3 Waste water treatment improvements

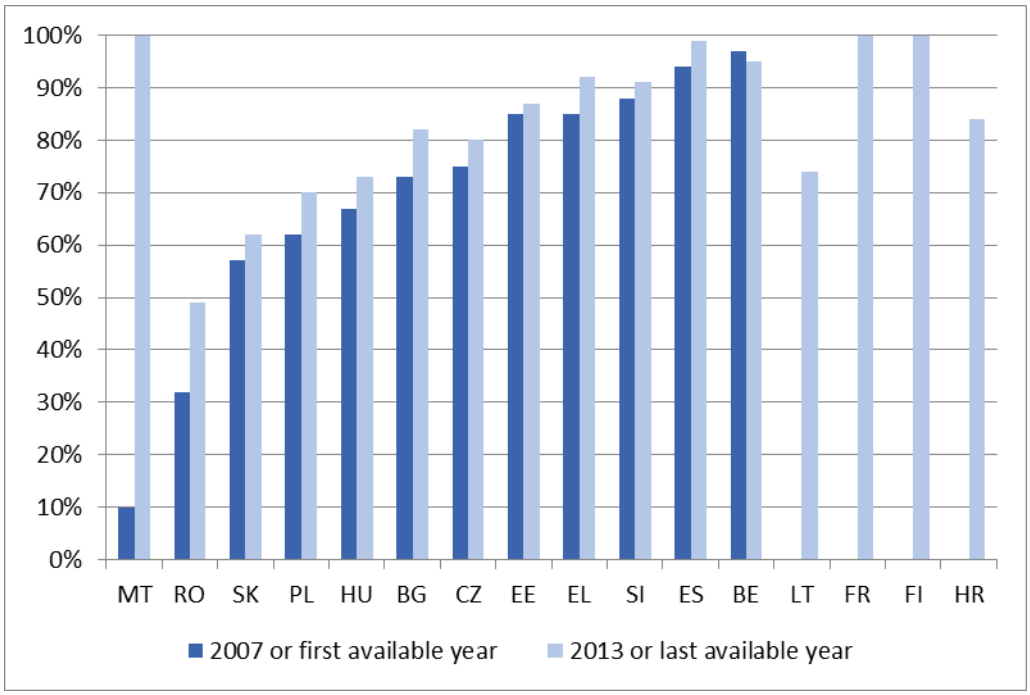
In many Member States, improvements can be seen across several indicators for the provision of waste water treatment: share of population connected, level of secondary treatment and compliance with tertiary treatment. As for drinking water, many of these

[62] Allocations per capita are reported in: Martens B., et al (2016), Ex post evaluation of Cohesion Policy Programmes 2007-2013 – Work Package 6 – Environment (study by COWI and partners for the European Commission, DG Regional and Urban Policy), available at: http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2007-2013/#7

improvements are seen in Member States where OPs had high allocations for water investments; nonetheless, it is not possible to identify the specific share of improvements due to Cohesion Policy.

Member States report to Eurostat on the share of their population connected to waste water treatment. Based on reporting available, eleven of the sixteen Member States for which reporting was available saw an increase in the share of population connected to waste water treatment facilities between 2007 and 2013; in Malta, for example, the difference was dramatic, from 10% to 100% of the population. Figure 3-36 presents more details.

Figure 3-36 Increase in share of population connected to waste water treatment facilities, 2007 to 2013



Source: COWI and Milieu, 2016 (based on Eurostat, Water statistics)

Notes: Germany, Latvia, the Netherlands and Sweden reported 100% connection levels in both 2007 and 2013 and are not shown. For Spain, the first available year is 2008 and the last available year is 2012. For Greece, the last available year is 2012. No data available for Cyprus, Ireland, Italy and Portugal. For Lithuania, data is available only for 2012, for Croatia – only for 2011 and for France and Finland - only for 2013.

It can be seen that most Member States have reached already high rates of connection to waste water treatment facilities in 2007. Therefore, the key challenge was to improve waste water treatment.

Secondary treatment is required under Article 4 of the UWWT Directive for all agglomerations over 2,000 p.e. A considerable improvement can be observed for this Article, from 78% compliance rate in the 6th Implementation Report (2009) to 92% for

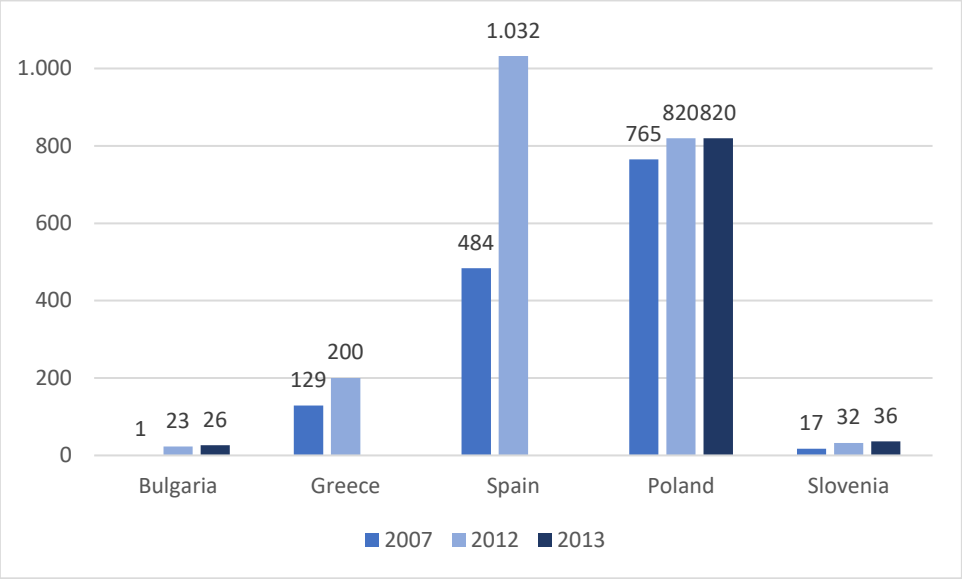
EU-28 Member States in the 8th Report (2013)[63]. Sixteen Member States reached 90-100% compliance, another five had levels of compliance in the range of 50- 90% (Cyprus, Czech Republic, France, Portugal and Spain), and three (Bulgaria, Malta and Slovenia) reached lower levels. Even though the compliance rates in EU-13 Member States are still lagging behind, with an overall rate of 68%, there has been a substantial improvement in comparison to the previous Report of 2011, in which only 39% of the waste waters in this group of Member States received appropriate secondary treatment.

Agglomerations of more than 10,000 p.e. discharging into sensitive areas should provide more stringent treatment, which is interpreted as tertiary treatment and is required under Article 5 of the UWWT Directive. A substantial improvement in compliance rates with this article for EU-28 Member States has been observed, from 76% to 88% over the period 2009-2013. However, due to delays in implementation of more stringent treatment in EU-13 Member States, those Member States showed an average compliance rate of only 32% in 2013. Difficulties in reaching full compliance include the high investment needs and problems with mobilisation of the necessary funding, as well as long and complex procedures for creating new infrastructure and upgrading the existing one.

The number of urban waste water treatment plants with tertiary treatment increased notably in Bulgaria, Greece, Spain and Slovenia (and less markedly in Poland), as shown by the next figure. In three of these countries – Bulgaria, Poland and Slovenia - Cohesion Policy played a key role in contributing to these investments in the 2007-2013 period (see Table 3-4 above); in Spain, Cohesion Policy funding for waste water was particularly high in the 2000-2006 period.

[63] Eighth Report on the Implementation Status and the Programmes for Implementation (as required by Article 17) of the Urban Waste Water Treatment Directive (91/271/EEC) (COM (2016) 105 final).

Figure 3-37 Number of urban waste water treatment plants - tertiary treatment



Source: Eurostat, Environment, Database on water statistics[64]

Note: 2013 data not available for Greece and Spain.

In conclusion, Cohesion Policy resources have played an important role in supporting Member State implementation of the Drinking Water Directive and the Urban Waste Water Treatment Directive. Cohesion Policy allocations for the water sector totalled about EUR 57 billion across the three programming periods. The lion's share of these resources has been allocated for drinking water infrastructure, including treatment plants and distribution networks, and for waste water infrastructure, including sewerage networks and waste water treatment plants. Cohesion Policy played a particularly strong role in EU-13 Member States and southern EU-15 Member States. The decline in allocations to the sector may be linked in part to completion of necessary infrastructure in many Member States.

3.3 Waste management sector

3.3.1 EU policy framework and estimates of investment needs

3.3.1.1 Policy framework

The EU has an extensive body of legislation covering waste collection, treatment and reuse across a range of key waste streams including municipal solid waste, hazardous waste, construction waste and mining waste. Two key directives in the sector are the 1991 Landfills Directive and the 2008 Waste Framework Directive. Requirements in place at the beginning of the 2007-2013 programming period included: by 2009, closure of

[64] Eurostat (2017) Environmental, Database on water statistics, available at: http://ec.europa.eu/eurostat/web/environment/water/database (retrieved 12 May 2017).

landfills that did not meet EU standards; and reduction in the amount of biodegradable MSW sent to landfills. The 2008 Waste Framework Directive then set targets for the recycling of glass, metal, paper and plastic from households, to be met by 2020.

3.3.1.2 Investment needs

In 2007, many EU-15 Member States already had high levels of recycling, and several had closed substandard landfills and reduced landfilling for municipal solid waste. For many of the EU-13 Member States that joined the EU from 2004 onwards, as well as some southern EU-15 Member States, EU requirements necessitated major changes in MSW management and infrastructure. For example, an analysis for the European Commission estimated that, early in the programming period, about two-thirds of Member States operated landfills that did not meet EU standards.[65]

A 2006 study for the European Commission estimated that 8.4 billion Euros of investments would be needed in the EU-12 Member States and three southern European EU-15 Member States to implement EU waste legislation in the period from 2007 to 2013.[66] This represents a broad-brush estimate, however, that does not include the cost of meeting the recycling targets from the 2008 Waste Framework Directive; consequently, it provides at best a rough indication of the investment needs, though it does suggest that investment needs in the waste sector were second only to those in the water sector.

3.3.2 Cohesion Policy allocations and expenditures

This section presents an overview of EU Member States allocations to waste management (see Appendix C for more detailed information about the investment categories included).

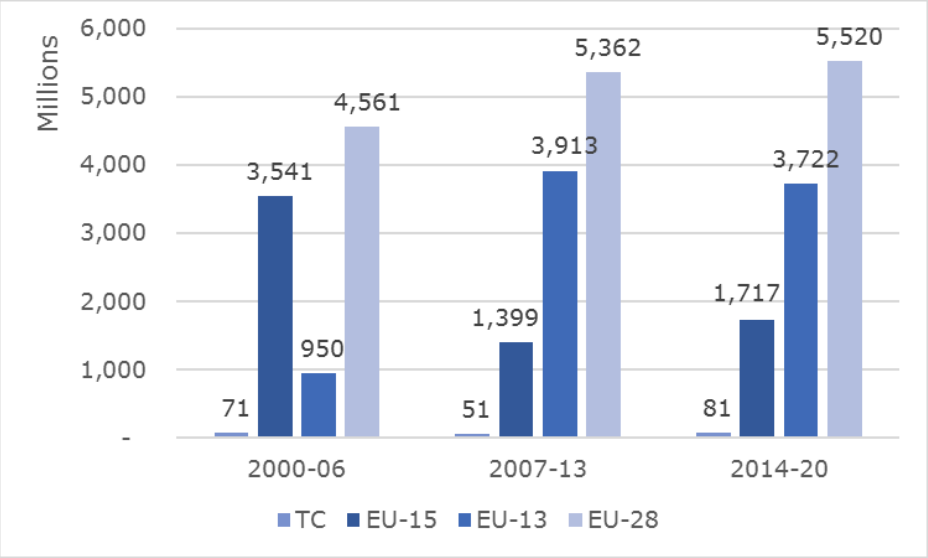
3.3.2.1 Total allocations

Cohesion Policy allocations to waste management measures steadily increased over the three financing periods: from EUR 4.6 billion in 2000-2006 to EUR 5.4 billion in 2007-2013 and EUR 5.5 billion in 2014-2020 (see Figure 3-38). In this sector, opposite trends can be observed in the allocations made by EU-15 and EU-13 countries. While the allocations made by EU-15 countries for this sector decreased from EUR 3.5 billion in 2000-2006 to EUR 1.4 billion in 2007-2013 and to EUR 1.7 billion in 2014-2020, allocations in the EU-13 countries increased from EUR 950 million in 2000-2006 to EUR 3.9 billion in 2007-2013 and EUR 3.7 billion in 2014-2020 (ten of these Member States acceded in 2004, and the three others later, so it is not surprising their allocations were lower in the first period).

[65] BiPRO, Screening of waste management performance of EU Member States, Report prepared for the European Commission, July 2012

[66] GHK and partners, Strategic Evaluation on Environment and Risk Prevention – Synthesis Report (report for DG Regional Policy), November 2006. The study covers: the EU-13 (except Croatia) plus Greece, Portugal and Spain. The study focused on EU requirements related to municipal solid waste.

Figure 3-38 Allocations (EUR million) to waste management across the three financing periods, by group of countries, EU amount

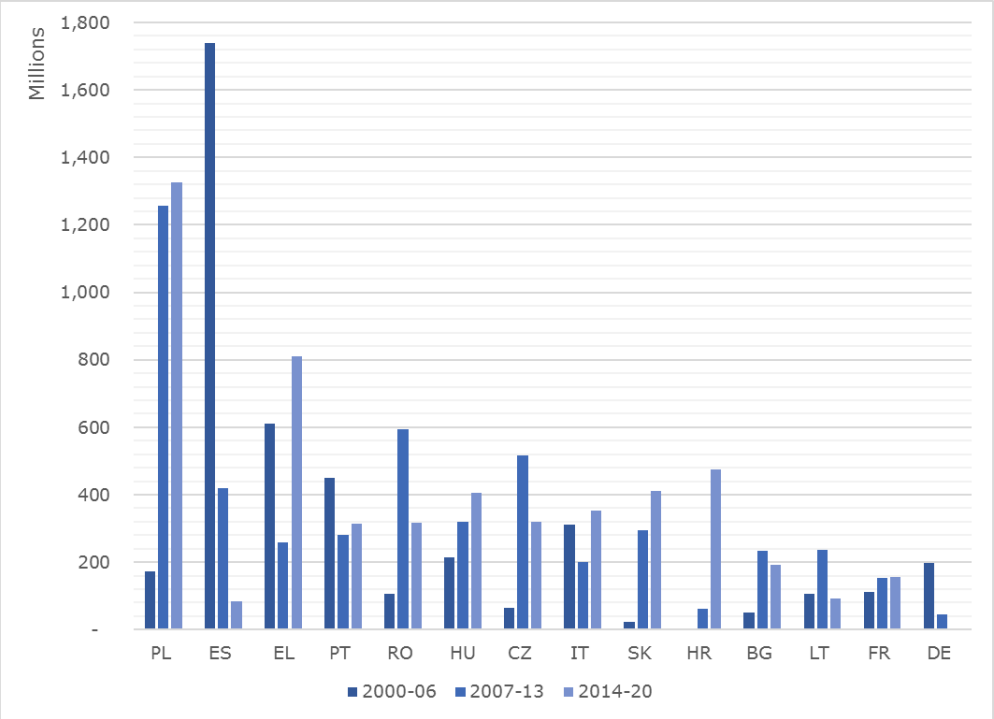


Source: DG REGIO (2016) for 2000-2006 and 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

The countries that have allocated the highest amount of Cohesion Policy resources to waste projects since 2000 are Poland (EUR 2.8 billion), Spain (EUR 2.2 billion) and Greece (EUR 1.7 billion) (see Figure 3-39). However, allocations to waste projects in Poland and Spain follow opposite trends. While Poland, which acceded to the EU in 2004, has increased its allocations from 2000-2006 (EUR 172 million) to 2014-2020 (EUR 1.3 billion) by more than seven times, the decrease of allocations to waste is remarkable in the case of Spain (from EUR 1.7 billion in 2000-2006 to EUR 85 million in the current period).

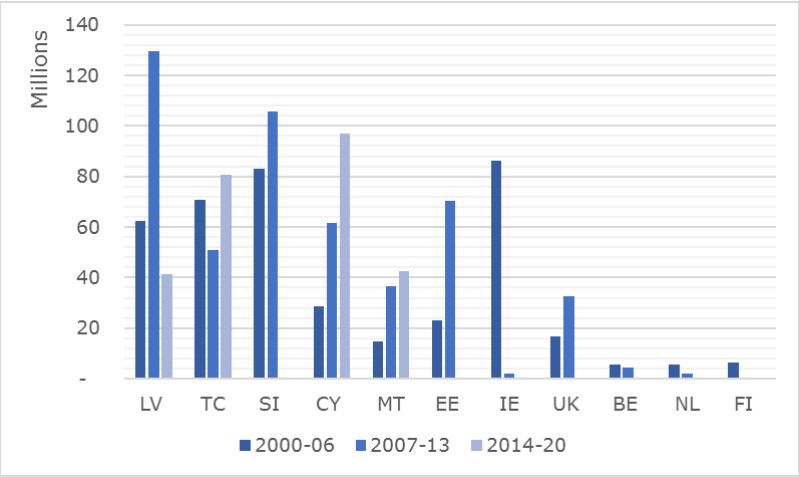
As groups, the EU-15 and EU-13 Member States echoed these trends: for the EU-15, allocations fell drastically from the 2000-2006 programming period to the 2007-2013 period; for the EU-13, they increased significantly across these two periods, though this is less remarkable for, as noted above, most of these Member States joined the EU in 2004. For the 2014-2020 period, allocations remained more or less stable for both groups (see Figure 3-38 above).

Figure 3-39 Allocations (EU amount in EUR million) to waste sector under ERDF and CF by Member State across the three financing periods



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Figure 3-40 Allocations (EU amount in EUR million) to waste sector under ERDF and CF by Member State across the three financing periods (Member States with allocations under EUR 140 million per period)



Source: DG REGIO (2016)

3.3.3 Responding to EU objectives

Four Member State OPs were reviewed for their investments in the waste sector: Bulgaria's national OP Environment, the Czech Republic's national OP Environment, Spain's national OP for the Cohesion Fund and ERDF, and the Attica regional OP in Greece. Their allocations to waste management for the 2007-2013 period ranged from about EUR 450 million for the CZ Environment OP to EUR 43 million for the Attica OP. Bulgaria's OP Environment allocated 17% of its resources to the waste sector, the

highest of the four reviewed; however, this OP focused only on environment, while the overs also covered other areas of spending.

Table 3-8 Allocations to waste management in the OPs reviewed, 2007-2013 programming period

Country	OP	Allocation to waste management (EUR million)	Share of OP allocated to waste management
Bulgaria	Environment	242	17%
Czech Republic	Infrastructure and Environment	453	10%
Greece	Attica	43	2%
Spain	Cohesion Fund - ERDF	297	6%

Source: DG REGIO (2016). Note: Allocations as of end 2014

The review found that only the Bulgarian OP Environment cited EU legislation in the waste sector as a framework for investment planning. The Spanish OP mentioned policy and strategic documents such as the sixth EU *Environment Action Programme* and the EU *Strategy on the prevention and recycling of waste*. However, all four of the OPs reviewed referred to national or regional waste management plans, required by EU legislation, and formulated their priorities in the waste sector based on the needs and objectives defined in those plans. On this basis, the OPs sought to respond to overall EU requirements.

Table 3-9 OP objectives for waste management: policy documents cited in the Operational Programmes reviewed

Country	OP	EU Policy	National Strategic Reference Framework	National policy documents	Regional policy documents
Bulgaria	Environment	✓	✓	✓	
Czech Republic	Infrastructure and Environment		✓	✓	
Greece	Attica		✓		✓
Spain	Cohesion Fund - ERDF	✓	✓	✓	

Source: OPs and information from interviews with Managing Authorities

The waste sector investments supported in the OPs reviewed included waste collection and treatment infrastructure and the closure of old landfills. In terms of facilities, three of the four OPs called for investments to promote waste recycling and recovery, for example for separate waste collection (as in the Czech and Spanish OPs) and for waste composting (in the Bulgarian and Czech OPs): consequently, these investments would be expected to improve implementation of the waste hierarchy set out in EU legislation, which promotes these treatment options over landfilling.

Table 3-10 Key investment priorities for waste management

Country	OP	Key investment priorities
Bulgaria	Environment	Regional systems for waste management Projects for treatment and composting of waste Technical assistance
Czech Republic	Infrastructure and Environment	Separation and collection of waste Processing of biodegradable waste e.g. composting plants, biogas plants, waste treatment and recycling Landfill reclamation projects
Greece	Attica	Restoration of uncontrolled landfills and areas contaminated with hazardous waste
Spain	Cohesion Fund - ERDF	Installations for collecting waste Waste treatment facilities (new facilities and improvement of existing ones) Sealing of landfills Studies/plans in the waste sector

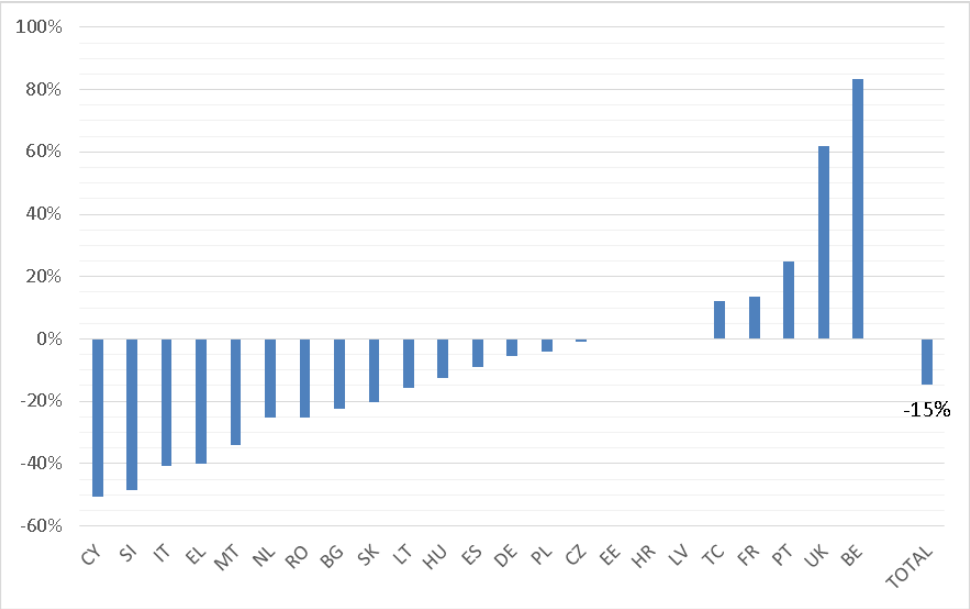
Source: OPs and information from interviews with Managing Authorities

3.3.4 Administrative capacity issues

3.3.4.1 Reallocations and expenditure rates in the 2007-13 programming period

The waste sector saw a large decrease in allocations during the course of the 2007-2013 period (14.8%), compared to other environmental sectors (see section 3.1.3), due to reallocations of funds by the Member States. Over the period, six Member States increased allocations for waste, while 15 Member States reduced allocations (see Figure 3-41).

Figure 3-41 Reallocations in the 2007-2013 financing period, waste sector

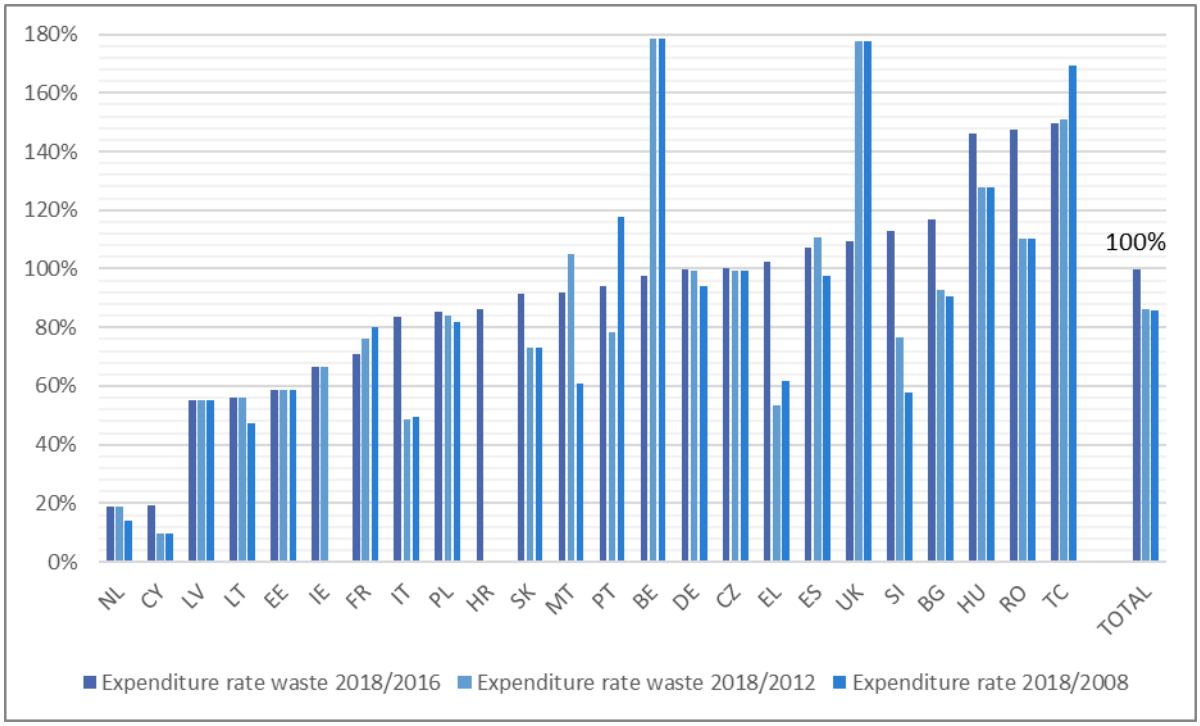


Source: DG REGIO (2016)

Note: Austria, Finland and Luxembourg did not allocate CP funding in waste sector; for Ireland (also not shown), in 2008 there were no allocations to the waste sector while in 2016 the allocation for this sector amounted to EUR 2 million

Overall, by 2018, the rate of expenditure (amount spent compared to allocations) for waste was 100% (compared to 2016 allocations). In seven Member States (see Figure 3-42) as well as for territorial cooperation OPs, expenditure rates were above 100%.

Figure 3-42 Expenditure rate in the 2007-2013 financing period, waste sector



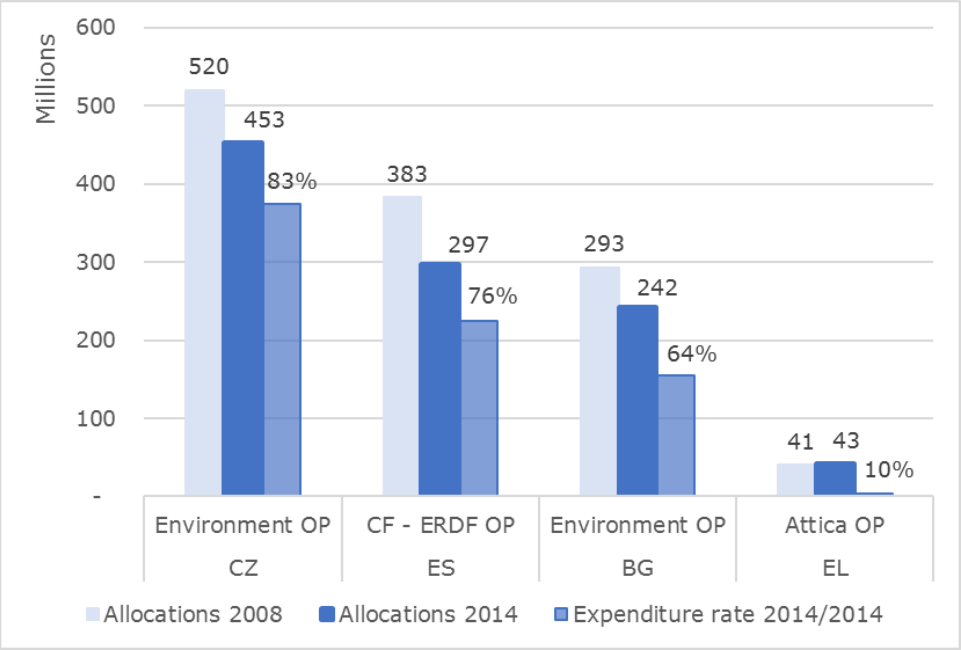
Source: DG REGIO (2016 and 2018)

Note: No OP allocations for waste in Austria, Denmark, Sweden, Finland, and Luxembourg.

3.3.4.2 OPs reviewed

Three of the OPs reviewed had higher levels of expenditure than average for environmental sectors at the end of 2014 (compared to 2014 allocations), with the OP Environment in the Czech Republic reaching 83% - however, all three – in Bulgaria, Czech Republic and Spain – had reduced their allocations to the waste sector through reallocations of funds during the course of the funding period (see Figure 3-43). Consequently, the expenditure rates would be lower than indicated if compared to the original allocations.

Figure 3-43 Allocations (EUR million) to waste management in 2008 and 2014, and expenditure rates (%) for the case study OPs



Source: DG REGIO (2016) and Milieu calculations based on DG REGIO (2016)

In Bulgaria, the expenditure rate for OP Environment was 64%, however, the MA (in this case – the Ministry of Environment and Water in Bulgaria) reported that some administrative challenges were still encountered. The MA clarified that the overall challenges with the implementation of OP Environment 2007-2013 were the delayed adoption of the programme, formulation and adoption of necessary legislative changes to accommodate the implementation of the OP and appeal procedures for the public procurement procedures. In addition, some specific issues were observed in the implementation of the priority axis on waste. These issues included: poor quality of project proposals; problems with the scope of Environmental Impacts Assessments (EIAs) and the issuing of permits; inconsistencies with the scope of the feasibility studies; long period for design; problems with the ownership of the sites; difficulties in organization and implementation of procedures for the selection of contractors under the public procurement procedures; delays in the implementation of construction activities due to the on-site activities that are restricted to certain seasons of the year. In addition, in certain cases the implementation of projects faced popular opposition, which according to the MA were mainly due to misunderstandings and lack of awareness of the nature of the environmental requirements that apply to the design, construction and operation of such facilities. Some legislative changes were also required in order to specify and expand the scope of the definition of 'specific beneficiary' and include the regional waste management associations of municipalities as specific beneficiaries[67].

In the Czech Republic, the expenditure rate of OP Environment in the waste sector in 2014 was the highest among the four OPs reviewed, namely 83%. Nevertheless, the Czech Ministry of Environment reported that delays and non-implementation of large projects were encountered early in the 2007-2013 programming period in the waste sector. Despite substantial reallocations to the water and air sector caused by problems

[67] Information received by the Ministry of Environment and Water (Bulgaria), March 2017.

with two large waste projects concerning incinerators, the OP successfully shifted to finance a large share of smaller projects (up to EUR 200,000) at the end of the period. As a result, the expenditure rate for the waste sector exceeded 100% by 2015[68].

In Spain, the main problems faced with the management and implementation of OP Cohesion Fund and ERDF 2007-2013 were essentially due to the process of budgetary consolidation that lead to budget reductions in the public sector. The budgetary constraints applied at all levels of public administrations had a major impact on the management of the 2007-2013 OPs. Likewise, the economic crisis had a negative effect on the activity of companies. In 2011, the maximum Community co-financing rate was increased from 70% to 80% to address this. Some changes were also made to the OP itself, ranging from simple inter-agency adjustments within the same axis, to changes in the distribution of resources between axes. All these measures were intended to mitigate the risk of loss of EU resources and incorporate new actions into the programme to reinforce its objectives in line with the Europe 2020 Strategy.

In the fourth OP, for the Attica region in Greece, waste projects faced a lack of local acceptance and difficulties in procurement processes, along with delays in incorporating the requirements of the 2008 Waste Framework Directive: one of the factors cited was the need to revise the regional waste management plan to take on board the new requirements. as a result, OP spending focused on the closure of landfills and at the end of 2014 had reached only 10% of allocations for the sector.

Based on the experiences of the four countries reviewed, there are a range of reasons for delays in implementing the waste sector projects as envisioned in the 2007-2013 OPs. Most of these indeed have their roots in administrative capacity to carry out activities such as the management of public procurement procedures and handling of appeals, or the organisation of local and regional authorities to design projects at the strategic level. Other problems seem to be related to financial issues – public sector budgets and the availability of co-financing, especially and local and regional levels. Finally, public opposition is an important issue in the waste sector, often linked to the siting of infrastructure. Here also administrative capacity can be a root cause, if linked to lack of information about projects and their benefits for the communities overall. Other factors, such as those related to the financial or technical design of projects, quality of EIAs, or construction issues rather reflect problems with the technical skills and expertise available to support the preparation and implementation of projects.

These findings are in line with the problems identified in the background study[69] conducted for the ex-post evaluation of Cohesion Policy in the 2007-2013 period. These varied across OPs, but included problems with procurement procedures and a lack of capacity on the part of local governments for the management of waste projects. In addition, in the financial crisis the cost of many waste projects turned out to be lower than anticipated, leaving a surplus budget – but for the implementation of many

[68] Information provided by the Ministry of Environment (Czech Republic) in March 2017.

[69] Martens et al (2016), Ex post evaluation of Cohesion Policy programmes 2007-2013, focusing on the European Regional Development Fund (ERDF) and the Cohesion Fund (CF), Environment Work Package 6

Operational Programmes there was lack of a good pipeline of additional projects to use this surplus.

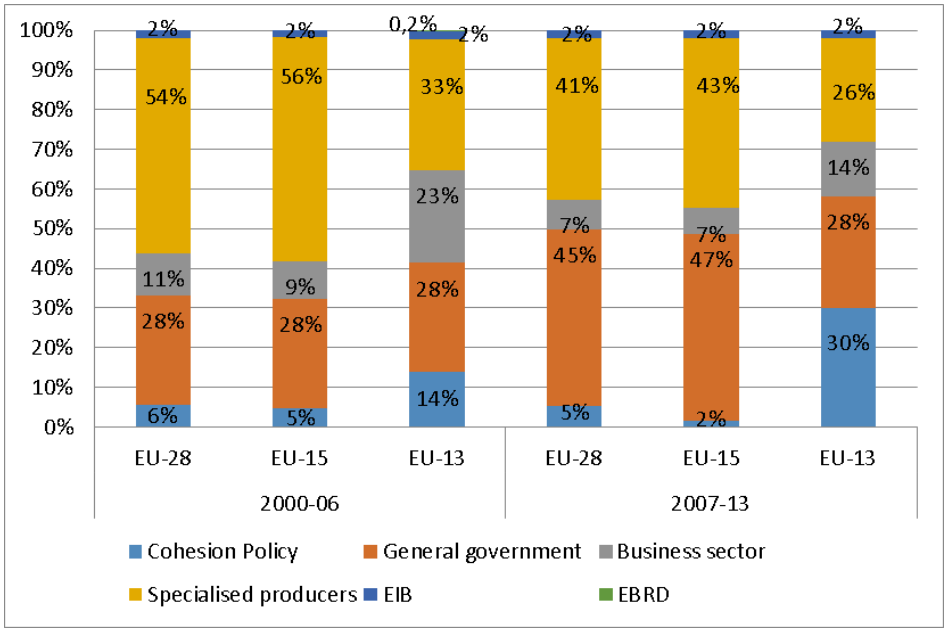
3.3.5 The role of Cohesion Policy compared to other sources of financing

3.3.5.1 Cohesion Policy as a share of total investments

Cohesion Policy played a significant role, in particular in the EU-13, providing an estimated 14% of waste investments in the 2000-2006 period and 30% in the 2007-2013 period. In contrast, for the EU-15 as a whole, Cohesion Policy played a relatively small role: an estimated 5% of investments in the 2000-2006 period and 2% in the 2007-2013 period. Other important financing sources in the period were government funding, specialised producers and the business sector (see Figure 3-44).

As noted previously, these results compare datasets whose accounting methods differ: consequently, the results should be considered as rough estimates (sections 2.3.2- 2.3.3 and Appendix I for information on the datasets used). As for the water sector, Cohesion Policy appears to have played an even larger role in some Member States and regions. In particular, the lower-income cohesion regions received greater resources overall. Moreover, Cohesion Policy investments in the sector have focused on municipal solid waste treatment, and thus appear to have played a particularly strong role in this area.

Figure 3-44 Estimated roles of main financing sources for waste management, 2000-06 and 2007-13



Source: own calculations based on DG REGIO, (2016) for Cohesion Policy; Eurostat, General government expenditure by function (COFOG) for general government; Eurostat, Environmental protection expenditure in Europe - detailed data (NACE Rev. 2) for business sector

Note: The different data sources followed different accounting approaches. Consequently, the results presented in the figure represent broad estimates. Specialised producers include public and private companies providing waste collection and treatment services (municipal departments operating in this field may be included in some cases).

Even though estimates for the period 2014-20 are not available, it can be expected that the role of Cohesion Policy funding remains similar to that in the previous period given the similar overall amounts available for the waste sector in both programming periods.

Funding for solid waste projects was also provided by the EIB – around EUR 2 billion in total were provided for solid waste in the EU between 2007 and 2013[70].

3.3.5.2 Co-financing of Cohesion Policy resources

For projects supported under Cohesion Policy, most of the co-financing came from public sources rather than private-sector sources. The co-financing rates for the waste sector in the OPs reviews were high in the period 2007-2013 ranging from 80% in Spain to nearly 100% in Attica. In Bulgaria, Cohesion Policy funding for investments in the waste sector was complemented with funding from the state and municipal budgets and the Bulgarian-Swiss Cooperation Programme in the period 2007-2013. In the Czech Republic, Cohesion Policy funding for waste was complemented with public resources. In Spain, waste investments under the OP Cohesion Fund and ERDF were co-financed with state resources in the period 2007-2013.

3.3.6 Results of Cohesion Policy investments

In three of the four OPs reviewed, Cohesion Policy financed investments in waste recycling and composting, thus supporting implementation of the EU waste hierarchy (as well as the recycling targets for municipal solid waste, introduced in the 2008 Waste Framework Directive).

The Czech OP Environment, for example, financed the construction of many new facilities: 502 compositing plants, 10 biogas stations, 449 separate collection sites, and 1398 facilities for waste separation[71]. Bulgaria's OP Environment supported integrated projects that significantly changed waste management practices, which before accession was based largely on landfills, many of which did not meet EU standards (see the box below). Spain's OP for Cohesion Policy and ERDF similarly financed new facilities for MSW composting and recycling.

Text Box 3-3 Financing integrated waste management in Stara Zagora, Bulgaria

Financing integrated waste management in Stara Zagora, Bulgaria

Bulgaria's OP Environment provided EUR 25 million (EU contribution) for an integrated project for municipal waste management in the city of Stara Zagora and the surrounding area, serving a population of just under 350,000. The project financed a new landfill meeting EU standards, a waste separation facility, a composting plant and an installation for construction and demolition and other large waste, as well as a facility for the temporary storage of hazardous waste.

[70] EIB, 2017, Projects financed, Multi-criteria list, website:
http://www.eib.org/projects/loan/list/?from=2007&region=1&sector=2060&to=2013&country=

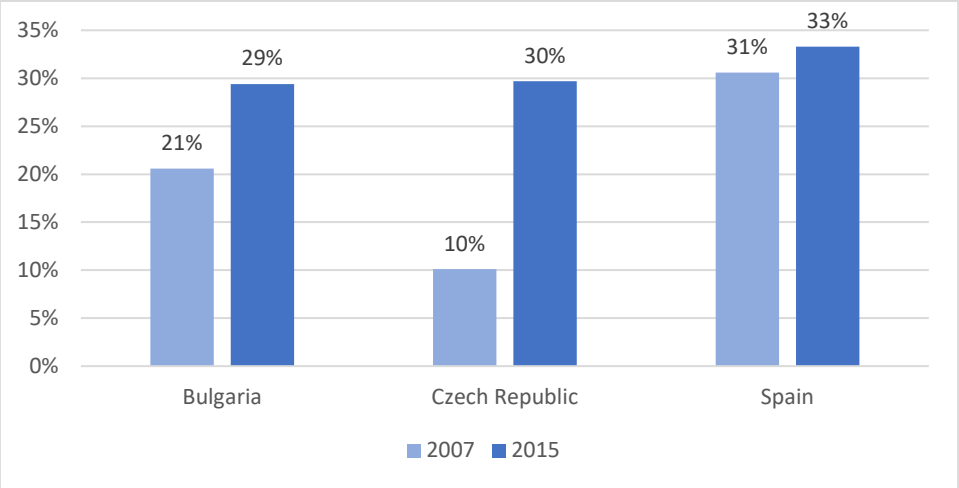
[71] Evaluation of area 4.1 - Improvement of Waste Management, Priority Axis 4 of the Operational Program Environment 2007-2013, http://www.opzp2007-2013.cz/soubor-ke-stazeni/56/17018-zhodnoceni_po_4_1.pdf

All four of the OPs reviewed financed the closure of old landfills that did not meet EU standards: the Czech OP Environment, for example, financed the closure of 77 such landfills[72].

A focus on recycling was also seen in many projects financed in the 2000-2006 period. The European Court of Auditors (2012)[73] reviewed 26 projects financed during this period. Seven of the 26 projects financed landfills (both the construction of new ones and the closure and rehabilitation of old ones). In addition, the following main project types:

- sorting plants that can separate recyclables;
- composting and anaerobic digestion plants;
- mechanical biological treatment facilities that separate recyclables as well as biological waste and treat biological waste;
- separate collection systems.

Figure 3-45 Recycling rates for municipal solid waste



Source: Eurostat, Environmental Data Centre on Waste[74]

Note: The recycling rate is the tonnage recycled from municipal waste divided by the total municipal waste arising. Recycling includes material recycling, composting and anaerobic digestion.

With many investments to support waste recycling, it is reasonable to assume that an increase in recycling rates would be a key result of the OP implementation. In three of the four Member States whose OPs were reviewed, recycling rates for municipal solid

[72] Evaluation of area 4.1 - Improvement of Waste Management, Priority Axis 4 of the Operational Program Environment 2007-2013, http://www.opzp2007-2013.cz/soubor-ke-stazeni/56/17018-zhodnoceni_po_4_1.pdf

[73] European Court of Auditors (2012), Is Structural Measures Funding for Municipal Waste Management Infrastructure Projects Effective in Helping Member States Achieve EU Waste Policy Objectives?, Special Report No 20

[74] Eurostat (2017) Environmental Data Centre on Waste, Turning Waste into a Resource data, available at: http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/resource-efficiency-indicators/resource-efficiency-scoreboard/thematic-indicators/transforming-the-economy/turning-waste-into-resource#recycling-rate (retrieved 12 May 2017).

waste indeed increased over the 2007-2015 period[75]. The largest increase is observed in the Czech Republic where recycling grew from 10% to 30% (see the figure above). Investments in the 2007-2013 programming period may lead to further increases in recycling levels as additional facilities become operational.

Questions have been raised, however, about the use of Cohesion Policy resources to finance waste-to-energy incinerators. For example, Hjerp *et al.* (2011)[76] analyse in their study a project in Czech Republic for the construction of a municipal waste incinerator in Karvina[77], financed by the Czech OP Environment 2007-2013. In addition to EU Cohesion Policy financing, the project received financing through a commercial loan, an EIB loan, as well as state, regional and municipal funds. This project is in line with the Czech national waste management plan, as modified in 2009, which highlights incineration as waste management option, and it reduces municipal waste sent to landfill. Nevertheless, the promotion of waste incinerators can lead to a potential technological lock-in that hinders high recycling rates. In a recent Communication, the European Commission has underlined that:

> *'Waste-to-energy processes can play a role in the transition to a circular economy provided that… choices made do not prevent higher levels of prevention, reuse and recycling….*
>
> *The Commission remains committed to ensuring that EU funding and other public financial support is directed towards waste treatment options that are in line with the waste hierarchy, and that priority is given to waste prevention, reuse, separate collection and recycling.'*[78]

In addition, policy instruments play a key role in ensuring the effectiveness of waste investments, including those for recycling. In its review of 26 waste management facilities in Italy, Portugal, Romania and Spain during the period 2000-2006, the European Court of Auditors (2012)[79] concluded that overall there was an improvement in the management of waste. However, the report found that the effectiveness of waste management projects co-financed by EU structural funds was in many regions hampered by the poor implementation of policy measures: awareness campaigns, quality

[75] Data for Greece is not available after 2012. However, pre-2012 Eurostat data indicates the recycling rate of municipal waste remained stable at around 20% (e.g. it was 20% in 2007 and 19% in 2012). Moreover, the Attica OP invested in landfill closure but not the construction of new facilities, such as those that could support greater recycling.

[76] Hjerp, P., Medarova-Bergstrom, M., Cachia, F., Evers, D., Grubbe, M., Hausemer, P., Kalinka, P., Kettunen, M., Medhurst, J., Peterlongo, G., Skinner, I. and ten Brink, P., (2011) Cohesion Policy and Sustainable Development: Supporting Paper 4: Case Studies, An Annex to the Final Report. A report for DG Regio, October 2011.

[77] The official name of the project is 'Regional integrated centre for recovery of municipal wastes in the Moravian-Silesian Region'.

[78] European Commission, The role of waste-to-energy in the circular economy, COM(2017)34 final, January 2017

[79] European Court of Auditors (2012), Have EU Structural Measures successfully supported the regeneration of industrial and military brownfield sites?, Special Report No. 23

standards, separate collection or 'pay as you throw' schemes and landfill taxes were highlighted as key measures to support the compliance with EU waste requirements. These were needed to, for example, ensure an adequate supply of separately collected waste to composting or recycling plants.

Examples of good practice cited by the EU Court of Auditors include the communication campaign for sorting and collection of biodegradable waste ran by a Portuguese composting plant (LIPOR); here, the company operating the composting plant also developed a specific marketing strategy for the compost, carried out public satisfaction surveys and distributed waste management guidelines. In Catalonia, some municipalities provided discounts to the waste management tariff paid by households linked to levels home composting, the use of collection centres or participation in campaigns.

In terms of indicators the four OPs reviewed contained both common and programme-specific indicators for the waste sector. The Bulgarian and Czech OPs performed best, achieving or showing significant progress towards their indicator targets. In Bulgaria, OP Environment included one output indicator (focused on the number of waste management systems) and one result indicator aimed to measure improvements in access of the population to regional waste management services. Both indicators were achieved by the end of 2015. Similarly, in the Czech Republic, OP Environment included one output indicator (focused on the number of projects in the sector) and three result/impact indicators that reflected the volumes of different waste streams. By the end of 2015, all the indicators were achieved except one (proportion of municipal waste used), which was almost completely met. This progress was achieved despite the administrative challenges reported by the MAs in the two countries suggesting that encountering challenges during the implementation of the OPs does not automatically lead to poor results.

In contrast, at the end of 2015 the Spanish and Greek OPs covered had not fulfilled their waste indicators for the 2007-2013 programming period. In Spain, the national OP defined several indicators for the waste sector in the period 2007-2013. However, they were differentiated according to the general objectives of the Cohesion Policy funds and focused exclusively on outputs (e.g. number of projects). As such these indicators provided little information about the environmental impacts of the investments in the waste sector. By 2014, none of the relevant indicators were met.

In Greece, three relevant indicators were defined in ROP Attica. Two of those indicators focused on outputs (e.g. number of projects in the sector) and were not met by 2015. The only result indicator that was included in the ROP and focused on the share of treated solid waste was revised to have a target value of zero in 2015 to reflect the fact that no waste management or recycling infrastructure projects were implemented.

In conclusion, the results from the OP reviews as well as other sources show that a broad range of Cohesion Policy investments have supported the implementation of EU waste requirements, including the promotion of waste recycling and recovery as well as the closure of old landfills. As noted, it has not been possible to capture an aggregated overview of the results of investments made in the 2007-2013 programming period in the data available. At the same time, there is evidence that Cohesion Policy investments have improved waste management: it is notable that three of the four OPs reviewed used result indicators and went beyond the common waste indicator for the 2007-2013 period,

which focused on outputs (number of projects) and did not provide clear information of results.[80]

3.4 Nature protection and biodiversity

3.4.1 EU policy framework and estimates of investment needs

3.4.1.1 Policy framework

The EU legal framework for nature protection is set out in the Birds and Habitats Directives, and requires Member States to create and manage a network for protected areas, the Natura 2000 network.

The EU's 2011 Biodiversity Strategy sets out targets to halt the loss of biodiversity and ecosystems services in the EU by 2020, including via the implementation of EU nature protection legislation. The full implementation of the EU Nature Directives and of the Natura 2000 network is an important element for the achievement of the Strategy's targets.

3.4.1.2 Investment needs

While Member States have the main responsibility for financing the Natura 2000 network, Art. 8 of the Habitats Directive (92/43/EEC) explicitly calls for EU co-financing where Member States identify needs.

The 2011 Biodiversity Strategy calls for 'better uptake and distribution of existing funds for biodiversity', highlighting funds available under Cohesion Policy, though the Strategy also refers to other sources including the LIFE Programme and EU funds for rural development and fisheries[81]. The Strategy presents a broad estimate that EUR 5.8 billion of funding, including both EU level and Member State resources, would be needed per year to implement the Natura 2000 network, including for management plans and conservation measures[82]. To further promote the uptake of Cohesion Policy funding for the implementation of nature and biodiversity investments in the EU, the Commission

[80] Martens B., et al (2016), Ex post evaluation of Cohesion Policy Programmes 2007-2013 – Work Package 6 – Environment (study by COWI and partners for the European Commission, DG Regional and Urban Policy), available at: http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2007-2013/#7

[81] For sustainable agriculture and forestry, the Strategy also highlights the role of the EU's rural development funding, as well as the Fisheries Fund for sustainable fisheries. The Strategy also highlights the need for further funding to meet global targets under the Nagoya Protocol and indicates mechanisms such as climate finance, mainly for measures outside the EU. In addition, the EU's Strategy on Green Infrastructure, linked to the Biodiversity Strategy, was published in 2013. This Strategy also indicates a role of Cohesion Policy for financing; while its publication came at the end of the 2007-2013 financing period, green infrastructure is relevant for the current period and moreover is explicitly cited in the title of a Cohesion Policy intervention field.

[82] The Strategy bases this estimate on: Kettunen et al., 2011, Assessment of Natura 2000 co-financing arrangements of the EU financing instrument. A project for the European Commission – final report. Institute for European Environmental Policy (IEEP), Brussels, Belgium.

published a *SMART Guide to multi-benefit Cohesion Policy investments in nature and green infrastructure* in 2013[83].

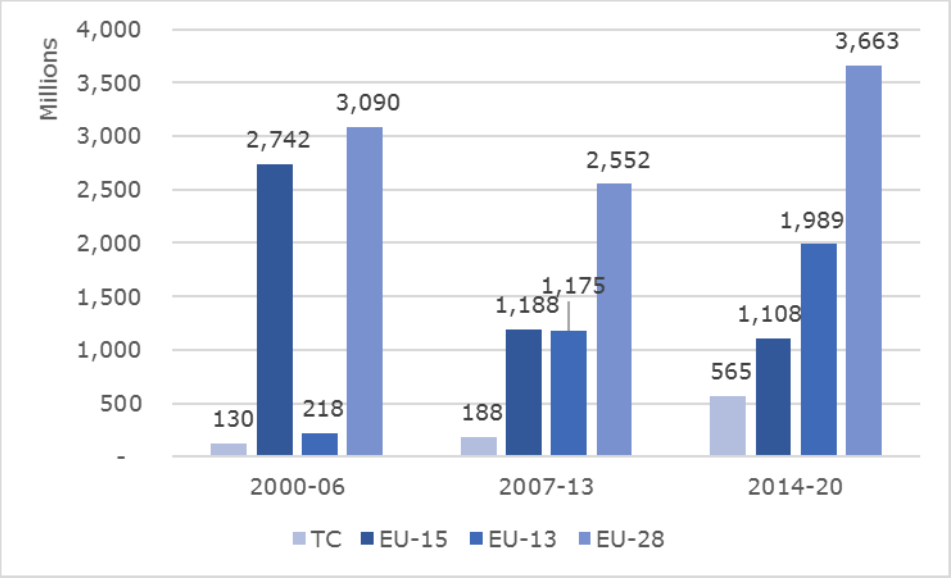
3.4.2 Cohesion Policy allocations and expenditures

This section presents an overview of EU Member States allocations to nature protection, biodiversity, and Natura 2000 sites[84] (see Appendix C for more detailed information about the investment categories included).

3.4.2.1 Total allocations

Cohesion Policy allocations for nature protection and biodiversity were EUR 3.1 billion in the 2000-2006 financing period. They fell to EUR 2.6 billion in the 2007-2013 period; however, initial allocations in the 2014-2020 period have risen to nearly EUR 3.7 billion (see Figure 3-46).

Figure 3-46 Allocations (EUR million) to biodiversity across the three financing periods, by group of countries, EU amount



Source: DG REGIO (2016) for 2000-2006 and 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Notably, allocations in the EU-13 rose sharply across all three periods, even when considering that the accession of these Member States started in 2004, mid-way through

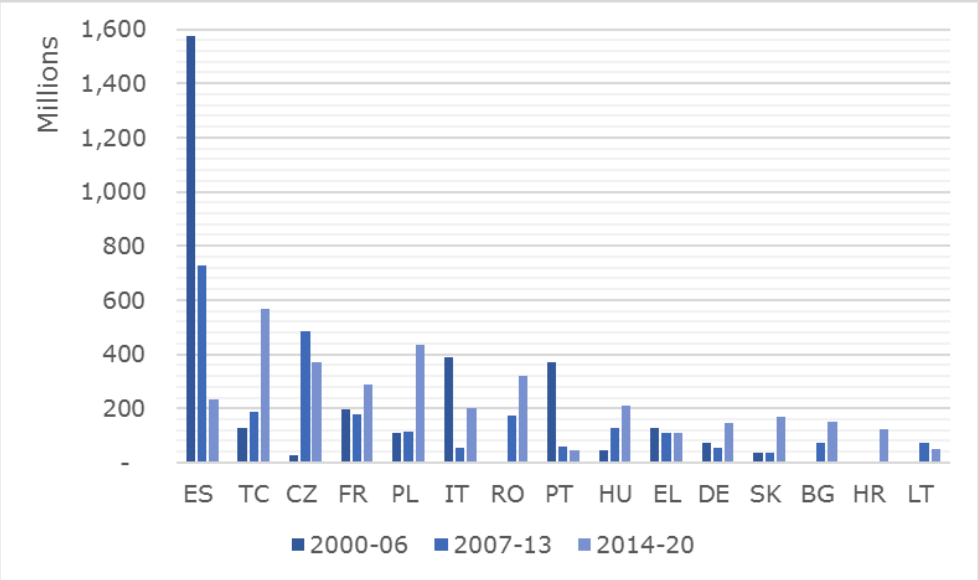
[83] IEEP and Milieu, 2013, The guide to multi-benefit Cohesion Policy investments in nature and green infrastructure, June 2013

[84] In the 2000-2006 programming period as well as the 2014-2020 period, two spending categories are covered; for the 2007-2013 period, however, only one category is provided and consequently information is aggregated for all three periods.

the first programming period. Moreover, allocations by territorial cooperation (TC) programmes to nature increased sharply in the 2014-2020 period.[85]

In terms of individual Member States, total allocations to nature protection across the three periods have been the highest in Spain (EUR 2.5 billion). The second largest amount (EUR 883 million) of Cohesion Policy funds for biodiversity has been allocated under Territorial Cooperation (TC) programmes (see Figure 3-47). Although EU-15 countries as a group decreased their allocations to nature protection across the three periods, a few Member States (e.g. France, Germany and the UK) have increased their allocations to biodiversity in the current period (see Figure 3-47 and Figure 3-48). EU-13 countries have followed an opposite trend and increased allocations to biodiversity throughout the three periods (see Figure 3-46); notably, many EU-13 Member States increased spending in the 2014-2020 period – for example, allocations in Poland rose more than three times.

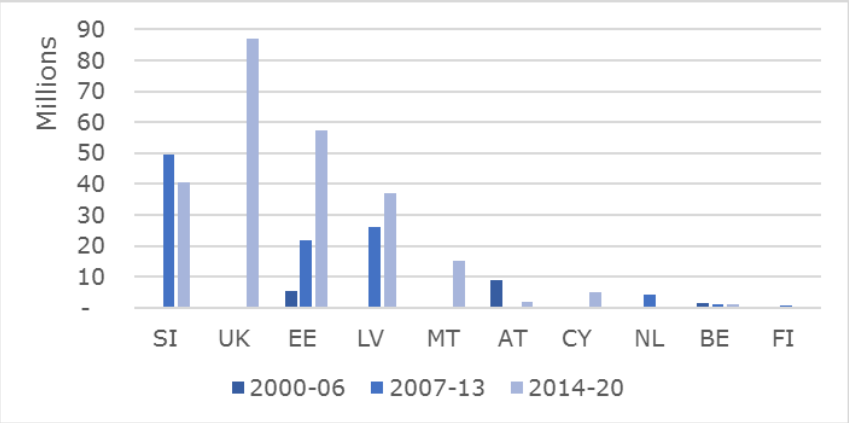
Figure 3-47 *Allocations (EU amount in EUR million) to biodiversity and nature protection under ERDF and CF by Member State across the three financing periods (allocations above EUR 100 million per period)*



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

[85] The spending categories for the 2014-2020 period specifically include green infrastructure, which had not been identified in the categories for previous periods: future research might assess whether part of the increase in this period results from green infrastructure investments.

Figure 3-48 Allocations (EU amount in EUR million) to biodiversity and nature protection under ERDF and CF by Member State across the three financing periods (allocations below EUR 100 million in each period)



Source: see Figure 3-47

3.4.3 Responding to EU objectives

3.4.3.1 Total spending levels

In the 2000-2006 programming period, a total of 11% of Cohesion Policy resources for direct environmental investments were allocated for nature protection. The share fell to 5% in the 2007-2013 period, but grew to 10% in the 2014-2020 period.

A 2010 review of 46 OPs[86] concluded that, even though there was potential to include biodiversity in all of the OPs, this potential was not fully realised. Notably, the lack of earmarking of funds for nature protection and biodiversity other than under the LIFE programme was identified as constraint for EU funding in the sector. As Member States are not obliged to programme specific financing for Nature 2000 under different EU funds this can result in relatively low levels of allocation in the context of national programmes.

Furthermore, the Habitats Directive foresees the development of Prioritised Action Frameworks (PAFs) that outline conservation measures for Natura 2000 and link those measures to EU co-financing[87]. For the 2014-2020 period, the European Commission promoted the greater use of PAFs for programming EU resources and developed a guidebook on financing Natura 2000 for this.[88]

At the same time, investments beyond the spending categories for nature protection can also support biodiversity. A 'Rio marker' system could be used to estimate the total

[86] SURF Nature report, 2011: European Regional Development Funding for biodiversity: An analysis of selected operational programmes, available at: http://www.surf-nature.eu/fileadmin/SURFNATURE/Publications/Surf_analysisV4.pdf

[87] European Commission, 2016, Integration of Natura 2000 and biodiversity into EU funding (EAFRD, ERDF, CF, EMFF, ESF). Analysis of a selection of operational programmes approved for 2014-2020, available at: http://ec.europa.eu/environment/nature/natura2000/financing/docs/Natura2000_integration_into_EU%20funds.pdf

[88] IEEP and Milieu, 2013, The guide to multi-benefit Cohesion Policy investments in nature and green infrastructure, June 2013

contribution. A recent study for DG Environment[89] proposed shares of spending for biodiversity and nature – either 100%, 40% or 0% - for the intervention categories in the 2014-2020 programming period. On this basis, an estimate was prepared of total biodiversity allocations[90]: EUR 17.1 billion in this period, significantly higher than the EUR 3.7 billion allocated under the codes specifically for biodiversity and Natura 2000. (Conversely, spending in areas such as roads can have negative impacts on environment[91], though these issues should be addressed in environmental impact assessments for specific projects.)

3.4.3.2 OPs reviewed

For this sector, OPs for 2007-2013 were reviewed in three Member States: the OP Environment in Bulgaria, the OP Infrastructure and Environment in Poland and the Andalusia Regional OP in Spain. In addition, the Alpine Space Cooperation Programme was reviewed.

Table 3-11 Allocations to nature protection in the OPs reviewed, 2007-2013 programming period

Country	OP	Allocation to nature protection (EUR million)	Share of OP allocated to nature protection
Bulgaria	Environment	81	6%
Poland	Infrastructure and Environment	90	0.3%
Spain	Andalusia	233	3%
Territorial Cooperation	Alpine Space	5	5%

Source: DG REGIO (2016). Note: Allocations as of end 2014

The research plans also included two additional OPs: the Warminsko-Mazurskie regional OP in Poland, and the Veneto regional OP in Italy. It turned out, however, that the Warminsko-Mazurskie OP did not allocate financing to the priority theme 51 related to biodiversity. In Veneto, the initial allocation to this theme amounted to EUR 3.5 million but subsequently it was reduced to zero[92].

The three Member State OPs reviewed (in Bulgaria, Poland and Spain) all cited either EU policy and legal documents such as the Birds and Habitats Directives or national legislation transposing them in their investment planning. In contrast, the Alpine Space

[89] Medarova-Bergstrom, K., et al (2014) Tracking Biodiversity Expenditure in the EU Budget, Part I – Guidance on definition and criteria for biodiversity expenditure in the EU budget, Final Report for the European Commission – DG ENV, Institute for European Environmental Policy, London/Brussels. Available at: http://ec.europa.eu/environment/nature/biodiversity/pdf/financing_part_1.pdf

[90] Medarova-Bergstrom, K., et al (2015)

[91] European Environment Agency (2009), Territorial cohesion: Analysis of environmental aspects of the EU Cohesion Policy in selected countries, Technical Report No 10/2009, Copenhagen

[92] For the Veneto OP, due to internal changes and rotation of the staff within the Regional administration, it was not possible to identify the person responsible for this part of the OP and to investigate the reasons of re-allocation.

Programme did not cite the EU policy and legal framework for nature conservation, though it referred to national strategic reference documents of Member States that did.

Table 3-12 OP objectives for nature protection: policy documents cited in the Operational Programmes reviewed

Country	OP	EU Policy	National Strategic Reference Framework	National policy documents	Regional policy documents
Bulgaria	Environment	✓	✓	✓	
Poland	Infrastructure and Environment	✓	✓	✓	
Spain	Andalusia	✓	✓	✓	✓
Territorial Cooperation	Alpine Space		✓ *		

Source: OPs and information from interviews with Managing Authorities
*Note: * The Alpine Space Programme cites the NSRFs of participating Member States*

In the 2007-2013 financing period, Cohesion Policy resources were used in the three Member State OPs reviewed for a broad range of investments: preparation of management plans (a key step for the management of Natura 2000 sites) as well as species and habitats protection programmes; restoration and maintenance of ecosystems; public awareness of the impact of human activities on the environment; and the development of appropriate tourist infrastructure.

Table 3-13 Key investment priorities for nature protection

Country	OP	Key investment priorities
Bulgaria	Environment	Development of management plans for Natura 2000 sites Implementation of conservation measures Awareness raising and administrative support Addressing forest fires in protected areas *
Poland	Infrastructure and Environment	Preparation of management plans for protected areas Preparation of protection programmes for species and habitats in protected areas Restoration and maintenance of ecosystems Public awareness Development of appropriate tourism infrastructure
Spain	Andalusia	Activities within the Natura 2000 network: construction of facilities for public information, construction of infrastructure for the improvement of species conservation and restoration of habitats and species Biodiversity projects and activities outside the Natura 2000 network Addressing forest fires: surveillance systems and mechanisms for fire fighting Prevention and control of wildlife diseases Adjustments of river flows
Territorial Cooperation	Alpine Space	Joint actions for conservation and integrated management of biodiversity and cultural landscapes Development of management tools for protected areas

Source: Operational Programmes and interviews with Managing Authorities
*Note: * Added in the first revision of the OP*

The Alpine Space Programme in contrast focused on somewhat different areas, including the development of common management tools as well as promoting ecological

connections among protected areas: strengthening connectivity has been an area for investment also by other territorial cooperation programmes[93].

3.4.3.3 Literature review

The European Court of Auditors (2014)[94] reviewed 32 biodiversity and nature protection projects financed by Cohesion Policy in the 2007-2013 period. Of these, about one-third (11) covered preparatory actions including the elaboration of management plans for sites and species, mapping and other work to establish baselines, and public awareness activities. The remaining 21 projects invested directly in measures for biodiversity and nature, conservation, restoration and protection (many of these also included awareness and other components).

An EEA study provides a case study from the 2000-2006 financing period: the regional OP for Campania in Italy financed 28 projects for biodiversity protection in this period, for a total value of about EUR 13 million. Of these, 15 projects carried out restoration activities, and others supported animal rescue centres. Resources were also spent to promote nature tourism and local development linked to natural areas[95].

These sources, as well as the OPs reviewed, show that Cohesion Policy investments have focused on protected areas, including Natura 2000 sites. Key types of investment actions include the preparation of management plans, restoration activities themselves and also activities to support visitors (some investments under sustainable tourism may also cover these areas, in particular support for tourism in natural areas – see section 3.8.3 below).

3.4.4 Administrative capacity issues

3.4.4.1 Reallocations and expenditure rates in the 2007-13 programming period

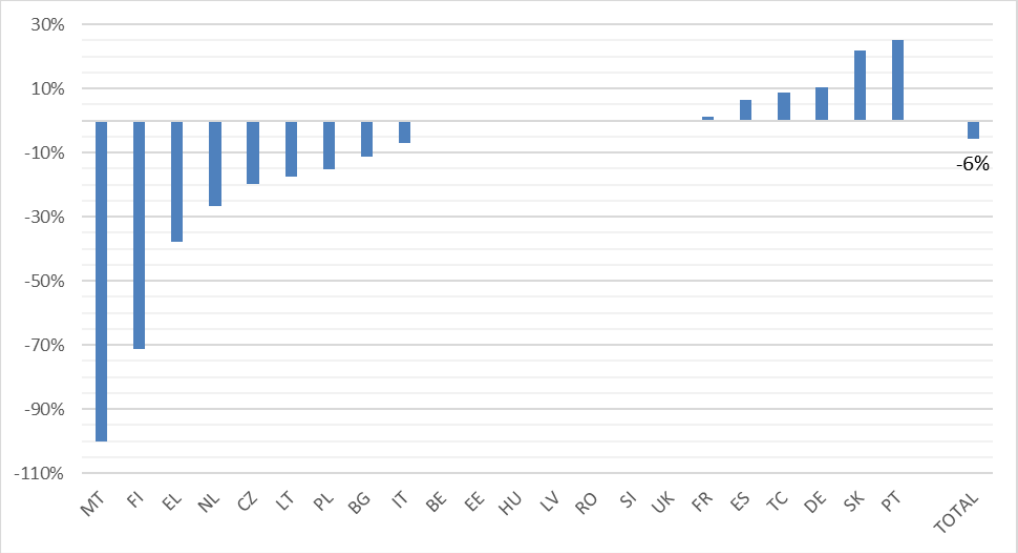
Overall, allocations for nature protection and biodiversity fell 5.8% during the course of the 2007-2013 programming period due to funding reallocations by Member States. Five Member States (along with transboundary cooperation OPs) saw an increase in allocations over this period, while nine Member States saw reductions (see Figure 3-49).

[93] Hjerp, P. et al, (2011) Cohesion Policy and Sustainable Development, A report for DG Regio, October 2011.

[94] European Court of Auditors (2014), Is the ERDF effective in funding projects that directly promote biodiversity under the EU biodiversity strategy to 2020?, Special Report No. 12

[95] European Environment Agency (2009), Territorial cohesion: Analysis of environmental aspects of the EU Cohesion Policy in selected countries, Technical Report No 10/2009, Copenhagen

Figure 3-49 Reallocations in the 2007-2013 financing period, biodiversity and nature protection



Source: DG REGIO (2016)

Note: Austria, Cyprus, Croatia and Luxembourg did not allocate CP funding in the biodiversity sector

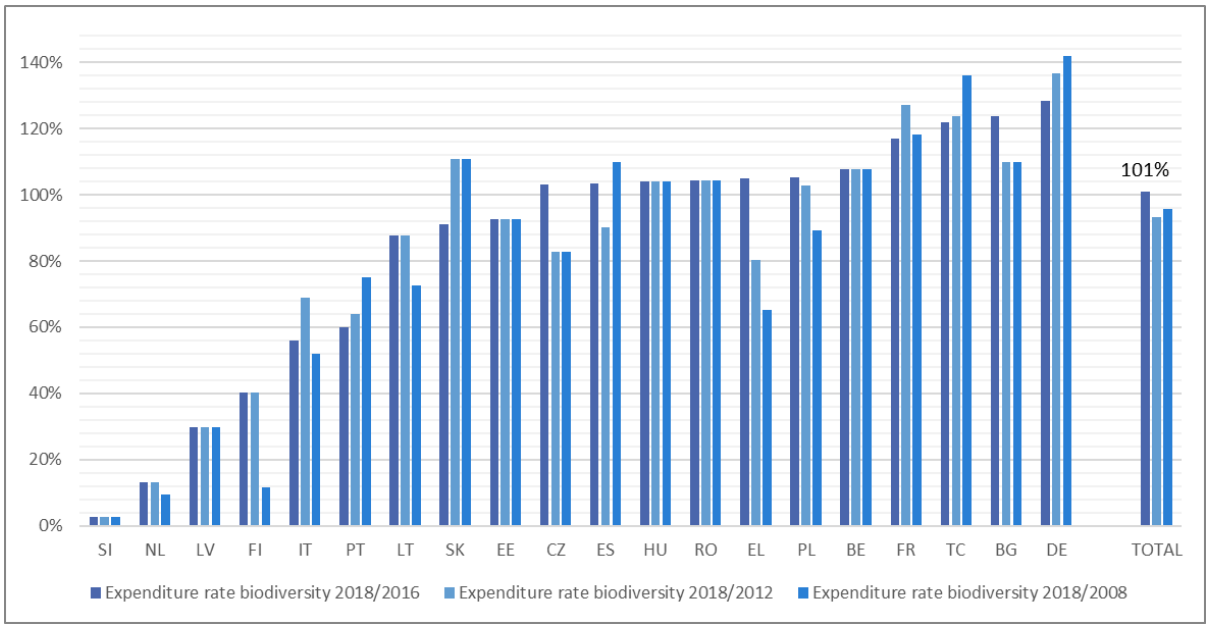
Previous reports have concluded that administrative capacity can be an issue for the implementation of nature conservation projects financed via Cohesion Policy: this was stated by the EU Court of Auditors[96]; and the SURF Nature study identified a lack of capacity on the part of national administrators and stakeholders to absorb EU funding for the sector[97]. In the study workshop (February 2017), participants noted that many nature and biodiversity projects were implemented by local governments and NGOs, bodies that often lack capacity for project and financial management. Moreover, a further issue cited is that projects in this sector are small compared to those for water and waste infrastructure, for example, and consequently project planning and design can represent a higher share of total costs.

The rate of expenditure for nature protection in the 2007-2013 period does not, however, indicate that administrative capacity may be a major issue: across all Member States, final expenditure for nature protection had reached 101% of allocations(see Figure 3-50). Most Member States as well as territorial cooperation programmes achieved expenditure rates above 100% (see Figure 45). In Slovenia, the Netherlands, Latvia, and Finland, however, the expenditure rate was below 50%.

[96] European Court of Auditors (2014), Is the ERDF effective in funding projects that directly promote biodiversity under the EU biodiversity strategy to 2020?, Special Report No. 12

[97] Fitness Check of the EU Nature Legislation (Birds and Habitats Directives), SWD(2016) 472 final

Figure 3-50 Expenditure rates in the 2007-2013 financing period, biodiversity and nature protection



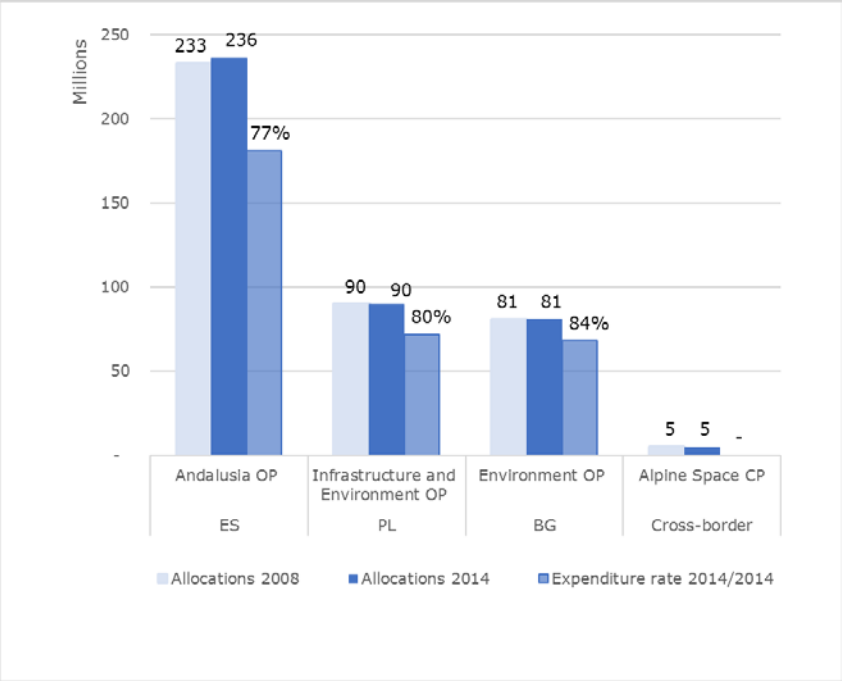
Source: DG REGIO (2016 and 2018)

Note: No OP allocations for biodiversity and nature protection in Austria, Denmark, Cyprus, Ireland, Malta, Luxembourg, Croatia and Sweden; UK removed due to problems with data (UK allocations constituted only approximately 0.003% of total OP allocations).

3.4.4.2 OPs reviewed

The data on reallocations and spending rates of the OPs reviewed, suggests that administrative capacity does not appear to have been a major obstacle for them in the 2007-2013 period. The OPs reviewed in Bulgaria, Poland and Spain all had achieved spending levels around 80% in this area by the end of 2014 – greater than the average environmental expenditure rate. Moreover, these three OPs by and large had not reduced their allocations for nature conservation throughout the programming period. (Information about the expenditure rate of the Alpine Space CP is not available, and its allocations for nature protection and biodiversity changed little.)

Figure 3-51 Allocations (EUR million) to biodiversity and nature protection in 2008 and 2014, and expenditure rates (%) for the case study OPs



Source: DG REGIO (2016) and Milieu calculations based on DG REGIO (2016)

Note: data on expenditures for the Alpine Space Cooperation Programme is not available.

Interviews with the Managing Authorities of these four OPs indicated that the OPs reviewed had set up appropriate mechanisms to ensure administrative capacity. In Bulgaria, the Ministry of Environment supported potential recipients with capacity building. In Poland, a national Coordination Centre for Environmental Projects supported the selection and coordination of biodiversity projects financed by the national OPIE. CEEWeb points out that this institution created clear selection criteria and carried out a transparent and well-structured approach to the management and monitoring of implementation of nature protection projects; in contrast the national Coordination Centre did not support regional OPs in Poland, and as a result many had greater difficulty managing their resources for nature and biodiversity[98]. The good practices in Bulgaria and Poland (at national level), with designated national bodies supporting project development in the sector, illustrate ways to address potential administrative issues related to nature and biodiversity spending.

3.4.5 The role of Cohesion Policy compared to other sources of financing

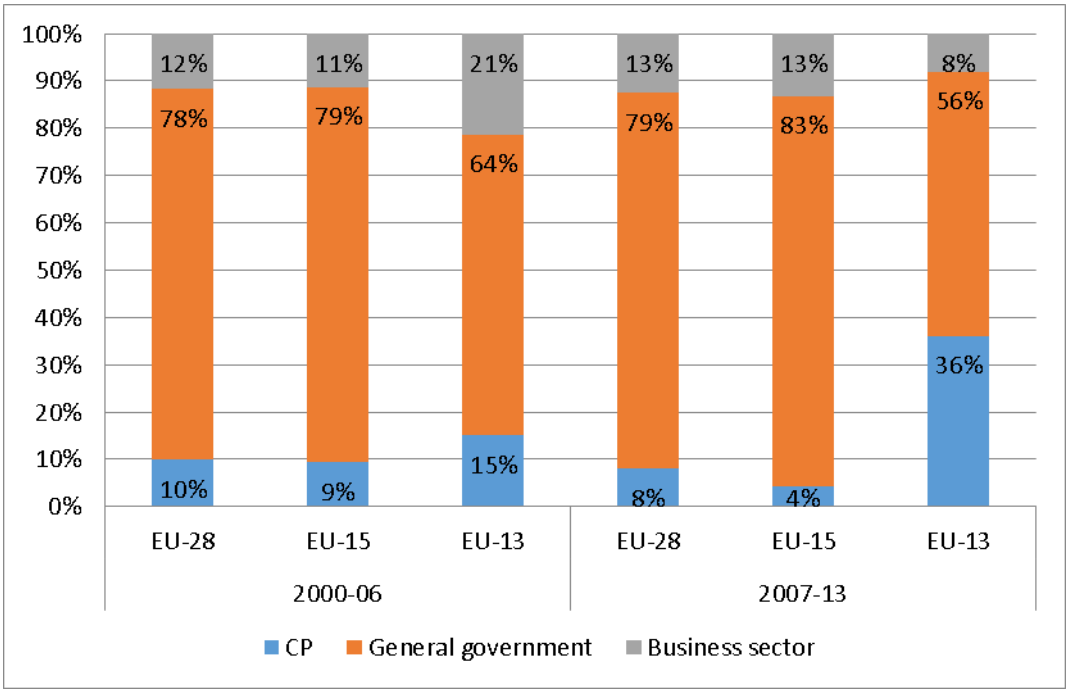
3.4.5.1 Cohesion Policy as a share of total investments

While in the 2000-2006 programming period, Cohesion Policy appeared to provide just under 10% of total financing for nature protection in the EU-15, it already reached about 15% for the EU-13 in this period (though their accession only started in 2004). For the 2007-13 period, the difference appeared to have been even greater, and Cohesion Policy provided more than one-third of all nature protection investments in the EU-13, but less than 5% in the EU-15 (see Figure 3-52). As noted in section 3.1, these results represent

[98] http://www.ceeweb.org/wp-content/uploads/2012/01/Financing_Nature_CEE_experience.pdf

estimates based on data sources that use different methods: consequently, they show overall trends and patterns rather than detailed results.

Figure 3-52 Comparison of financing sources for nature protection investments, 2000-06 and 2007-13



Source: own calculations based on DG REGIO, (2016) for Cohesion Policy; Eurostat, General government expenditure by function (COFOG) for general government; Eurostat, Environmental protection expenditure in Europe - detailed data (NACE Rev. 2) for business sector

Nonetheless, this comparison shows that Cohesion Policy played a key role in supporting nature protection investments in EU-13 Member States, where ERDF and the Cohesion Fund together provided an estimated one-third of financing for investments for this sector in the 2007-2013 programming period. Even though specific earmarking of EU funds for nature protection and biodiversity is not in place, Member State can successfully use the opportunities provided by the Cohesion Policy funds to invest in nature protection and biodiversity. Moreover, it is expected that in some Member States, Cohesion Policy played an even stronger role than the EU-15 and EU-13 averages shown below (due to the differences in sources, statistical results at Member State level would not be reliable).

3.4.5.2 Other sources of EU funding

Member States had access to other sources of EU financing for nature investments, including the LIFE Programme as well as the European Agricultural Fund for Rural Development (EAFRD).

The total EU resources for EAFRD were approximately EUR 96 billion for the 2007-2013 programming period. During the same period, the EU Member States allocated on average 45% of their EAFRD budget to Axis 2 devoted to 'improving the environment and the countryside'. [99] Within Axis 2, EUR 22.5 billion was allocated to agri-environment payments, while direct allocations to Natura 2000 measures[100] equalled EUR 518.4 million for the 2007-2013 period.[101] It should be however noted that agri-environment payments can contribute to biodiversity conservation objectives.[102] Other EAFRD spending, including for forests, rural tourism and rural heritage can also contribute to nature and biodiversity protection. The specific spending patterns are determined at national and regional levels. Nevertheless, there has been criticism that some rural development programmes have had an insufficient design of management requirements in relation to conservation objectives[103].

Indicative allocations to nature and biodiversity under LIFE+ during the years 2007-2013 were estimated to be EUR 858 million[104]. Of this amount, EUR 700 million was estimated to be most likely to benefit Natura 2000.[105]

Cohesion Policy provided allocated EUR 2.5 billion for nature protection and biodiversity spending categories in the 2007-2013 period. Consequently, ERDF and the Cohesion Fund provided the largest source of EU financing for nature protection in this period, if compared to the amount provided by EARDF specifically for Natura 2000 measures. Overall EARDF support for agri-environmental measures was of course much larger than Cohesion Fund and ERDF financing for nature protection. The Cohesion Fund and ERDF financing was almost three times the resources provided by LIFE+.

The role of the different funds can of course vary across Member States and regions. In Latvia, for example, EAFRD was used for investments at Natura 2000 sites but not the Cohesion Fund or ERDF. In Andalusia (Spain), on the other hand, the regional OP provided 47% of the contribution made by European funds to environmental projects in

[99] European Commission, Directorate-General for Agriculture and Rural Development, 2012, 'Chapter 4: Overview of the EU Rural Development Policy 2007-2013', in: *Rural Development in the EU Statistical and Economic Information Report 2012*, available online at https://ec.europa.eu/agriculture/sites/agriculture/files/statistics/rural-development/2012/ch4_en.pdf

[100] Categories 213 'Natura 2000 payments and payments linked to Directive 2000/60/EC' and 224 'Natura 2000 payments' under Axis 2 are considered as direct allocations to Natura 2000. Within Axis 2, allocations to category 213 and 224 were equal to 1% and 0.2% respectively during the period 2007-2013.

[101] Authors calculations based on figures from European Commission, Directorate-General for Agriculture and Rural Development, 2012, 'Chapter 4: Overview of the EU Rural Development Policy 2007-2013', in: *Rural Development in the EU Statistical and Economic Information Report 2012*.

[102] Kettunen et al., 2011, Assessment of the Natura 2000 co-financing arrangements of the EU financing instrument. Project for the European Commission – final report, Institute for European Environmental Policy (IEEP), Brussels, Belgium.

[103] Fitness Check of the EU Nature Legislation (Birds and Habitats Directives), SWD(2016) 472 final

[104] Authors' calculations based on figures from European Commission, 2011, Impact Assessment Accompanying the document Proposal for a Regulation on the establishment of a Programme for the Environment and Climate Action (LIFE), SEC(2011) 1542 final, Brussels 12.12.2011.

[105] European Commission, 2011, Impact Assessment Accompanying the document Proposal for a Regulation on the establishment of a Programme for the Environment and Climate Action (LIFE), SEC(2011) 1542 final, Brussels 12.12.2011.

Andalusia, and was the most important out of all EU funds for environmental projects in the region. In comparison, EAFRD represented 26% of funding, and the EU Cohesion Fund represented 4%. Lastly, the European Social Fund's contribution was 1%.[106] Thus, resources for nature and biodiversity investments are available from several EU funds. Compared to the estimate in the EU Biodiversity Strategy that EUR 5.8 billion of funding would be needed per year to implement the Natura 2000 network, however, EU Cohesion Policy provided only a limited share of the estimated resources needed between 2007 and 2013.

3.4.5.3 Co-financing of Cohesion Policy resources

Member State governments were the main other source of financing for nature protection.

As noted, one problem encountered in several Member States has been a lack of national resources for operational expenses once Cohesion Policy investments are implemented (this has also been the case for investments supported by other EU sources, such as the LIFE Programme).

3.4.6 Results of Cohesion Policy investments

The OPs reviewed in Bulgaria and Poland exceeded their targets in terms of the number of management plans developed and habitat or species projects undertaken (the box below provides an overview of project results in Bulgaria as of 2013). In Bulgaria and Andalusia, OPs also financed investments to fight forest fires in protected areas.

[106] Interview with Managing Authority

Text Box 3-4 Achievements of Bulgaria's OP Environment for nature conservation

Achievements of Bulgaria's OP Environment for nature conservation

A 2015 report[107] summarised key results achieved at the end of 2013:

- Nearly 70% of the zones from the Natura 2000 network and 228 zones according to Habitats Directive were mapped.
- The status of 119 species and 87 types of habitats protected under the Habitats Directive was assessed
- A unified system was created for public information on the status of protected areas and for coordination
- Management plans for 47 protected territories and 19 action plans for rare and protected plant and animal species came into force.
- Management plans for 59 protected areas were being developed or updated.
- 34 km of eco-paths were created or restored.
- Activities for the restoration of more than 100 habitats and eight species were implemented.

Territorial Cooperation Programmes have played an important role in supporting nature protection, providing almost EUR 200 million in allocations in the 2007-2013 programming period and almost EUR 600 million in the 2014-2020 period. The box below provides examples of projects supported by the Alpine Space Programme.

The OPs reviews by and large did not provide information on improvements in natural conditions resulting from Cohesion Policy investments. This reflects conclusions on OP indicators for this sector made by previous studies. The SURF nature report[108] showed that, although the majority of the OPs analysed identified biodiversity as an important issue and contained needs analyses, they lacked suitable indicators. In particular, the relevant indicators were not sufficiently clear or useable. Furthermore, the EU Court of Auditors noted that almost all nature projects assessed in its study used physical output indicators – for example, on hectares of reforestation or other activities – together with project output indicators, such as the number of projects financed. The Court noted, however, that result indicators were by and large not employed: consequently, it is difficult to describe the impact of Cohesion Policy in terms of improved habitat and species conditions. Moreover, such improvements themselves may not be visible for several years after investments are completed and OPs are closed.

Text Box 3-5 Examples of nature and biodiversity projects supported by TC programmes

[107] Second Report on the monitoring and control of the impact on the environment as a result of the implementation of Operational Programme 'Environment' 2007-2013 (for the period 01.01.2011 – 31.12.2013), Directorate Cohesion Policy for Environment, Ministry of Environment and Water, 2015, available at: http://ope.moew.government.bg/bg/pages/otsenka-na-programata/61#1 (viewed 9 Mar 2017).

[108] SURF Nature report, 2011: European Regional Development Funding for biodiversity: An analysis of selected operational programmes, available at: http://www.surf-nature.eu/fileadmin/SURFNATURE/Publications/Surf_analysisV4.pdf

The Alpine Space Programme supported joint actions for conservation and integrated management of biodiversity and cultural landscape and the development of joint management tools for protected areas (see the table below).

Table 3-14 Biodiversity projects financed by the Alpine Space CP

Project Title	Objective
ECONNECT - Improving Ecological Connectivity in the Alps	enhancement of ecological connectivity and an ecological continuum in the Alpine space.
recharge.green - Reconciling Renewable Energy Production and Nature in the Alps	analyse impacts of renewable energy production on biodiversity in the Alpine region and find solutions to minimise them
GreenAlps - Valorising connectivity and sustainable use of resources for successful ecosystem management policies in the Alps	Surveyed the efficiency and effectiveness of nature conservation instruments, from the European to the municipal level, with the goal to stimulate pro-nature governance changes in Alpine countries.

Source: Alpine Space website[109]

Other examples from territorial cooperation programmes include projects oriented towards ecosystem services and ecological networks. Hjerp *et al.* (2011)[110] report several such projects financed by the Cohesion Policy funds during the 2007-2013 financing period. These include the Natureship project in Southern Finland, Sweden, Estonia and Latvia, financed by the Central Baltic Interreg IVA Programme: the project focused on ecosystem services for integrated sustainable coastal planning, and it supported management of traditional rural biotopes in city areas. The Tidal River Development (TIDE) project between Germany, England, Belgium and the Netherlands, financed by the Interreg IV B North Sea Programme, aimed to identify knowledge gaps in hydrology, morphology and ecology, and to ensure that the objectives of the nature directives and the Water Framework Directive were both achieved in tidal river zones.

This trend is observed also for the indicators in the four OPs covered in this study. All four OPs covered defined only output indicators measuring the number of projects financed in different areas e.g. number of Natura 2000 management actions or number of biodiversity conservation actions. Although these indicators were largely exceeded, they provide very limited information as to the actual impact on nature.

Overall, Cohesion Policy (especially ERDF) appears to have provided a major contribution to supporting the Natura 2000 network, in particular in the EU-13 Member States. Cohesion Policy financed the preparation of management plans as well as projects for habitat and species protection. In addition, Cohesion Policy investments supported visitor infrastructure in protected areas. While Member States had access to other EU funds, notably EARDF and LIFE+, to support nature protection and biodiversity, overall Cohesion

[109] http://www.alpine-space.org/2007-2013/projects/projects/index.html (viewed 9 May 2017).

[110] Hjerp, P. et al, (2011) Cohesion Policy and Sustainable Development, A report for DG Regio, October 2011.

Policy (i.e. the Cohesion Fund and ERDF) was the largest single source of EU support for Natura 2000 sites in the 2007-2013 programming period.

Although several previous studies identified administrative capacity as an obstacle for this sector, the OPs reviewed for this study did not find such problems: on the contrary, in both Bulgaria and Poland national institutions ensured adequate capacity to carry out projects in this sector. A further issue, however, is that several Member States have faced difficulties ensuring domestic resources for operational costs in protected areas after completing projects co-financed by EU funding.

3.5 Land rehabilitation

3.5.1 EU policy framework and estimates of investment needs

3.5.1.1 EU Policy

The European Commission's Thematic Strategy for Soil Protection (COM(2006)231) warns that 'soil degradation is a serious problem in Europe': key factors include erosion, urban sprawl and contaminated sites. Concurrently with the Strategy, the Commission presented a legislative proposal for a Framework Directive on Soil, which would have called on Member States to develop inventories of their contaminated sites along with national remediation strategies and to promote the reuse of former industrial 'brownfield' sites. The proposed Directive was, however, withdrawn in 2010.

Consequently, while soil and land issues – including problems of contaminated sites and related issues – had been identified as a European policy issue in this period, the EU does not have binding requirements concerning land rehabilitation, included contaminated sites.[111] As noted by the European Court of Auditors (2012), there are no standards at the EU-level to determine whether a site constitutes a significant risk for human health and soil or water.[112] Nonetheless, the Community Strategy Guidelines for the 2007-13 programming period included 'the decontamination of land to prepare it for new economic activities' among potential spending areas.[113]

A closely related issue is the safe closure of old landfills, which is regulated by the EU Landfills Directives (see section 3.3). Section 3.3 above shows that Cohesion Policy financed the closure of landfills that did not meet EU standards under spending categories for solid waste management. However, there may be overlaps in spending between categories. Where former landfills were not officially authorised, or where their owner or operator has gone bankrupt, they become abandoned, contaminated sites, and their rehabilitation may have been financed under spending categories for land rehabilitation.

[111] The EU's Seventh Environmental Action Programme (2013) subsequently set a goal that by 2020, 'land is managed sustainably in the Union, soil is adequately protected and the remediation of contaminated sites is well underway targets on soil and land as a resource'.

[112] European Court of Auditors (2012), Have EU Structural Measures successfully supported the regeneration of industrial and military brownfield sites? Special Report No. 23.

[113] Council Decision on Community strategic guidelines on cohesion (2006/702/EC), 6 October 2006

3.5.1.2 Investment needs

EU-wide information on the extent of contaminated sites – sites with local soil contamination and, potentially, groundwater contamination – is incomplete. The 2006 Thematic Strategy cited estimates from the European Environment Agency that the EU had a total of 3 million potentially contaminated sites, of which about 250,000 would contain contamination.

A 2014 study by the Commission's Joint Research Centre gave a broadly similar estimate of 2.5 million potentially contaminated sites in Europe, including EU Member States and other countries[114]; of these, about 340,000 were estimated to be contaminated and likely require remediation. These figures were extrapolated based on information from only one-third of the countries: many EU Member States and other European countries are still at an early stage of mapping potentially contaminated sites[115].

Consequently, an EU-wide estimate of total costs for the cleanup of contaminated sites and their rehabilitation and reuse was not available for the 2007-2013 programming period (and is not available now). Nonetheless, the estimates of the number of contaminated sites indicate that these costs reach billions of Euros, though the priority given to cleanup remains a Member State policy choice.

3.5.2 Cohesion Policy allocations and expenditures

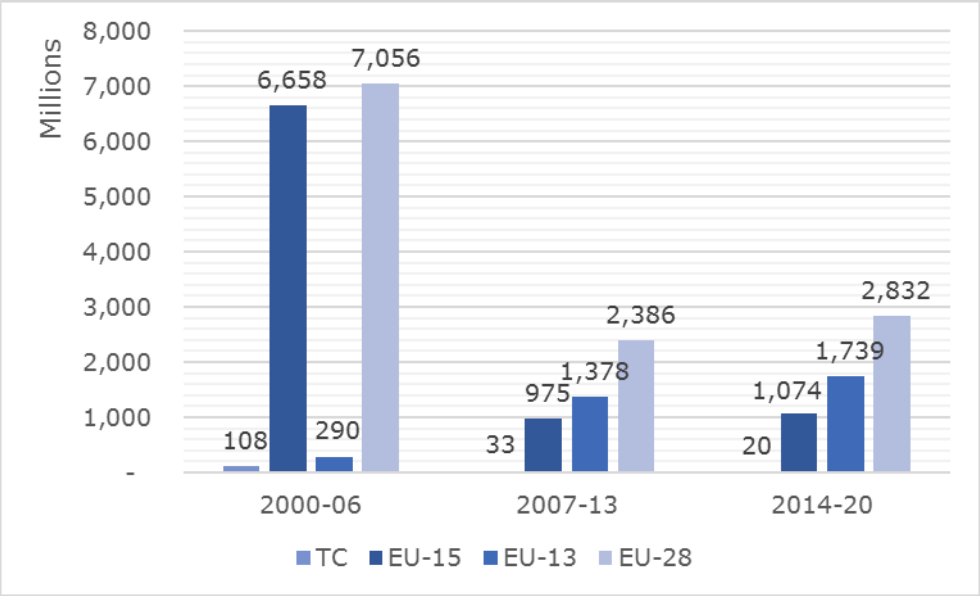
3.5.2.1 Total allocations

Cohesion Policy allocations to land rehabilitation were EUR 7.1 billion in the 2000-2006 programming period but fell to EUR 2.4 billion in 2007-2013; they rose again to EUR 2.8 billion in 2014-2020 (see Figure 3-53). In EU-15 countries allocations to land rehabilitation measures decreased drastically from the financing period 2000-2006 (EUR 6.7 billion) to 2007-2013 (EUR 1.1 billion), while between the period 2007-2013 and 2014-2020 allocations have been more or less stable. On the contrary, the data shows a sharp increase in EU-13 allocations to land rehabilitation measures between 2000-2006 (EUR 290 million) and 2007-2013 (EUR 1.4 billion), even when considering that Member States in this category only acceded in 2010 and after.

[114] Including 27 Member States plus Iceland, Liechtenstein, Norway, Switzerland and Turkey

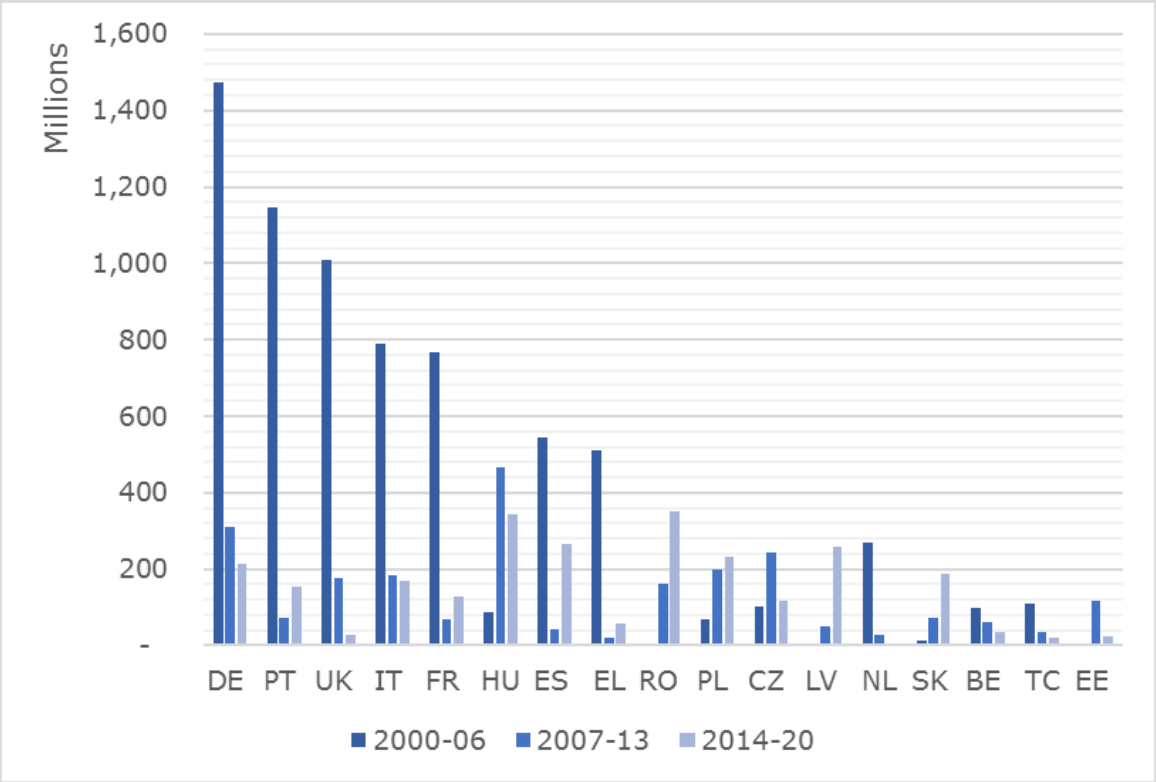
[115] van Liederkere et al, Progress in the Management of Contaminated Sites in Europe, JRC Reference Reports, European Commission, 2014. Available at:
http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/30755/1/lbna26376enn.pdf

Figure 3-53 Allocations (EUR million) to land rehabilitation across the three financing periods, by group of countries, EU amount



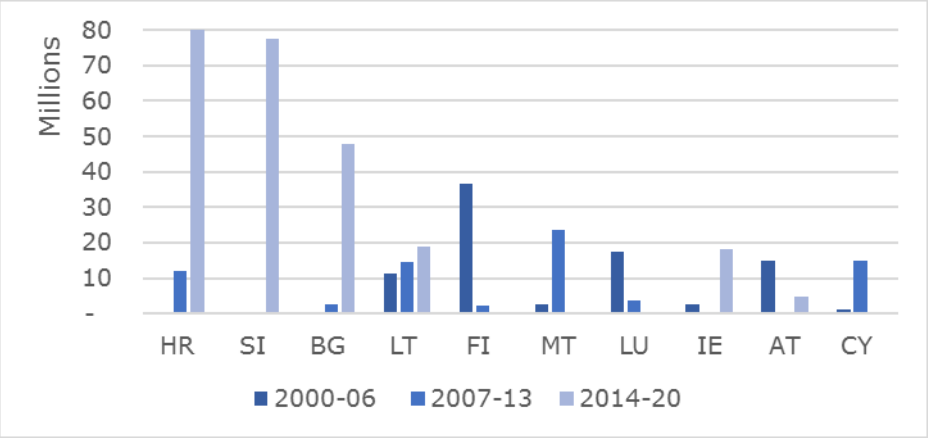
Source: DG REGIO (2016) for 2000-2006 and 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Figure 3-54 Allocations (EU amount in EUR million) to land rehabilitation measures under ERDF and CF by Member State across the three financing periods



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Figure 3-55 *Allocations (EU amount in EUR million) to land rehabilitation measures under ERDF and CF by Member State across the three financing periods (Member States allocating less than EUR 100 million per period)*



Source: see Figure 3-54

Across the three financing periods, Germany (total of EUR 2 billion), Portugal (EUR 1.4 billion) and the United Kingdom (EUR 1.2 billion) have allocated the largest amount of Cohesion Policy funds to land rehabilitation (see Figure 3-54 above). These three countries – as well as Italy, France, Spain and Greece - substantially decreased their allocations since the 2000-2006 period. Major increases can be seen in EU-13 Member States including Slovenia, Bulgaria and Croatia (see also Figure 3-55).

3.5.3 Responding to EU objectives

3.5.3.1 Total spending levels

In the 2000-2006 programming period, Operational Programmes allocated 25% of their direct environmental investments for land rehabilitation, but both the share and the total amount fell significantly in the 2007-2013 period, when it accounted for only 5% of direct environmental investments. The information gathered does not identify the reasons for this trend; the withdrawal of proposed EU soil legislation may have influenced trends. At the same time, the Thematic Strategy on Soil was released in 2006, just before the 2007-2013 period. It is possible that Member State spending levels reflected national rather than EU priorities.

3.5.3.2 OPs reviewed

Two regional OPs were reviewed for their work on land rehabilitation: Thuringia in Germany and Veneto in Italy. The amount of their allocations for this sector are quite different, EUR 72 million compared to EUR 6 million, reflecting the different sizes of the OPs: Thuringia was a convergence region in the 2007-13 period while Veneto, as a competitiveness region, received had less Cohesion Policy resources overall and per capita.

Table 3-15 Allocations to land rehabilitation in the OPs reviewed, 2007-2013 programming period

Country	OP	Allocation to land rehabilitation (EUR million)	Share of total OP resources allocated to land rehabilitation
Germany	Thüringen	72	5%
Italy	Veneto	6	3%

Source: DG REGIO (2016). Note: Allocations as of end 2014

In terms of the policy basis for their spending, neither OP cited EU policy documents such as the Thematic Strategy on Soil in their planning for sectoral investments. The Veneto OP based its investments on national and regional plans to address soil contamination, and the Thuringia OP on an analysis of regional soil and land problems.

Table 3-16 OP objectives for land rehabilitation: policy documents cited in the Operational Programmes reviewed

Country	OP	EU Policy	National Strategic Reference Framework	National policy documents	Regional policy documents
Germany	Thüringen		✓		
Italy	Veneto		✓	✓	

Source: OPs and information from interviews with Managing Authorities

Both OPs called for the cleanup (i.e. remediation) of contaminated sites as well redevelopment for new economic activities, though the types of sites to be addressed reflected regional conditions: for example, the Thuringia OP included former industrial sites and potash mine shafts among areas for investment.

Table 3-17 OP investment priorities for land rehabilitation

Country	OP	Key investment priorities
Germany	Thüringen	Revitalisation of brownfield sites for sewage treatment projects Rehabilitation of ex-military land with potential for nature, agriculture and forestry use Securing abandoned potash mine shafts
Italy	Veneto	Preparation of plans, studies, research and risk analysis for contaminated sites Rehabilitation and conversion of abandoned, contaminated industrial sites in critical environmental areas Promotion of experimental projects for new rehabilitation techniques Rehabilitation and regeneration of abandoned areas for waste disposal

Source: OPs and information from interviews with Managing Authorities

3.5.3.3 Literature review

A 2012 analysis by the European Court of Auditors[116] of 27 projects co-financed by the ERDF and CF on regeneration of brownfield sites identified three main types of projects:

- remediation of unstable and contaminated land (4 of the 27);
- redevelopment of sites without major contamination issues (6 of the 27);
- full regeneration of contaminated brownfield sites combining both remediation and redevelopment measures (17 of the 27).

The majority of the projects considered in that analysis focused on both remediation and redevelopment work; this was the case also for most of the projects in the two OPs reviewed (main exception is the securing of old potash mines in Thuringia, where no redevelopment is foreseen).

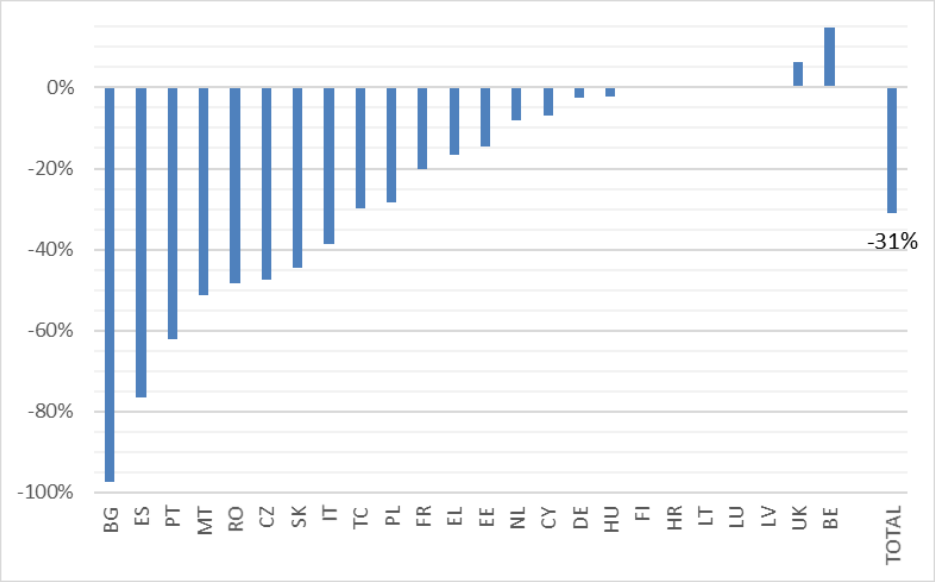
3.5.4 Administrative capacity issues

3.5.4.1 Reallocations and expenditure rates in the 2007-13 programming period

Land rehabilitation is the sector of direct environmental investments that saw the greatest fall in allocations over the 2007-13 period, 31%. Only two Member States saw an increase in allocations over the period, Belgium and the UK, while 16 Member States (as well as territorial cooperation programmes) saw a reduction in allocations (see Figure 3-56).

[116] European Court of Auditors (2012), Have EU Structural Measures successfully supported the regeneration of industrial and military brownfield sites?, Special Report No. 23. The study focused on projects in five EU Member States – Germany, the UK, Hungary, Poland and Czech Republic – with the largest expenditures for land rehabilitation during the two financing periods. It covered projects in both the 2000-2006 and the 2007-2013 periods.

Figure 3-56 Reallocations in the 2007-2013 financing period, land rehabilitation



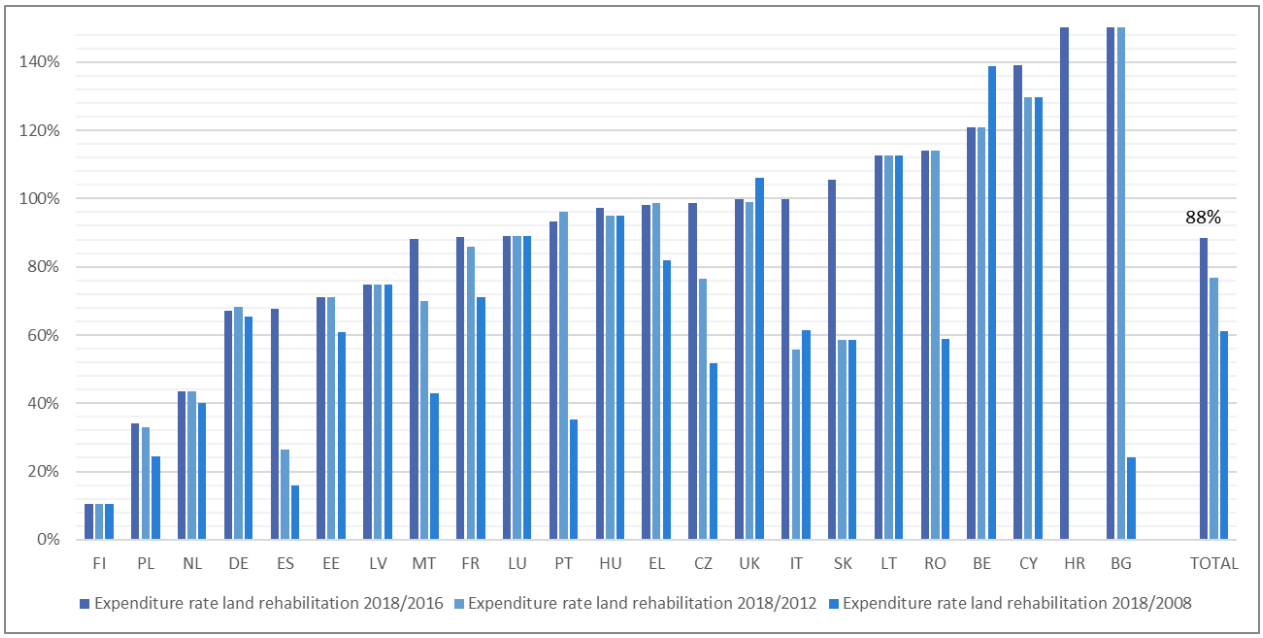
Source: DG REGIO (2016)

Note: no data for Austria, Ireland and Slovenia

The overall expenditure rate for land rehabilitation reported in 2018, 88% (compared to 2016 allocations), was the lowest of the six sectors for direct environmental investment. While seven Member States had allocations over 100% - Slovakia, Lithuania, Romania, Belgium, Cyprus, Croatia and Bulgaria– allocations in three Member States – Finland, Poland and the Netherlands - were under 50%. Due to the large reductions in allocations, expenditure rates compared to 2008 allocations are lower in most Member States.

In the project workshop in February 2017, some participants noted an obstacle in terms of financing projects to cleanup and reuse contaminated sites: many of these areas are located on private land, in which case Cohesion Policy financing is restricted by state aid rules. The state aid rules support the polluter pays principle, which is considered also in the chapter on horizontal integration (see section 4.1.3) as well as the case fiche number 8 (see Appendix M).

Figure 3-57 Expenditure rates in the 2007-2013 financing period, land rehabilitation



Source: DG REGIO (2016 and 2018)

Note: No data on allocations as of 2014 for Austria, Sweden and Ireland, zero allocations reported for Slovenia

3.5.4.2 OPs reviewed

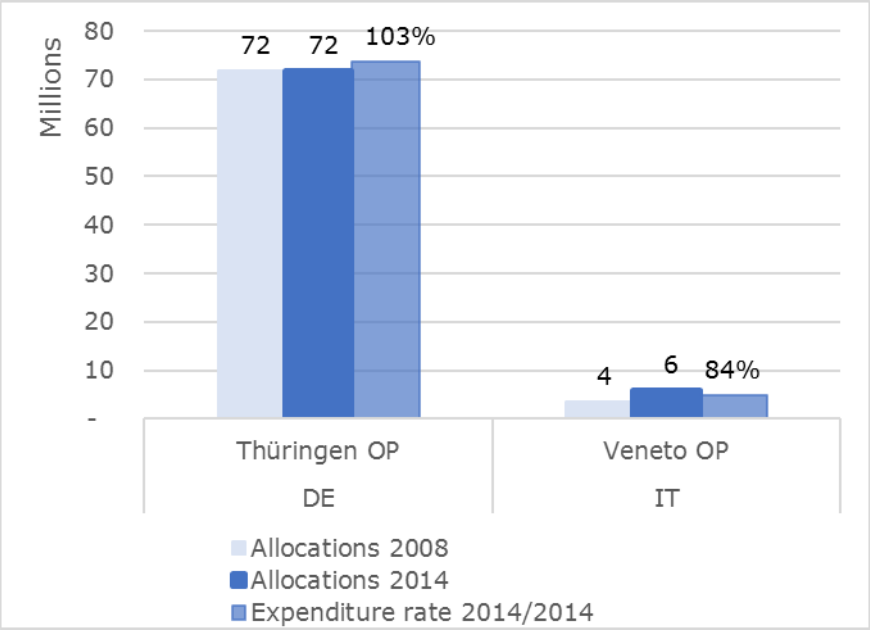
For both OPs reviewed, however, administrative capacity was not highlighted as an issue. Allocations for land rehabilitation had increased over the course of the period and expenditure rates were high. The initial allocations for land rehabilitation in Veneto were around EUR 3.6 million. This allocation rose by 62% and in 2014 was EUR 5.8 million (Figure 3-58); by the end of the programming period, the ROP financed land rehabilitation projects with an EU contribution of EUR 4.9 million. This implies that the expenditure rate was 84% compared to the 2014 allocation.[117]

The total allocations for land rehabilitation in the Thuringia ROP in 2008 were EUR 71.7 million. These allocations increased slightly in the 2007-2013 period and reached EUR 71.75 million in 2014. Furthermore, the expenditure rate for land rehabilitation investments was high and in 2014 was 103%.

In interviews, officials in the two regions did not report major issues with administrative capacity for this theme.

[117] Communication with Veneto Region official, 9 March 2017.

Figure 3-58 Allocations (EUR million) to land rehabilitation in 2008 and 2014, and expenditure rates (%) for the case study OPs



Source: DG REGIO (2016) and Milieu calculations based on DG REGIO (2016)

Note: the expenditure rate for the Veneto OP is calculated based on 2015 data, obtained directly from the regional Managing Authority.

3.5.5 The role of Cohesion Policy compared to other sources of financing

3.5.5.1 Cohesion Policy as a share of total investments

EU-wide statistics are not collected on expenditures for land rehabilitation. A recent JRC study provides data from selected Member States: costs varied from about EUR 10 per capita in Finland, France, Hungary and Slovakia; to EUR 20 per capita in Belgium (Flanders), Denmark and the Netherlands; to EUR 30 per capital in Estonia. In some of these Member States, the private sector played an important role in financing cleanup actions, covering 60% of the costs in Finland, 70% in France and 75% in Belgium (Flanders). These differences may reflect national contexts, such as the extent to which private sector owners of contaminated land can be identified. The data do not always cover the same periods, however, and thus may not be fully comparable.[118]

In contrast, it appears that EU resources provided a large share of financing for land rehabilitation in less developed Member States and regions. According to data reported to JRC, government sources financed 90% of cleanup costs in Estonia[119]. It appears that Cohesion Policy provided the lion's share of government financing: EUR 86.5 million for

[118] van Liederkere et al, Progress in the Management of Contaminated Sites in Europe, JRC Reference Reports, European Commission, 2014. Available at: http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/30755/1/lbna26376enn.pdf

[119] van Liederkere et al, Progress in the Management of Contaminated Sites in Europe, JRC Reference Reports, European Commission, 2014. Available at: http://publications.jrc.ec.europa.eu/repository/bitstream/111111111/30755/1/lbna26376enn.pdf

the cleanup of contaminated sites across both the 2007-2013 and 2014-2020 programming periods; national resources provided EUR 5.5 million (most of the sites addressed in Estonia were former waste landfills, including for hazardous and mining waste)[120].

The Veneto region established its own financing mechanism for site cleanup: in 2009, a revolving fund was created to fund land rehabilitation measures. Local government bodies can receive up to 100% of the investment amount from the revolving fund. In addition, from 2010 the region government provided grants to support technical studies for the project preparation.[121] During the period 2009-2012, the regional government financed land rehabilitation measures for total EUR 95.8 million (EUR 90 million from the revolving fund and EUR 5.8 million from the non-repayable grant), an average of about EUR 24 million per year.[122] Consequently, Cohesion Policy provided only a small share of government funding for land rehabilitation in the region.

3.5.5.2 Co-financing of Cohesion Policy resources

In Veneto, one of Italy's higher income regions and a competitiveness region, national and regional sources provided more than half of the financing for projects supported by Cohesion Policy: the Veneto OP financed land rehabilitation projects for a total amount of around EUR 10.7 million of which 46% came from EU resources, 48% from national resources and 6% from regional resources.

Information was not found on co-financing in Thuringia.

3.5.6 Results of Cohesion Policy investments

A review by the EU Court of Auditors of Cohesion Policy[123] of investments to clean up contaminated sites (largely in the 2000-2006 period) noted that projects have two main objectives: decontamination and site reuse. The Court reported that difficulties were encountered in achieving the second objective, and several sites were not reused as planned once cleaned up. The Court also cited examples of good practice for reuse, including the C-mine project in Belgium (see the box below).

[120] OECD, Environmental Performance Review: Estonia, 2017

[121] Regione Veneto, 2012, available online at https://www.regione.veneto.it/web/guest/comunicati-stampa/dettaglio-comunicati?_spp_detailId=352344

[122] Regione Veneto, Regional measures to support land rehabilitation, available online at https://www.regione.veneto.it/c/document_library/get_file?uuid=1a441975-8094-46bf-8bad-fe2ffdd75f84&groupId=10709

[123] European Court of Auditors (2012), Have EU Structural Measures successfully supported the regeneration of industrial and military brownfield sites?, Special Report No. 23

Text Box 3-6 The C-mine reuse project

The C-mine reuse project

The C-Mine project in Genk, Belgium, received EUR 3.2 million in total across 2000-2006 and the 2007-2013 financing periods. The project established cultural and artistic activities on the former mining site (which had been cleaned up by its owners on closure), including an art school, an exhibit area, performance spaces and other leisure activities.

Both Thuringia and Veneto OPs, however, exceeded their targets for the area of decontaminated land rehabilitated. In Thuringia, Cohesion Policy investments rehabilitated former potash mine shafts and ex-military areas. Thuringia exceeded its target for the reuse of areas, while Veneto did not achieve its target. In both regions, however, the investments made appeared to tackle only a small share of contaminated sites: 11 out 150 in Veneto and 7% of the 6800 ha. of contaminated areas in Thuringia.

Based on the results from these two regions, plus the review by the EU Court of Auditors, it appears that Cohesion Policy has made an important contribution to land rehabilitation in the EU. The results from the Veneto and Thuringia regions as well as EU-wide surveys carried out by JRC suggest that contaminated sites and other land rehabilitation needs remain an important issue in many parts of the EU, and Member States actions to address these problems vary significantly.

3.6 Air Quality

3.6.1 EU policy framework and estimates of investment needs

3.6.1.1 EU legislation and policy

The EU has had a long-standing legal framework to protect air quality. This includes air quality standards for a range of pollutants: at the start of the 2007-2013 programming period, binding limits were in force for sulphur dioxide, nitrogen dioxide, particulate matter (specifically PM10), benzene, ozone, lead and carbon monoxide; non-binding target values were in place for arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons. In 2010, midway through the programming period, a non-binding target value for fine particles (PM2.5) was introduced.[124]

Member States are required to provide public information on air pollution levels and to draw up action plans where there are risks that alert thresholds for one or more pollutants will be exceeded.

Concurrently, EU legislation sets ceilings for total national emissions of four types of pollutants: sulphur dioxide (SO2), nitrogen oxides (NOx), volatile organic compounds (VOC) and ammonia (NH3). These ceilings reflect the requirements of the Convention on

[124] These standards were set under several pieces of legislation that were replaced by Directive 2008/50/EC on ambient air quality and cleaner air for Europe, which introduced the 2010 standards. An overview of the standards can be found on: European Commission (DG Environment), Air Quality Standards, web page (consulted March 2017): http://ec.europa.eu/environment/air/quality/standards.htm

Long-Range Transboundary Air Pollution and its Protocols, negotiated under the aegis of the UN.[125]

EU policy documents prior to the start of the 2007-2013 programming period highlighted the role of economic sectors in addressing air quality issues. The EU's renewed Sustainable Development Strategy (2006) called for sustainable transport, including: a reduction in transport emissions, a shift towards environmentally friendly transport modes and the reduction of transport noise.[126] The 2005 Thematic Strategy on air pollution called for actions to promote energy efficiency, including better energy performance of buildings, to reduce emissions from small combustion sources and to shift to less polluting modes of transport. The Strategy called for EU funds to support sustainable transport and sustainable energy systems.[127]

3.6.1.2 Investment needs

In 2010, EEA reported that many EU Member States had not met air quality requirements. For example, from 2000 to 2008, 75% or more of the EU's urban population was exposed to particulate levels (PM10) above the daily limit value for at least seven days of the year – and 25% of the urban population experienced exceedences more than 35 days of the year.[128] Conditions varied across the EU, but exceedences were seen in almost all Member States.

Despite declines in air emissions over preceding decades, many countries were not expected to meet their 2010 emissions ceilings: notably, the ceilings for nitrogen oxides would be exceeded by at least 12 Member States. The energy and transport sectors were seen as the most problematic in terms of air emissions, though agriculture was also an important source.[129]

Support to air quality measures through the Cohesion Funds is considered a key initiative to secure air emission reductions in the short-term by the European Commission, which in 2011 identified the following examples of air quality measures that the EU financing could contribute to[130]:

- make available to public authorities across the EU the latest air quality assessment and management tools;

[125] In the period for 2007-2013, the were set in Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants (the Directive was recently replaced by Directive 2016/2284/EU).

[126] Council of the European Union, Review of the EU Sustainable Development Strategy (EU SDS) - Renewed Strategy (10917/06), 26 June 2006

[127] European Commission, Thematic Strategy on air pollution, COM(2005) 446 final, September 2015

[128] EEA, The European Environment: State and Outlook 2010 – Air Pollution, 2010. Available at: http://www.eea.europa.eu/soer/2010

[129] EEA, The European Environment: State and Outlook 2010 – Air Pollution, 2010. Available at: http://www.eea.europa.eu/soer/2010

[130] European Commission, SEC(2011) 342 final, COMMISSION STAFF WORKING PAPER on the implementation of EU Air Quality Policy and preparing for its comprehensive review, 14.03.2011.

- public procurement that is targeted to air quality benefits, such as city fleet retrofit projects or electrification programs;
- agricultural measures, such as improving animal husbandry and reducing ammonia thanks to fertiliser management.

An assessment of total EU investment needs to implement the 2005 Thematic Strategy on air pollution estimated that the cost would be about EUR 7 billion per year (and the results health and ecosystem benefits would be at a minimum EUR 42 billion per year).[131]

3.6.2 Cohesion Policy allocations and expenditures

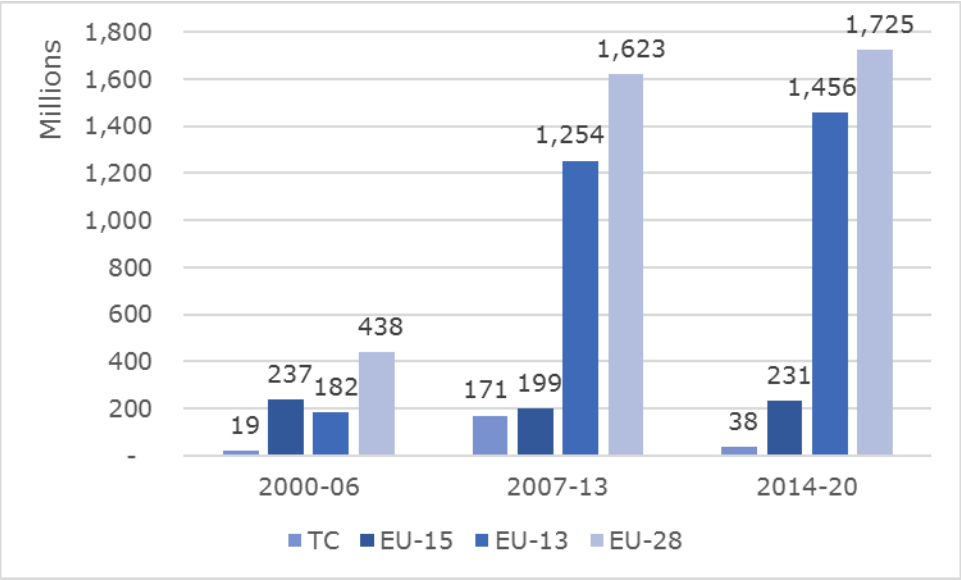
3.6.2.1 Allocations for priority themes on air quality

Across all Member States, close to EUR 1 billion in Cohesion Policy resources were allocated to direct environmental investments for air quality measures in the 2000-2006 programming period, rising to about EUR 3 billion 2007-2013. (These figures represent the sum of allocations for two priority themes: *'47. Air quality*' and *'48. Integrated Prevention and Pollution Control*'. It should be noted that the second theme by its nature includes a range of actions that go beyond air pollution investments.)

While the allocations to air quality measures have slightly deceased in EU-15 countries (from EUR 237 million in 2000-2006 to EUR 231 million in 2014-2020), the increase in EU-13 countries has been much larger: from EUR 182 million to EUR 1.4 billion. These opposing trends have resulted in allocations to air quality measures in EU-13 countries several times higher than in EU-15 countries.

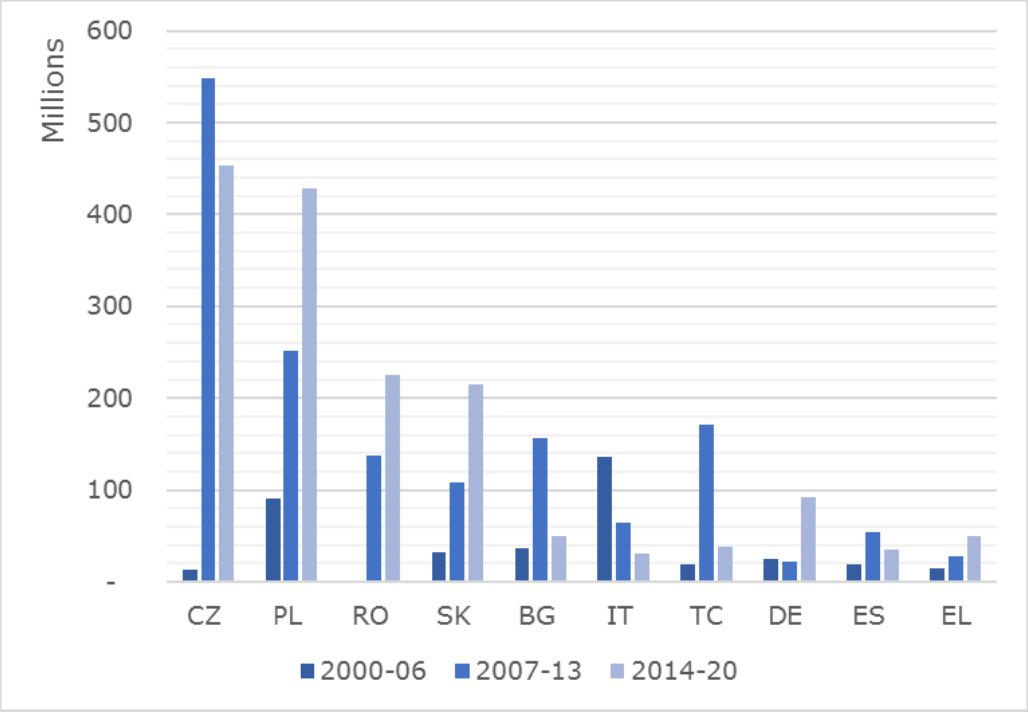
[131] AEAT, Cost-Benefit Analysis of the Thematic Strategy on Air Pollution, Report for the European Commission, October 2005. (This report presents summary information from more detailed reports.) Available at: http://ec.europa.eu/environment/archives/cafe/general/keydocs.htm#integrated

Figure 3-59 Allocations (EUR million) to air quality across the three financing periods, by group of countries, EU amount



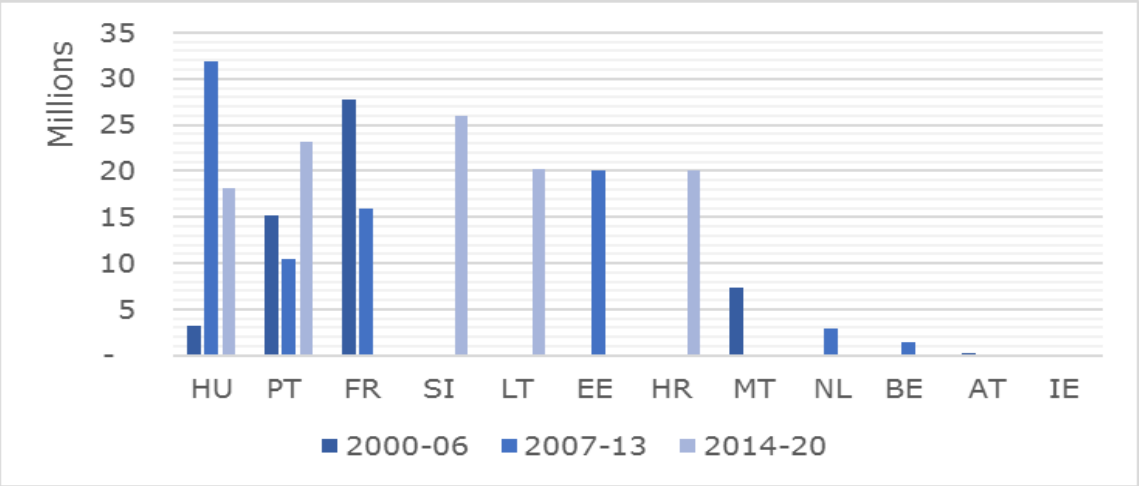
Source: DG REGIO (2016) for 2000-2006 and 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Figure 3-60 Allocations (EU amount in EUR million) for air quality under ERDF and CF by Member State across the three financing periods



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Figure 3-61 Allocations (EU amount in EUR million) for air quality under ERDF and CF by Member States across the three financing periods (allocations below EUR 35 million per period)



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Throughout the three financing periods, Czech Republic (EUR 1 billion) and Poland (EUR 770 million) are the Member States that have allocated the highest amounts of Cohesion Policy funds to air pollution measures (see Figure 3-60 and Figure 3-61 above).[132]

3.6.2.2 Indirect allocations for air quality

In addition to the allocations for the priority themes directly related to air quality, allocations for renewable energy, energy efficiency and sustainable transport can have positive impacts on air quality. Indeed, spending in the direct and indirect categories may be quite similar: as shown in the following sections, investments for improvements to public transport are made in some OPs under the spending category for air quality; in other OPs, such investments may be addressed under spending categories for transport. In a similar fashion, investments to improve heating systems in buildings might be counted under air quality or under energy efficiency.

Moreover, investments for energy and transport categories have been much larger than those for air quality: in total over the three periods, about EUR 36 billion were allocated for sustainable energy investments and about EUR 24 billion for sustainable transport investments. (Further details on these indirect allocations can be found in section 3.8 below.)[133]

[132] For the 2000-2006 period, investments for noise pollution are also included. This category is not found in the subsequent programming periods.

[133] Other transport investments, for example for roads, may however lead to greater air emissions.

3.6.3 Responding to EU objectives

3.6.3.1 OPs reviewed

Three OPs were reviewed in terms of their air quality investments. Their allocations to air quality in the 2007-2013 period varied, from over EUR 0.5 billion for the Czech Environment OP (representing 11% of its total resources) to EUR 189 million in the Polish Infrastructure and Environment OP and EUR 5 million in the Greek Environment and Sustainable Development OP. In the Polish and Greek OPs, air quality allocations represented less than 1% of total resources (see the table below).

Table 3-18 Allocations to air quality in the OPs reviewed, 2007-2013 period

Country	OP	Allocation to air quality (EUR million)	Share of total OP resources allocated to air quality
Czech Republic	Environment	523	11%
Greece	Environment and Sustainable Development	5	0.3%
Poland	Infrastructure and Environment	189	0.7%

Source: DG REGIO (2016). Note: Allocations as of end 2014

In describing the framework for investment planning, the Czech Environment OP and the Polish OP Infrastructure and Environment cited relevant EU legislation on air quality, albeit not linking their own targets to this legislation. The OPIE also referred to Poland's EU Accession Treaty, which identified a set of large facilities whose air emissions were to be addressed. The OPESD in Greece did not refer to EU air quality legislation or targets; however, it cited national policy documents in this area (as did the other two OPs). While the Czech and Greek OPs referred to assessments of air quality in national policy documents, legislation and strategies, the Polish OP did do so.

Table 3-19 OP objectives for air quality: policy documents cited in the Operational Programmes reviewed

Country	OP	EU Policy	National Strategic Reference Framework	National policy documents	Regional policy documents
Czech Republic	Environment	✓	✓	✓	✓
Greece	Environment and Sustainable Development		✓	✓	
Poland	Infrastructure and Environment	✓	✓		

Source: OPs and information from interviews with Managing Authorities

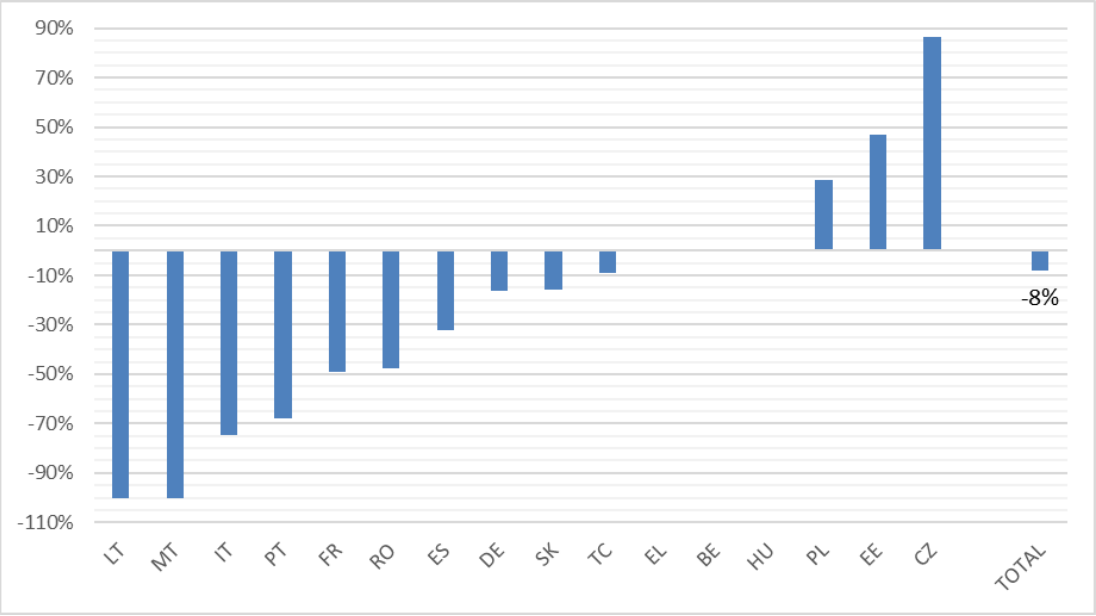
The air quality investments supported by the three OPs varied. Poland's national OPIE focused on large facilities, including those identified in the Accession Treaty. The Czech Republic's OP Environment financed investments at smaller installations, including buildings, farms and public transport systems (see the table below). The OPESD in Greece only financed public transport systems.

Table 3-20 OP investment priorities for air quality

Country	OP	Key investment priorities
Czech Republic	Environment	Reconstruction of boilers in buildings to reduce emissions. Projects to reduce VOC emissions – mainly denitrification and desulphurisation of large combustion sources. Projects to purchase public buses powered by compressed natural gas (CNG), thus reducing participate emissions. Measures to reduce NH_3 emissions from the agricultural sector, for example from stables, pig farming and slurry sinks. Measures to control dust from mass sources, including street cleaning
Greece	Environment and Sustainable Development	Public transport: extending rail-based transport modes/ metro lines, replacing polluting vehicles and developing cleaner urban transport systems Equipment and studies to: monitor air pollution, conduct noise mapping studies and improve noise measurement equipment
Poland	Infrastructure and Environment	Modernisation of combustion installations and heating systems Modernisation or installation of pollution control equipment Conversion of combustion installations to less polluting fuels

Source: OPs and information from interviews with Managing Authorities

Figure 3-62 Reallocations in the 2007-2013 financing period, air quality



Source: DG REGIO (2016)

Note: Austria, Cyprus, Finland, UK, Latvia, the Netherlands, Slovenia, UK and Luxembourg did not allocate CP funding in the air protection sector; Bulgaria and Croatia did not allocate funding in this sector in 2008 and are also not shown.

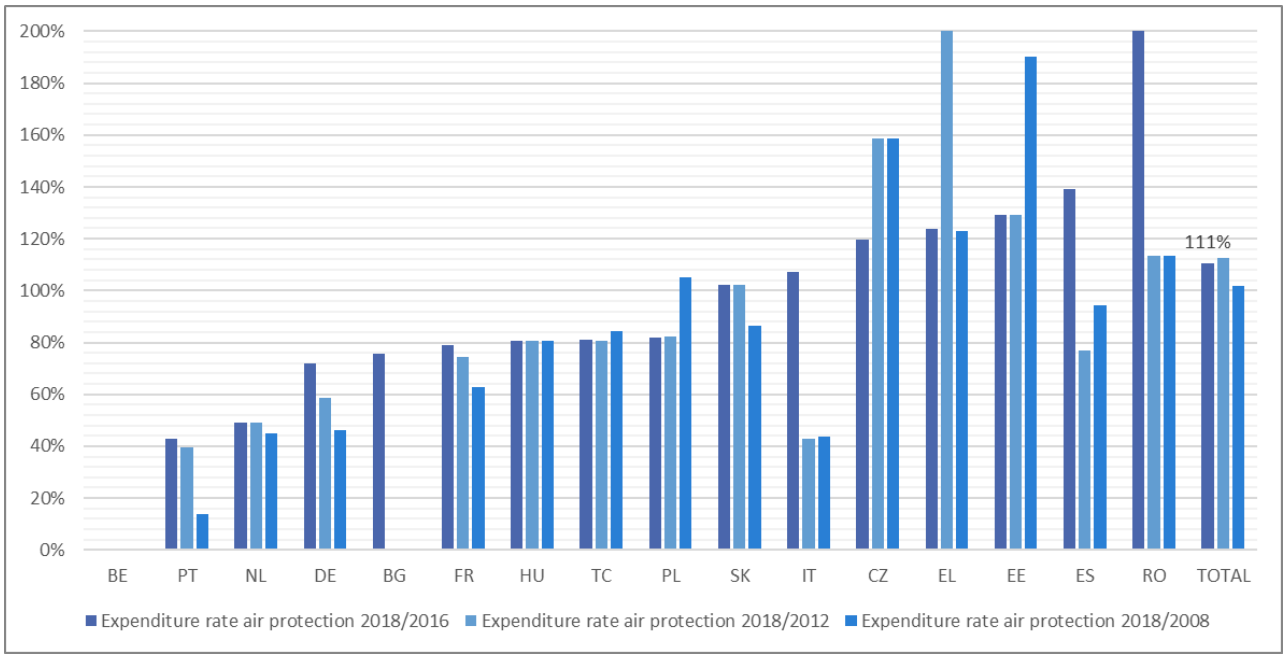
3.6.4 Administrative capacity issues

3.6.4.1 Reallocations and expenditure rates in the 2007-13 programming period

Overall, allocations for air quality fell by 7.9% over the 2007-2013 programming period. While three Member States saw increases in their allocations – Czech Republic, Estonia and Poland – nine other Member States saw reductions, which was also the case for territorial cooperation OPs (see Figure 3-62 above).

The overall expenditure rate for air quality was 111% in 2018 (compared to 2016 allocations), the second highest level among the six sectors of direct environmental investment. Expenditure rates were above 100% in seven Member States: Slovakia, Italy, Czech Republic, Greece, Estonia, Spain, Romania; and below 50% in Belgium, the Netherlands and Portugal (see Figure 3-63).

Figure 3-63 Expenditure rates in the 2007-2013 financing period, air quality



Source: DG REGIO (2016 and 2018)

Note: No OP allocations for Austria, Finland, Croatia, Sweden, Cyprus, Malta, Latvia, Slovenia, Croatia, and Lithuania; no expenditures recorded in Belgium. In Greece, the ratio of expenditures to OP allocations 2018/2012 are equal 209% and in Romania, the ratio of expenditures to allocations 2018/2016 equals 218%. These are cut in the figure at 200%. The allocations in Romania in 2016 constitute approximately 8.5% of total OP allocations to the selected categories.

These levels of reallocations and expenditure rates do not suggest there were major issues with administrative capacity issues specifically for investments in air quality.

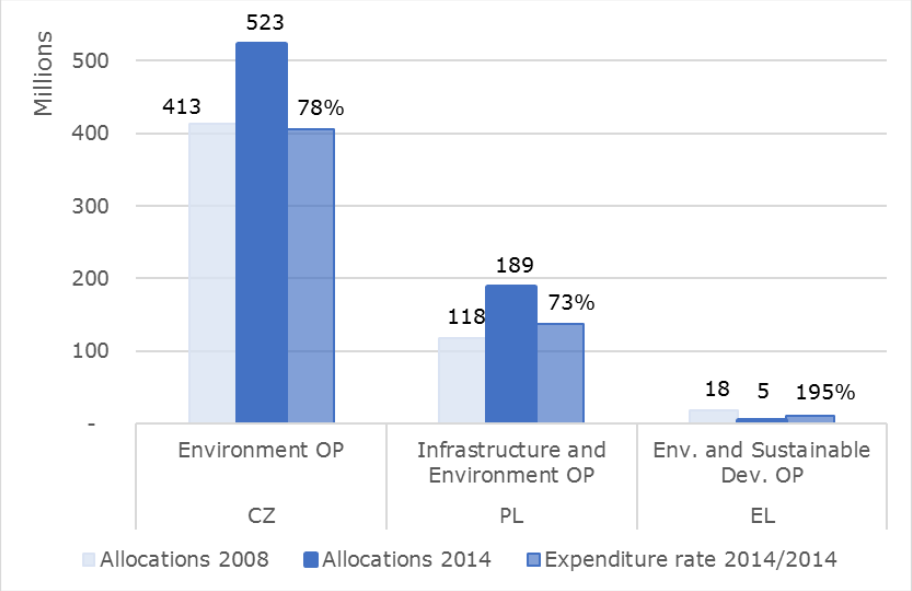
3.6.4.2 OPs reviewed

Among the three OPs covered, allocations to the air quality investment category increased over the period 2007-2013 in the Czech Republic and Poland. The expenditure rates for air quality for both OPs was high – over 70% (see Figure 3-64). In contrast, the

allocations for air quality investments in Greece decreased in the period 2007-2013. The initial allocations to the relevant theme in OPESD (only the theme 'air quality' was included in the OP) were EUR 18 million in 2008 but only EUR 5 million in 2014. By the end of 2014, however, spending reached about EUR 10 million.

In interviews, officials of the three OPs reviewed did not identify administrative capacity as an important issue for this spending category. Nonetheless, the Czech OP Environment and the Greek OPESD received few applications for their calls for projects in the early part of the programming period. In response, the Czech OP Environment re-oriented spending for air quality from large facilities to small projects. The OPESD in Greece reduced its allocations for air quality, but was then able to spend at a level higher than its allocations.

Figure 3-64 Allocations (EUR million) to air quality in 2008 and 2014 and expenditure rates (%) for the case study OPs



Source: DG REGIO (2016) and Milieu calculations based on DG REGIO (2016)

3.6.5 The role of Cohesion Policy compared to other sources of financing

3.6.5.1 Cohesion Policy as a share of total investments

In this sector, EU-wide data are not available on total investments for air quality, so it is not possible to identify with precision the role of Cohesion Policy compared to other sources.

One factor, as noted above, is that both direct and indirect Cohesion Policy investments can support reductions in air quality. In the Czech Republic, for example, in addition to over EUR 500 million in allocations for direct investments related to air quality, Cohesion Policy provided over EUR 1 billion for energy efficiency investments and EUR 500 million for sustainable transport.

A further issue is that the private sector may finance an important share of air quality investments, such as pollution control equipment at industrial facilities. As an example, in

2012 enterprise resources financed over 90% of investments for air emissions in Poland, according to national statistics (the statistics refer to pollution control equipment and appear not to include investments in areas such as energy efficiency and transport).[134] EU-wide statistics on enterprise financing for air quality, however, are not available.

3.6.5.2 *Co-financing of Cohesion Policy*

In the Czech Republic, the Cohesion Policy investments in air quality were complemented by resources from the state budget, the State Environmental Fund and the operators of air pollution sources.

In Poland, due to the legislative rules on public aid to the business sector and the fact that OPIE support for air quality investments in the period 2007-2013 focused on enterprises, the share of EU grants for interventions for air protection was limited to 35%. The remaining amount was typically covered from the investors' own funds[135].

In Greece, the maximum co-financing rate for investments supported by the Cohesion Policy funds gradually increased to 100% for the 2007-2013 programmes[136], given the conditions created by the economic crisis. Where projects included ineligible expenditure by the OP, these were covered from own resources of the beneficiaries

3.6.6 Results of Cohesion Policy investments

All three OPs reported meeting or achieving good progress towards indicator targets.

Table 3-21 Air quality indicators – reduction in emissions from 'especially burdensome fuel combustion sources' in Poland: OPIE, 2014

Indicators	Target 2013	Emission 2014 (GUS 2015)	% of target achieved
Sulphur dioxide (SO2) (tonnes)	358,000 (reduction from 845,900)	401,800	89%
Nitrogen oxides (NOx) (tonnes)	239,000 (reduction from 308,000)	280,800	85%
Dust (PM10) (tonnes)	50,000 (reduction from 98,600)	47,400	105%

Source: OPIE AIR 2014 and Main Statistical Office (GUS) yearbook 'Environment' of 2015[137]

For air quality, the Polish OPIE set out three result indicators regarding reduction of annual emissions of air pollutants from especially burdensome fuel combustion sources[138]

[134] Central Statistical Office, Environment 2013, Available at: http://stat.gov.pl/en/topics/environment-energy/environment/environment-2013,1,6.html

[135] Interview with a representative of the National Fund for Environmental Protection and Water Management, 9 February 2017.

[136] Regulation (EU) 2015/1839 of 14 October 2015 http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R1839&from=EN

[137] http://stat.gov.pl/obszary-tematyczne/srodowisko-energia/srodowisko/ochrona-srodowiska-2015,1,16.html

taking 2004 as the base year and 2013 as the target year (see Table 3-21). Although only one of the indicators was achieved in 2015, progress was made towards all of the indicators and significant reductions in emissions from large facilities, notably power plants (e.g. SO2, NOx, PM10), could be observed compared to the 2004 base levels.

In the Czech Republic, OP Environment 2007-2013 defined two impact/result indicators aiming to measure the release and population exposure to particle emissions (PM10) and three output indicators (focused on number of projects or emission reductions from road transport). By 2015, all of the output indicators were exceeded; however, the achievement of the impact indicators was still lagging. Even though the emissions reductions achieved by the OP Environment were more modest, they may translate more directly into improvements in air quality than those from large facilities (e.g. like those in Poland) as these come from public transport.

In Greece, OPESD 2007-2013 contained two indicators related to air quality, both of which were fulfilled according to the information received by the MA. Unlike the indicators in the Polish and Czech OP, these indicators aimed to measure the new population served by upgraded urban public transport and the reduction of CO2 emissions.

Text Box 3-7 Air quality investments financed by the Czech OP Environment

Air quality investments financed by the Czech OP Environment

A total of 2,454 projects for air quality were completed. The types of projects supported included:

- Reconstruction of boilers in buildings
- Projects to reduce VOC emissions.
- Purchase of public buses powered by compressed natural gas (CNG), reducing participate emissions.
- Measures to reduce ammonia emissions from the agricultural sector, for example from stables, pig farming and slurry sinks.
- Measures to control dust from fixed and mobile sources – e.g. via self-loading wagons and street flushers.

The three OPs each took a different approach in their investments to address air quality, with Poland's OPIE focusing on large facilities, the Czech OP on small sources and public transport and the Greek OP on public transport. The information gathered does not, however, provide an overview of Cohesion Policy's EU-wide role in improving air quality – however, even in Poland, one of the Member States with a high level of allocations for the sector, other sources such as private investment played a larger role. As noted in section 3.6.2, Cohesion Policy investments under spending categories for sustainable energy and transport are much larger than direct investments for air quality most likely play a crucial role in addressing air quality issues.

In conclusion, over EUR 4.5 billion were allocated for air quality spending categories across the three programming periods, and Member States have used these resources

[138] 'Especially burdensome fuel combustion sources' are installations included on the list of the Ministry of Environment. A fixed set of reporting units (plants) is maintained annually, which enables to preserve continuity and comparability of research results (information from the yearbook 'Environment', GUS 2015).

for pollution control at large industrial facilities, for the reconstruction of building heating systems, for public transport improvements and in some cases, also for air emissions from the agriculture sector. In addition, investments for sustainable energy and sustainable transport contributed to air quality goals: these exceeded EUR 15 billion in the 2007-2013 programming period. These allocations are, however, relatively small compared to the total cost estimate of EUR 7 billion per year made for the 2005 Thematic Strategy, though other resources, including private investments, are believed to have played an important role.

3.7 Climate change mitigation and adaptation, and risk prevention

This section provides an overview of Cohesion Policy allocations for climate change and for risk prevention. It then provides a description of support for adaptation to climate change provided by two territorial cooperation programmes.

3.7.1 EU policy framework

3.7.1.1 Adaptation to climate change

The EU did not have an overall policy framework for adaptation at the beginning of the 2007-2013 programming period: this was developed in the 2009 White Paper on Adaptation and then the 2013 Strategy; however, several policy areas addressed adaptation (for example, in the 2007 Floods Directive and 2007 Communication on water scarcity and droughts).

3.7.1.2 Climate change mitigation

The EU's climate change mitigation policy framework is more comprehensive compared to its adaptation policy. In 2007, EU leaders agreed on a set of mitigation targets for 2020 that were enacted in legislation in 2009[139]:

- 20% reduction of GHG emissions compared to the 1990 level;
- 20% increase in energy efficiency;
- 20% of renewable energy consumption.

These targets, which were recently updated for the period 2020-2030[140], are expected to contribute to the EU's ambition to cut its GHG emissions by 80% in 2050 compared to the 1990 level as set out in the 2011 policy document 'A Roadmap for moving to a competitive low carbon economy in 2050'[141].

[139] European Commission (2017), Climate Action, 2020 Climate & energy package, https://ec.europa.eu/clima/policies/strategies/2020_bg#tab-0-0

[140] The updated 2030 targets include 40% reduction of the GHG emissions, 27% of energy efficiency improvements and 27% of renewable energy consumption.

[141] COM(2011) 112 final

Another important pillar of the EU climate change mitigation strategy is the Emissions Trading Scheme (ETS), a cap-and-trade mechanism for the sectors representing altogether 45% of the GHG emissions in the EU[142]. Furthermore, the revenues from the sale of GHG allowances under the ETS can be used to finance climate action investments.

3.7.1.3 Financing climate action in the EU

The need for mitigation and adaptation investments is further reflected in the EU mainstreaming approach according to which at least 20% of the total EU budget expenditure during the financing period 2014-2020 should be spent on climate-related measures (both mitigation and adaptation). This equates to approximately EUR 180 billion[143] being spent on climate change over the 2014-2020 period. Within Cohesion Policy funding, mitigation and adaptation investments are explicitly addressed under dedicated thematic objectives or investment priorities (see Appendix C for a detailed list of the specific categories over the different programming periods).

3.7.1.4 Risk prevention

Cohesion Policy spending categories also refer to 'risk prevention', and EU legislation for Cohesion Policy provides examples of issues that can be addressed: desertification, droughts, fires and floods, as well as 'technological risks'.[144] Many of these risks have a link to climate change – consequently, addressing them can also contribute to adaptation.

EU policies specifically for risk prevention include the EU Civil Protection Mechanism[145], which fosters cooperation among European civil protection authorities and supports action around the world, and the EU Solidarity Fund[146] to support Member States and accession countries in the event of catastrophic events, including floods and droughts as well as earthquakes.

3.7.1.5 Investment needs

EU-specific estimates for the necessary climate action investment needs are not available. The UNFCCC estimated in 2007 that the global investment needs for climate change mitigation would be between USD 200 and 210 billion per year in 2030. No clear estimates are available for the adaptation investment needs[147].

[142] European Commission (2017), Climate Action, the EU Emissions Trading Scheme, http://ec.europa.eu/clima/policies/ets/index_en.htm .

[143] European Commission (2017), Climate Action, Supporting climate action through the EU budget, viewed 20.04.2017 at https://ec.europa.eu/clima/policies/budget_en

[144] See Article 5 of Regulation (EC) No 1080/2006 of the European Parliament and of the Council of 5 July 2006 on the European Regional Development Fund and repealing Regulation (EC) No 1783/1999

[145] European Commission, EU Civil Protection Mechanism, web page, available at: http://ec.europa.eu/echo/what/civil-protection/mechanism_en

[146] European Commission, EU Solidarity Fund, web page, available at: http://ec.europa.eu/regional_policy/en/funding/solidarity-fund/#4

[147] UNFCCC (2014), Fact sheet: Financing climate change action. Investment and financial flows for a strengthened response to climate change, viewed 20.04.2017 at http://unfccc.int/press/fact_sheets/items/4982.php

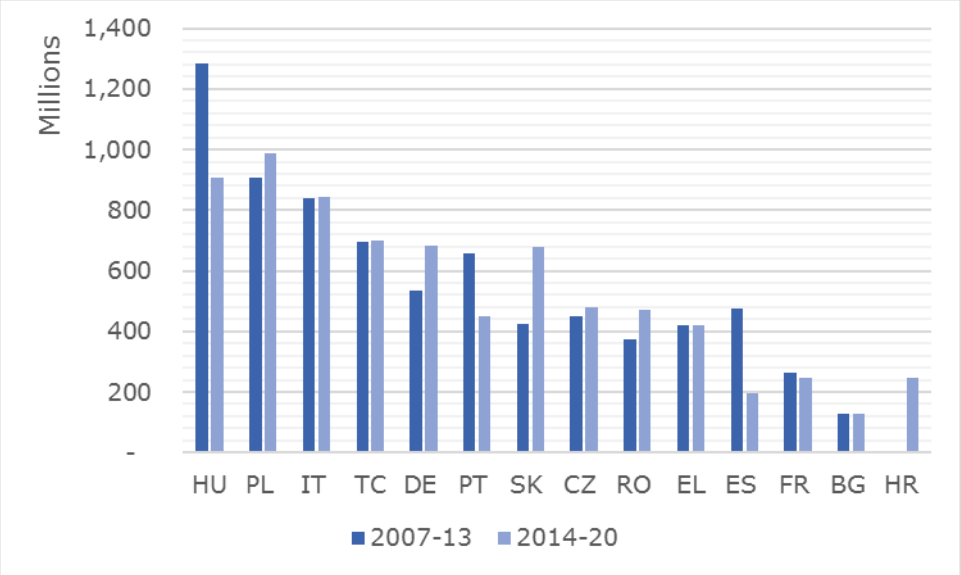
3.7.2 Cohesion Policy allocations and expenditures

3.7.2.1 Total allocations

A specific category for climate change adaptation and mitigation and environmental risks did not exist during the financing period 2000-2006. Thus, data on climate change and environmental risk prevention measures is compared only across the last two financing periods. (See Appendix C for the specific categories covered in these two periods.)

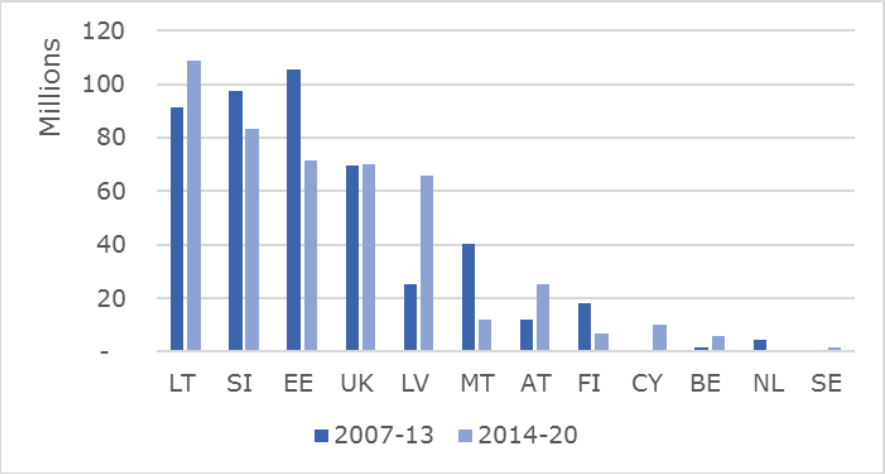
During the financing periods 2007-2013 and 2014-2020, Hungary (EUR 2.2 billion), Poland (EUR 1.9 billion) and Italy (EUR 1.7 billion) have allocated the largest amount of Cohesion Policy funds to climate change and risk prevention measures (see Figure 3-65). In addition, allocations to this sector under territorial cooperation OPs have also been relatively large (EUR 1.4 billion), if compared to the other Member States' allocations (see Figure 3-65 and Figure 3-66).

Figure 3-65 Allocations (EU amount in EUR million) to climate change adaptation and mitigation and risk prevention under ERDF and CF by Member State across two financing periods



Source: DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

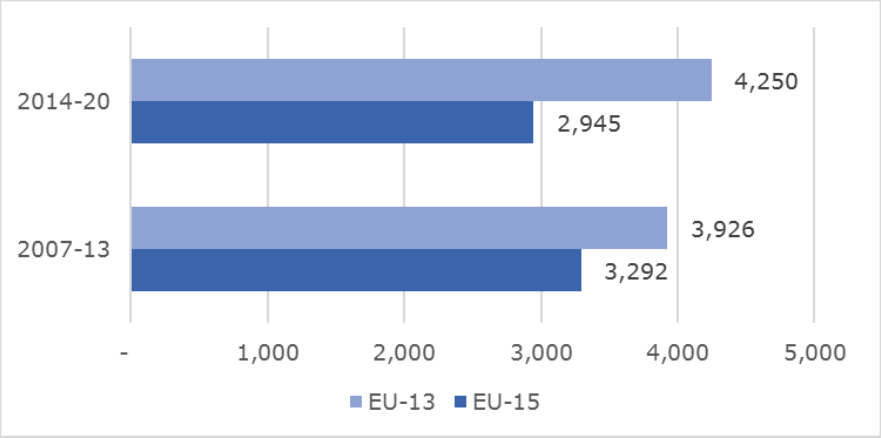
Figure 3-66 Allocations (EU amount in EUR million) to climate change adaptation and mitigation and risk prevention under ERDF and CF by Member State across two financing periods (Member State allocations under EUR 110 million per period)



Source: DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

In general, allocations to climate change adaptation and mitigation and to environmental risk prevention have been fairly stable between 2007-2013 and 2014-2020. (These figures, however, reflect environmental investments specifically for spending categories related to climate and thus do not capture indirect investments, for example for energy and transport, that can contribute to climate objectives: these are described at the end of this section.)

Figure 3-67 Allocations (EU amount in EUR million) of EU-15 versus EU-13 countries to climate change adaptation and mitigation and risk prevention under ERDF and CF across the two financing periods



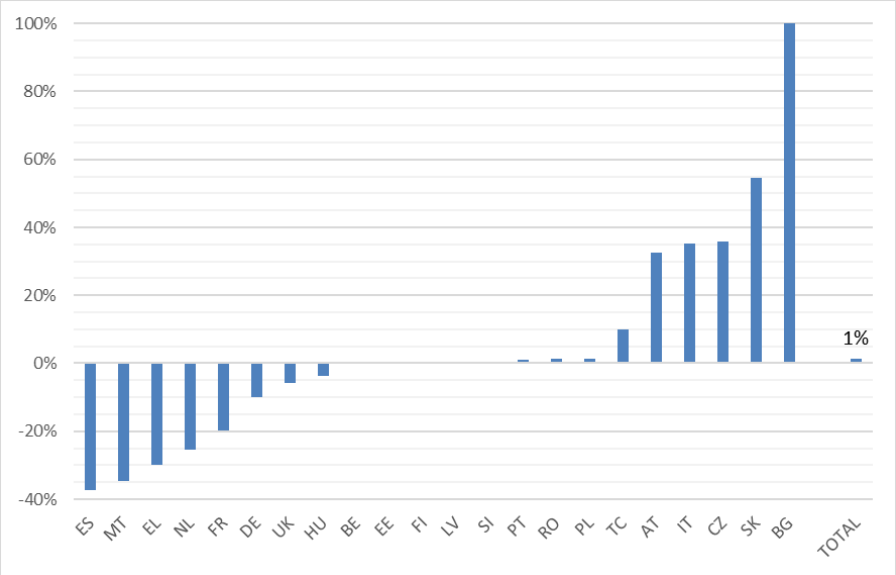
Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

3.7.2.2 Reallocations and expenditure rates in the 2007-13 programming period

Overall, allocations for climate change and risk prevention increased by 1.2% during the course of the 2007-2013 programming period, the only sector of direct environmental

investments to see an increase. Nine Member States had an increase in allocations (though for three, the change was quite small), and eight Member States, a reduction in allocations (see Figure 3-68).

Figure 3-68 Reallocations in the 2007-2013 financing period, climate change and risk prevention

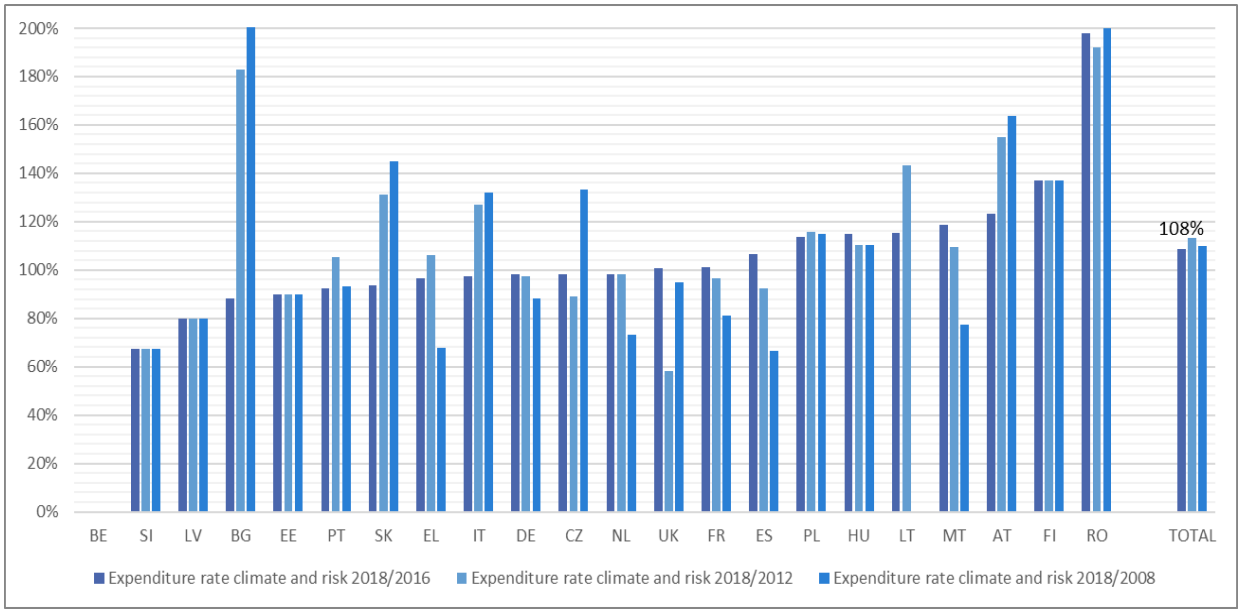


Source: DG REGIO (2016)

Note: Cyprus, Croatia and Luxembourg did not allocate CP funding in the climate and risk sector, Lithuania did not have the allocation in this sector in 2008; allocation for Bulgaria increased by 259% and in the figure has been capped at 100%

The overall expenditure rate for climate and risk prevention investments was 108% in 2018 (compared to 2016 allocations). In eight Member States (Spain, Poland, Hungary, Lithuania, Malta, Austria, Finland, and Romania), the expenditure rate exceeded 100% while only in two Member States (Belgium and Slovenia), the expenditure rate was below 70%.

Figure 3-69 Expenditure rates in the 2007-2013 financing period, climate change and risk prevention



Source: DG REGIO (2016)

Note: No OP allocations for Denmark, Sweden, Cyprus, Luxembourg, Croatia, Ireland, and Territorial Cooperation. Ratio of expenditures to allocation 2018/2008 for Bulgaria amounts to 316% and is cut in the figure at 200%.

3.7.2.3 Indirect allocations for adaptation, mitigation and risk prevention and the 'Rio markers' approach

Cohesion Policy investments for renewable energy, energy efficiency and sustainable transport can reduce CO2 emissions and thus have a positive impact on climate change mitigation, just as they can have a positive impact on efforts to improve air quality (see section 3.6.2). Over the three periods, about EUR 36 billion were allocated for sustainable energy investments and about EUR 24 billion for sustainable transport investments. A quantitative review of Cohesion Policy allocations for these sectors can be found in section 3.8.

The 'Rio markers' system can be used as an alternative method of estimating spending to address climate change. The European Commission has applied the 'Rio marker' method to track total Cohesion Policy spending on climate change mitigation and adaptation in the 2014-2020 programming period. This methodology aims to estimate the ESIF contribution to climate change and ultimately track the implementation of the EU's target for 20% spending on climate action. For Cohesion Policy funds this method is used to attribute to each intervention field values of 100%, 40% or 0%, depending on the importance of climate action as objective of the intervention field.[148] According to current Commission data, the total of ERDF and Cohesion Fund allocations in the 2014-2020 period for climate, using the 'Rio markers' approach, are EUR 55.3 billion.[149]

[148] Commission Implementing Regulation (EU) No 215/2014 of 7 March 2014

[149] European Commission (DG Regio), Data for research: climate tracking, available at: http://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/
See also: COWI, Mainstreaming of climate action into ESI Funds, Report for the European Commission (DG Climate Action), May 2016

Overall, in the 2014-2020 period the European Structural and Investment Funds allocate around 25% of their resources to climate action, most of which for climate change mitigation investments[150]. Given the cross-cutting nature of climate change and need for action across sectors, the 'Rio markers' approach provides a simple method for tracking climate expenditure across sectors and reporting on indirect climate action investments.

3.7.3 Spotlight on support for adaptation to climate change in two Territorial Cooperation Programmes

This section provides an overview of two territorial cooperation programmes, Alpine Space and Two Seas. The role of territorial cooperation programmes in Cohesion Policy has grown steadily across programming periods, reaching EUR 8.7 billion in resources in the 2007-2013 period. In parallel the attention these programmes give to environment and climate issues has grown. The territorial cooperation programmes typically develop problem-solving tools and policy approaches across Member States and regions.[151] Consequently, territorial cooperation is well-placed to address environmental issues that cross Member State borders and that present common policy challenges, as is the case for adaptation to climate change.

The Alpine Space Programme allocated EUR 10 million for climate mitigation and adaptation (i.e. priority theme '*49. Mitigation and adaptation to climate change*'), and the Two Seas Programme allocated EUR 3 million for this category: for both programmes, investments in the area of climate focused on adaptation projects. In addition, the Alpine Space Programme allocated around EUR 11.3 million to risk prevention in through priority themes '*53. Risk prevention (including the drafting and implementation of plans and measures to prevent and manage natural and technological risks*)' and *'54. Other measures to preserve the environment and prevent risks'*.

3.7.3.1 Alpine Space

The Alpine Space Programme noted that the NSRFs of participating Member States (Austria, France, Germany, Italy and Slovenia), plus national documents from Liechtenstein and Switzerland highlighted natural hazards and climate change impacts. The Programme emphasised that the Alps were affected significantly and increasingly by the impacts of climate change, creating a clear need for joint activities in this area.

Out of 57 projects financed under the Alpine Space Programme in the 2007-13 period, ten were financed under climate change categories and an eleventh project financed under the competitiveness priority addressed *Climate Change and its Impact on Tourism in the Alpine Space (ClimAlpTour)*.

[150] COWI, Mainstreaming of climate action into ESI Funds, Report for the European Commission (DG Climate Action), May 2016

[151] Stumm, Thomas, Looking back on 25 years of INTERREG and preparing the future of territorial cooperation: Background Document prepared by the Luxembourgish Presidency of the EU Council, October 2015

The climate change projects funded by the Alpine Space Programme addressed a range of issues. Their results include tools to address water scarcity, identification of actions to combat forest fires and mapping of permafrost in the Alps. Moreover, the Programme financed two 'capitalisation' projects that brought together and disseminated results in the sector. The work of Alpine Space supported the implementation of the EU Adaptation Strategy as well as adaptation work under the Alpine Convention.

3.7.3.2 Two Seas

The Two Seas Programme for the 2007-2013 period highlighted that its participating regions suffered from the effects of climate change, including drought and increased incidences of flooding, coastal erosion and technological and maritime risks. Climate change was included among the Programme's priorities, and was closely to its priorities for coastal management (see the box below).

In total, 21% of the Programme's funding was spent for objective 2.2 on risk prevention[152], which supported seven projects in the areas of: floods prevention, maritime security and safety, monitoring marine water quality, technological risks and forests management.

The Two Seas Programme reported that its projects increased awareness of climate change in coastal communities and developed management tools for adaptation.

Text Box 3-8 Support for coastal management in the Two Seas Programme

In addition to financing projects on adaptation to climate change, the Two Seas Programme supported projects for coastal management, some of which intersected with work on adaptation. The Programme did not refer to EU policy and legal documents for coastal management, such as the 2002 Recommendation concerning the implementation of Integrated Coastal Zone Management in Europe (2002/413/EC), though it cited the national strategic reference frameworks of participating Member States: these included sustainable management of coastal areas among their objectives.

The Two Seas Programme initially intended to finance several hundred micro-projects; however, its calls received fewer proposals, typically for larger scale projects. In the end, the Programme financed four projects related to coastal management. These developed tools for the management of coastal and maritime areas and supported cross-border planning.

3.7.4 Concluding notes

Cohesion Policy has devoted a growing share of its resources to climate investments. Cohesion Policy allocations for climate action and for risk prevention spending categories were just over EUR 7 billion in both the 2007-2013 and the 2014-2020 programming periods, (the 2000-2006 programming period did not have spending categories for climate). Moreover, spending in areas such as sustainable energy and transport supported action on climate. Territorial Cooperation Programmes have played an important role, allocating about EUR 700 million in each of the 2007-2013 and 2014-

[152] Programme Achievement Report (2016).

2020 programming periods: the Alpine Space and Two Seas Programmes, for example, have invested in common tools and actions to strengthen adaptation to climate change.

3.8 Overview of indirect environmental investments

This section provides quantitative data at Member State level on indirect environmental investments across the three financing periods: 2000-2006, 2007-2013 and 2014-2020 (the OP reviews did not cover indirect environmental expenditures). As noted in the previous sections, indirect investments in areas such as renewable energy, energy efficiency and sustainable transport can play an important role in supporting EU environmental and climate policy goals, notably for air quality and climate change mitigation.

3.8.1 Sustainable energy: renewable energy and energy efficiency

3.8.1.1 Total allocations

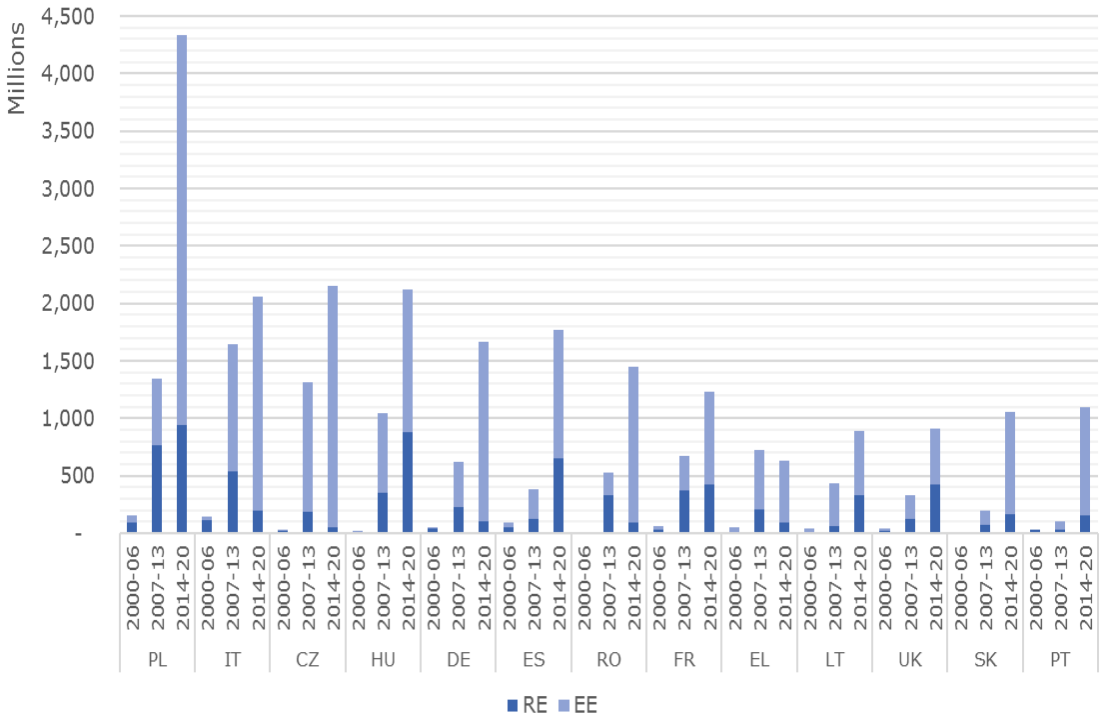
The spending categories designated as 'sustainable energy' are those for renewable energy and energy efficiency (see Appendix C for details on the specific categories across the three spending periods).

Poland (EUR 5.8 billion), Italy (EUR 3.8 billion) and Czech Republic (EUR 3.5 billion) are the countries that have allocated the largest amount of Cohesion Policy funds to sustainable energy during the last three financing periods (see Figure 3-70). With the exception of Malta, all Member States have been increasing their allocations to sustainable energy since the programming period 2000-2006 (see Figure 3-70 and Figure 3-71). Looking more closely at the composition of the allocations to sustainable energy, it can be noted that EU Member States increased consistently their allocations to energy efficiency, in particular from the financing period 2007-2013 to 2014-2020 (see Figure 3-70 and Figure 3-71).

While in the financing period 2000-2006, it was mainly EU-15 countries allocating EU resources to sustainable energy (and EU-13 accessions started midway through this period), this has changed during the last two financing periods. Allocations to sustainable energy from EU-13 countries represent almost 60% of total allocations to this area in the current financing period (see Figure 3-72).

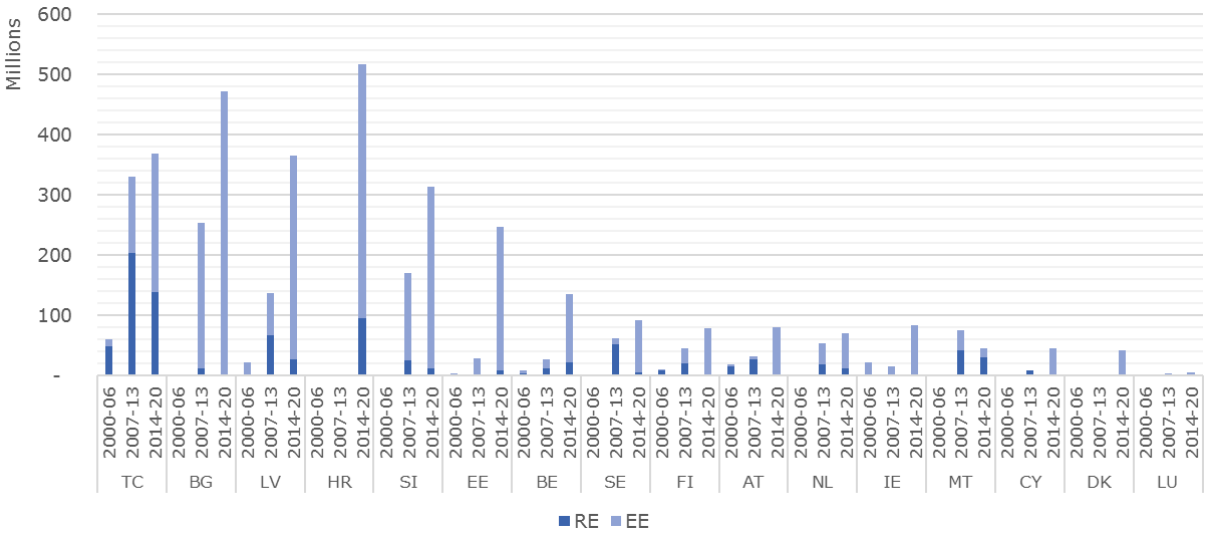
As noted in section 3.1.1, total Cohesion Policy investments for sustainable energy investments have increased steadily across the three programming periods: this trend appears due in part to the 'Lisbon earmarking' requirements for EU-15 Member States in the 2007-13 period and to the thematic objectives approach for the 2014-2020 period, including the EU's target of spending 20% of the multi-annual financial framework's resources on climate.

Figure 3-70 *Allocations (EU amount in EUR million) to sustainable energy, broken down to renewable energy and energy efficiency, under ERDF and CF by Member State across the three financing periods*



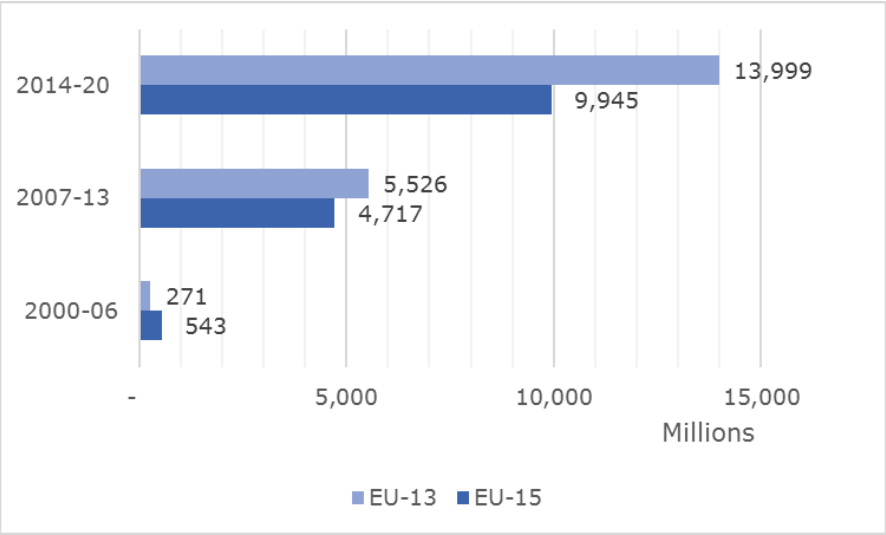
Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Figure 3-71 *Allocations (EU amount in EUR million) sustainable energy, broken-down to renewable energy and energy efficiency, under ERDF and CF by Member State across the three financing periods (Member States with EUR 500 million or less in allocations per programming period)*



Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Figure 3-72 Allocations (EU amount in EUR million) of EU-15 versus EU-13 countries to renewable energy and energy efficiency under ERDF and CF across the three financing periods

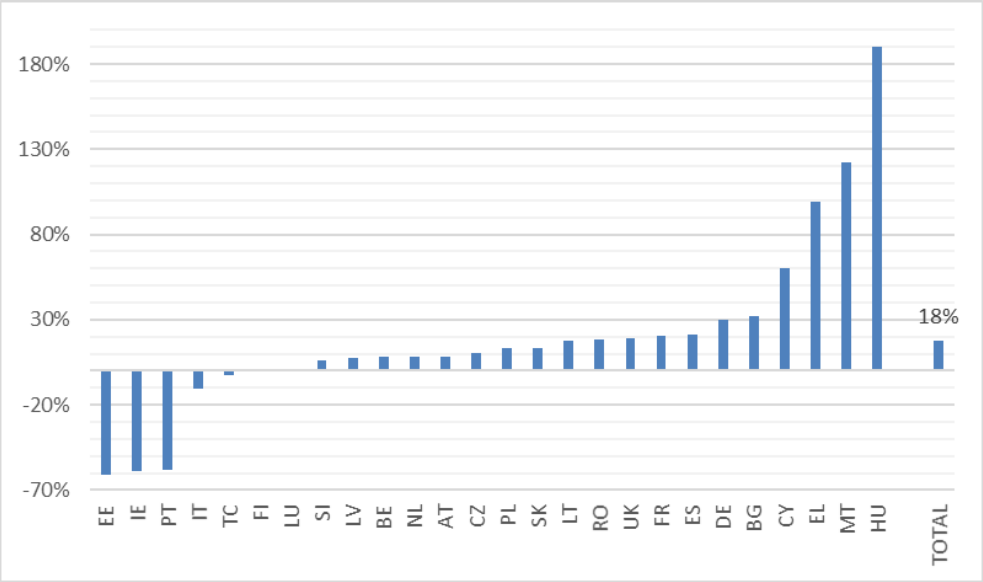


Source: see Figure 3-71

3.8.1.2 Reallocations and expenditure rates in the 2007-13 programming period

Across all Member States, the allocations for renewable energy and energy efficiency increased by 18% over the course of the 2007-13 programming period (see Figure 3-73). Allocations increased in 19 Member States, and decreased in only four (though for Estonia, Ireland and Portugal, the reductions exceeded 50%).

Figure 3-73 Reallocations in the 2007-13 financing period, renewable energy and energy efficiency

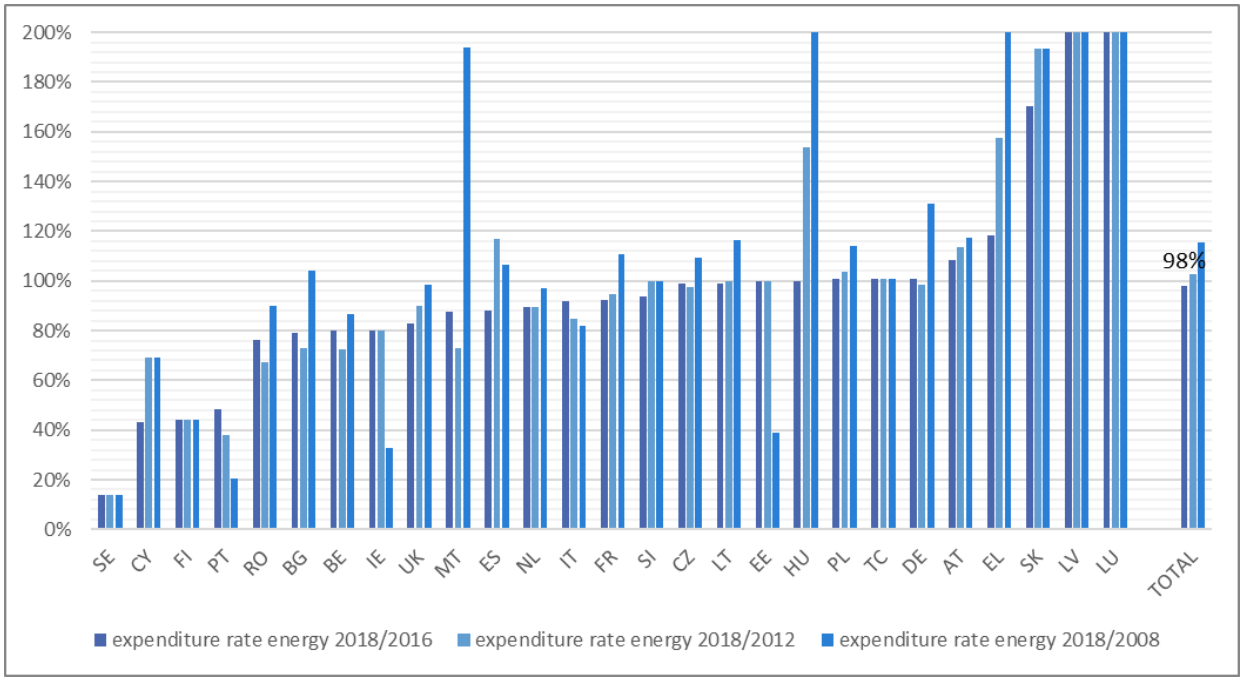


Source: DG REGIO (2016)

Note: No data on allocations to the energy sector in Croatia

The overall expenditure rate in 2018 was 98% (compared to 2016 allocations) and thus slightly lower than for direct environmental investments. Seven Member States (Poland, Germany, Austria, Greece, Slovakia, Latvia, Luxembourg) and also Territorial Cooperation Programmes exceeded 100% expenditure. Nonetheless, four Member States (Sweden, Cyprus, Finland, and Portugal) had expenditure rates below 50% (see Figure 3-74).

Figure 3-74 Expenditure rates in the 2007-2013 financing period, sustainable energy (renewable energy and energy efficiency)



Source: DG REGIO (2016)

Note: No OP allocations for Denmark and Croatia. For Hungary, Greece, Latvia and Luxembourg, the ratio of expenditures to allocations exceeds 200% (tha ratio 2018/2008 for Hungary amounts to 290% and for Greece 236%; for Latvia the ratio 2018/20012 and 2018/2008 equals 233% and 2018/2016 216%; for Luxembourg all the three calculated ratios amount to 281%) and has been cut in the figure at 200%. The allocations for Latvia and Luxembourg in 2016 constitute in aggregate 1.3% of the total allocations to the selected categories.

3.8.2 Sustainable transport

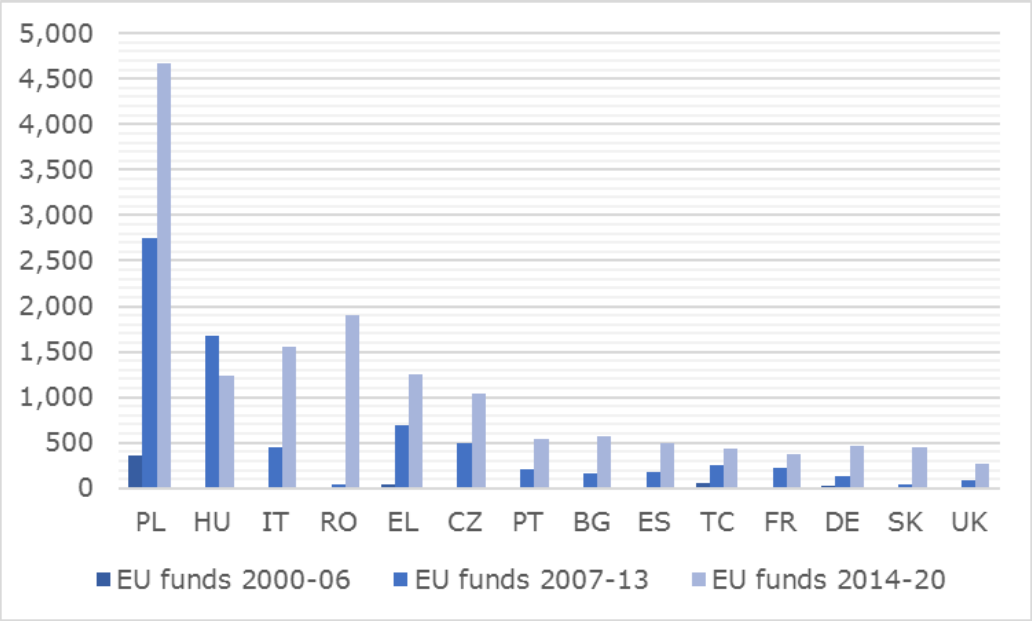
3.8.2.1 Total allocations

The spending categories designated here as 'sustainable transport' include clean urban transport systems, intelligent transport systems and cycle tracks (see Appendix C for the specific categories across the three programming periods). Other spending categories include investments for roads, rail, ports and airports. The sustainable categories have grown steadily in both total amounts and shares, reaching almost one-quarter of all transport investments in the 2014-2020 (see section 3.1).

For the sustainable transport spending categories, Poland, Hungary and Italy have allocated the highest total amounts over the three financing periods: respectively EUR 7.8 billion, EUR 2.9 billion and EUR 2.0 billion (see Figure 3-75). The amount allocated by Poland to sustainable transport in the current financing period is particularly high (EUR

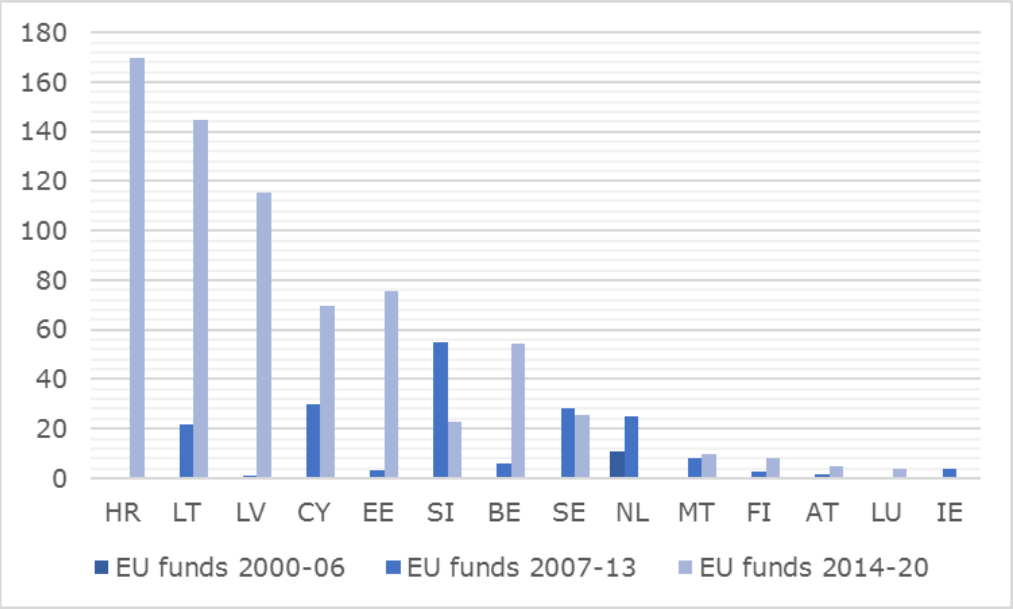
4.7 billion) compared to other Member States. Although an increasing trend of allocations to this category can be seen across all EU Member States (see Figure 3-75 and Figure 3-76), the majority of allocations occurs in the EU-13 countries (see Figure 3-77).

Figure 3-75 *Allocations (EU amount in EUR million) to sustainable transport under ERDF and CF by Member State across the three financing periods*



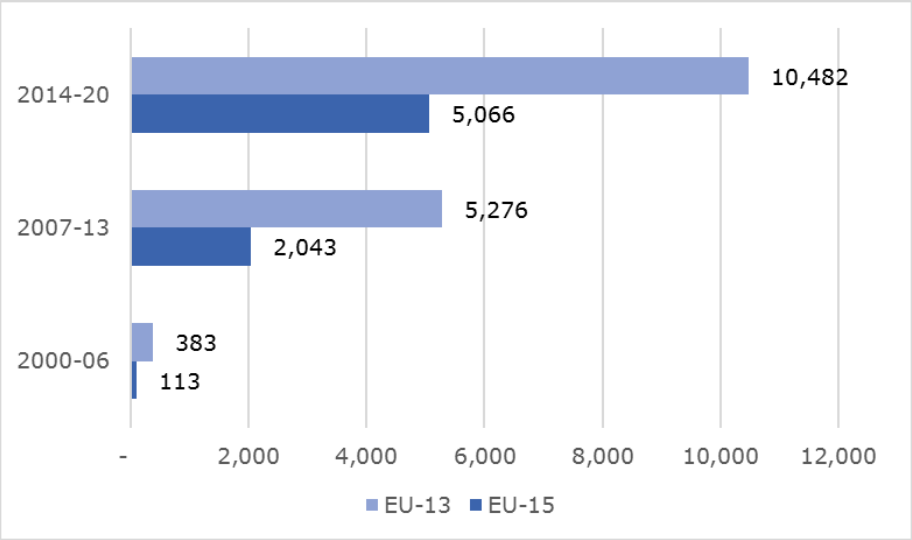
Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Figure 3-76 *Allocations (EU amount in EUR million) to sustainable transport under ERDF and CF by Member State across the three financing periods (MS with allocations under EUR 180 million per programming period)*



Source: see Figure 3-75.

Figure 3-77 Allocations (EU amount in EUR million) of EU-15 versus EU-13 countries to sustainable transport under ERDF and CF across the three financing periods

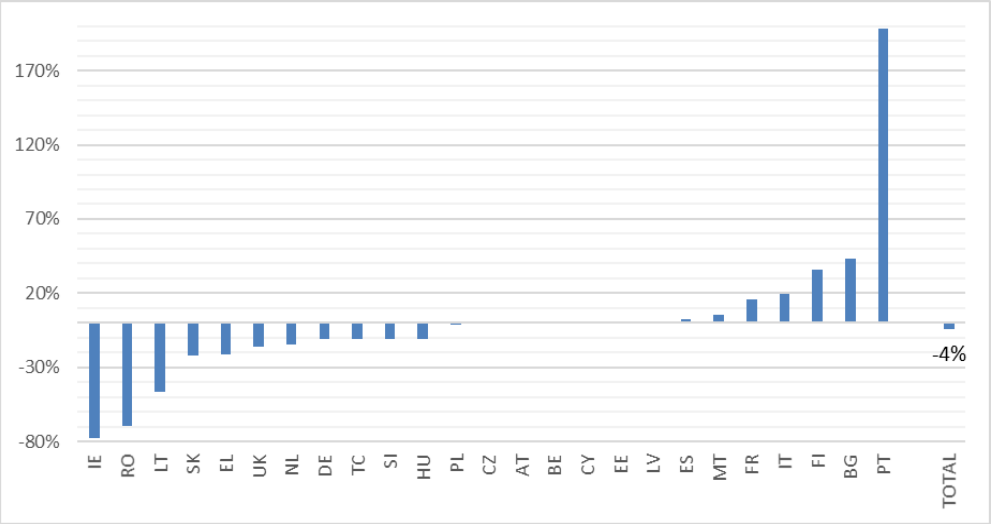


Source: see Figure 3-75.

3.8.2.2 Reallocations and expenditure rates in the 2007-13 programming period

The overall change in allocations for sustainable transport was quite small, 4%, in the programming period. Seven Member States saw an increase in allocations over the period, while eleven Member States (as well as territorial cooperation programmes) saw a decrease (see Figure 3-78).

Figure 3-78 Reallocations in the 2007-13 financing period, sustainable transport

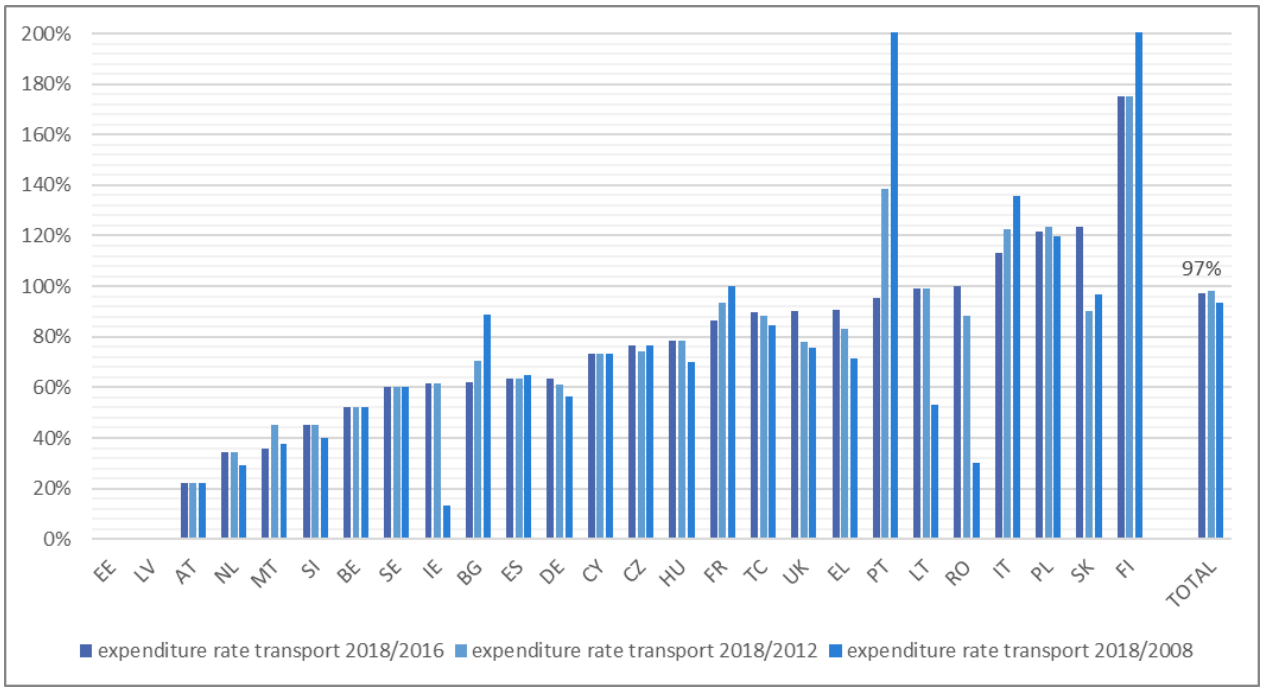


Source: DG REGIO (2016)

Note: No data on transport allocations in Luxemburg

The overall expenditure rate for sustainable transport was 97% in 2018 (compared to 2016 allocations). While four Member States (Italy, Poland, Slovakia, Finland) had expenditure rates over 100%, six (Estonia, Latvia, Austria, Netherlands, Malta and Slovenia) had rates under 50% - and of the latter, it appears that two (Estonia and Latvia) had not made expenditures by the end of 2018 (see Figure 3-79).

Figure 3-79 Expenditure rates in the 2007-2013 financing period, sustainable transport



Source: DG REGIO (2016)

Note: No OP allocations for Denmark, Luxembourg and Croatia. For Portugal and Finland, the ratio of expenditures to allocations 2018/2008 exceeds 200% (285% for Portugal and 238% for Finland) and has been cut in the figure at 200%.

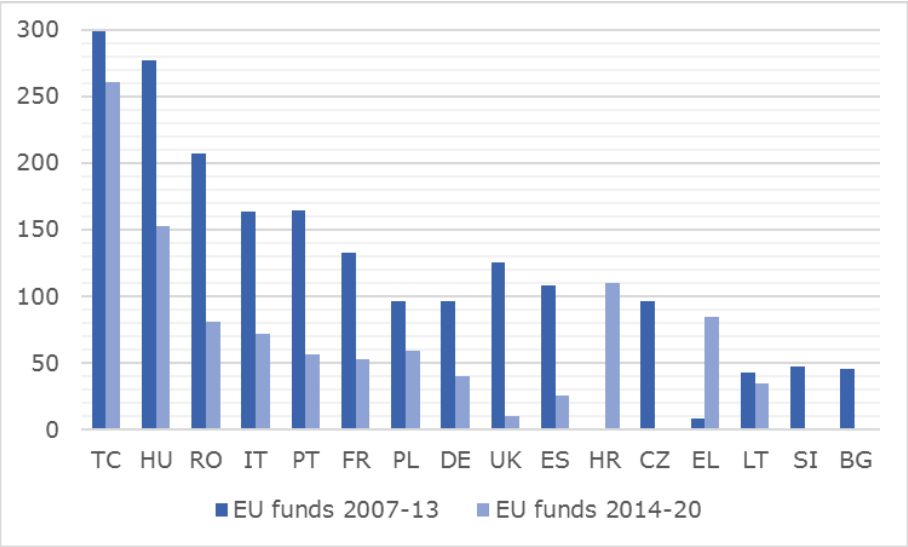
3.8.3 Sustainable tourism

3.8.3.1 Total allocations

The spending categories designated as 'sustainable tourism' are those for the development and promotion of the tourism potential of natural areas (see Appendix C for details). No category specifically covered these types of investments in the 2000-2006 programming period; consequently, data on sustainable tourism is presented only for the last two financing periods.

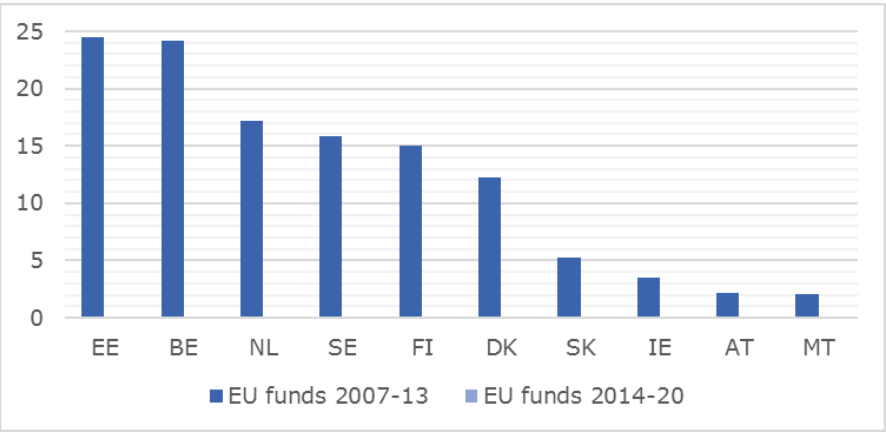
The highest amount (EUR 560 million) of Cohesion Policy funds dedicated to sustainable tourism during the last two financing periods has been allocated under territorial cooperation programmes (see Figure 3-80). Large amounts have been allocated also by Hungary (EUR 430 million) and Romania (EUR 288 million). Nevertheless, all Member States have allocated less resources to sustainable tourism in the current financing period compared to the previous one (see Figure 3-80 and Figure 3-81). In particular, 13 Member States – Czech Republic, Slovenia, Bulgaria, Estonia, Belgium, Netherlands, Sweden, Finland, Denmark Slovakia, Ireland, Austria and Malta – have not allocated any resources to this sector during the period 2014-2020, in contrast to their allocations during the previous period see Figure 3-80 and Figure 3-81). During the financing period 2014-2020, both EU-15 and EU-13 countries have decreased their allocations to this category by almost 50% compared to the previous period (see Figure 3-82).

Figure 3-80 Allocations (EU amount in EUR million) to sustainable tourism under ERDF and CF by Member State across the three financing periods



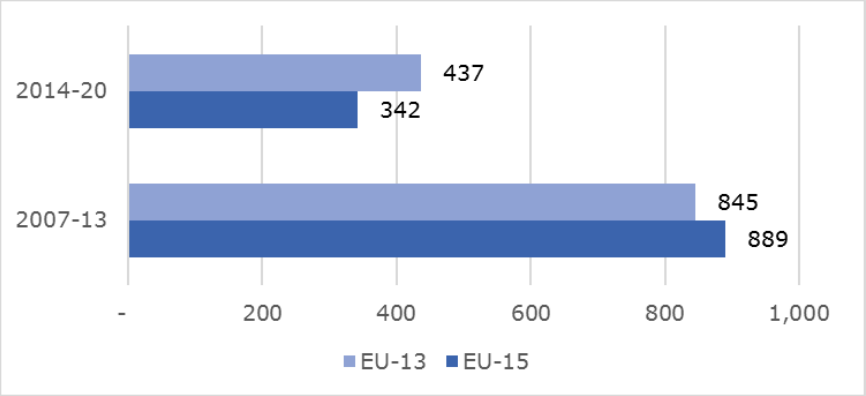
Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Figure 3-81 Allocations (EU amount in EUR million) to sustainable transport under ERDF and CF by Member State across the three financing periods (MS with allocations under EUR 25 million per programming period)



Source: see Figure 3-80.

Figure 3-82 Allocations (EU amount in EUR million) of EU-15 versus EU-13 countries to sustainable tourism under ERDF and CF across the three financing periods

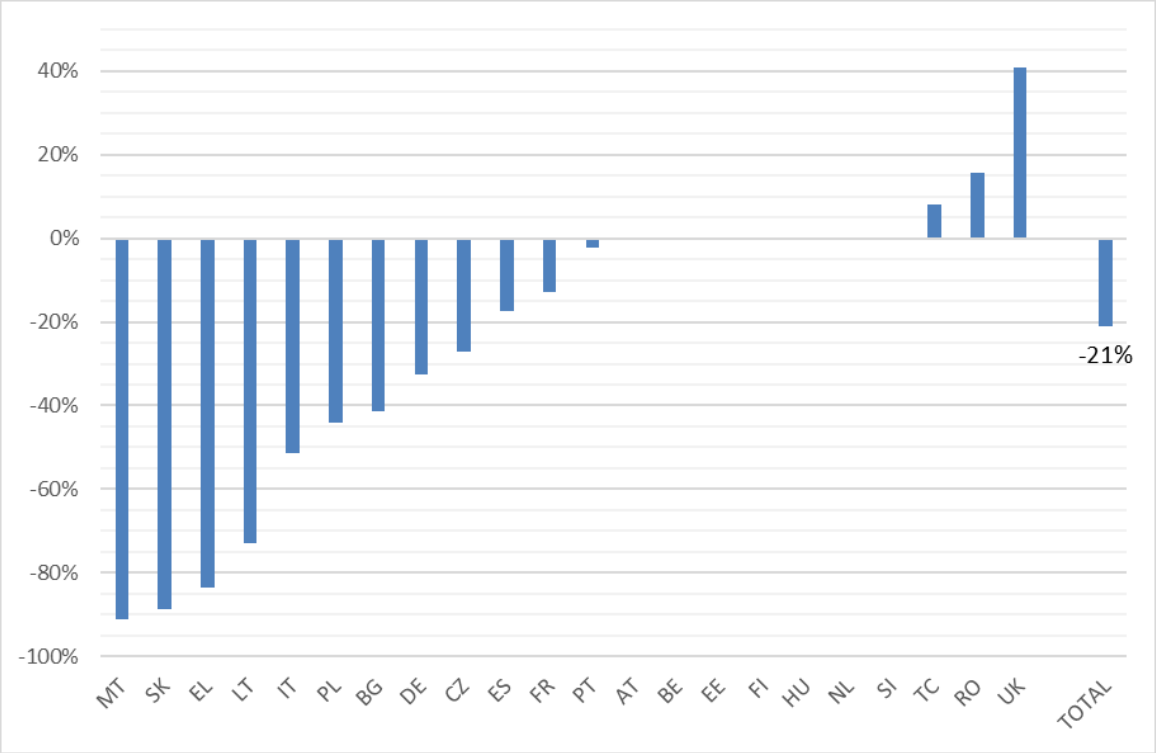


Source: see Figure 3-80.

3.8.3.2 Reallocations and expenditure rates in the 2007-13 programming period

Overall, this sector saw a reduction in allocations of 21% over the 2007-13 programming period. Only two Member States, Romania and UK, had an increase in allocations, as did territorial cooperation programmes. In contrast, 12 Member States saw reductions in their allocations to this sector (see Figure 3-83).

Figure 3-83 Reallocations in the 2007-13 financing period, sustainable tourism

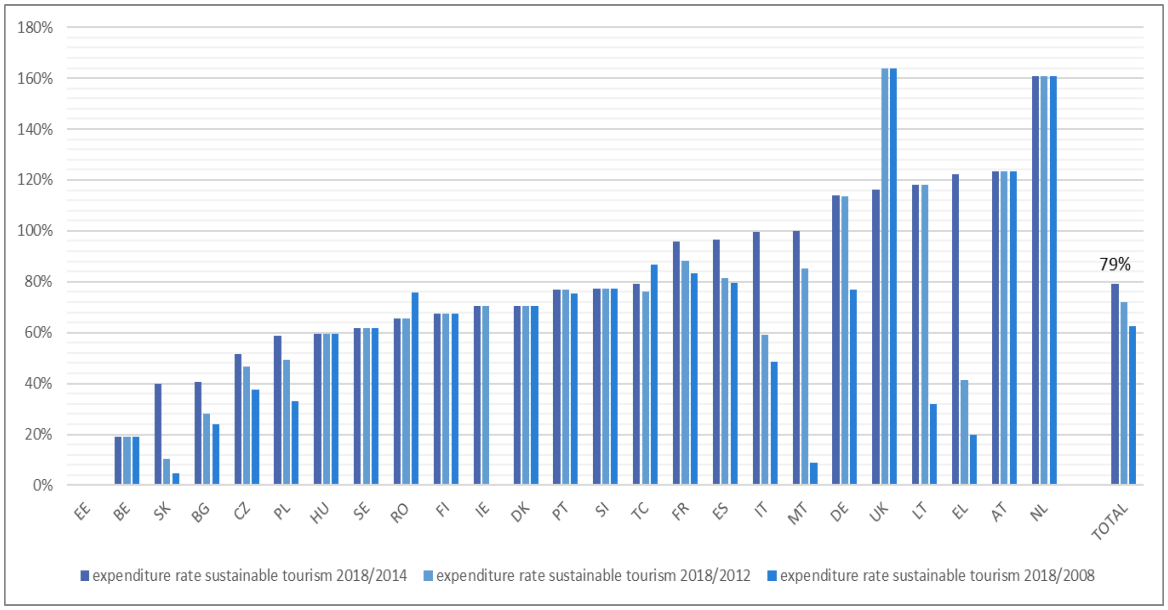


Source: DG REGIO (2016)

Note: No data on allocations in Luxemburg, Cyprus and Latvia; Ireland did not have allocations in this sector in 2008 (while they appear in 2016)

Overall expenditure rates were relatively low in this sector: 79% reported in 2018, compared to 2016 allocations. While six Member States (Germany, UK, Lithuania, Austria, Greece, the Netherlands) had expenditure rates exceeding 100%, for four Member States (Estonia, Belgium, Sweden, Bulgaria) the level was below 50% - and for one (Estonia), expenditure was essentially zero in this sector (see Figure 3-84 below).

Figure 3-84 Expenditure rates in the 2007-2013 financing period, sustainable tourism



Source: DG REGIO (2016 and 2018)

3.8.4 Environment-related business development and R&D

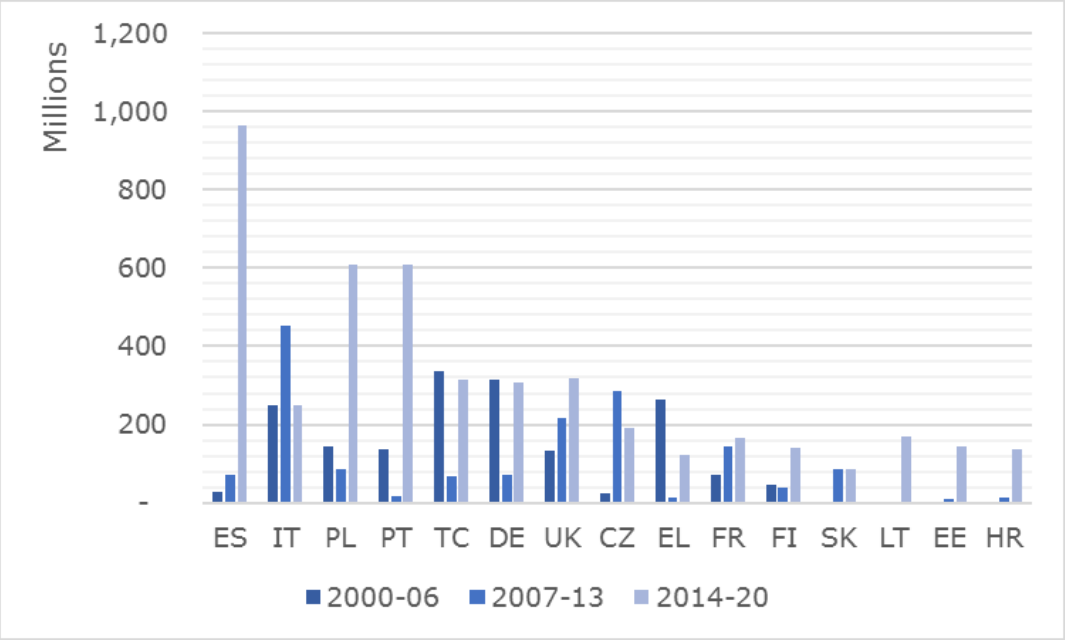
3.8.4.1 Total allocations

The spending categories included here refer to environmentally-friendly production processes and resource efficiency as well as research and development for the low-carbon economy. The spending categories have changed over the three programming periods – in particular, categories related to the second topic, research and development for the low-carbon economy, only appeared in the 2014-2020 period. Consequently, comparability is a question in this area: information is not available to indicate the extent to which the new categories promoted new types of investments or only captured types of investments accounted under other categories in previous periods. (See Appendix C for the spending categories used across the three programming periods.)

Spain (EUR 1.1 billion), Italy (EUR 952 million), Poland (EUR 840 million) and Portugal (EUR 765 million) are the countries that have allocated the largest total amounts to environmentally friendly business development and R&D activities over the three financing periods (see Figure 3-85 below). While certain Member States have increased their allocations to this sector across the three periods (e.g. Spain, UK and France), others have decreased allocations from 2000-2006 to 2007-2013 and then increased them from 2007-2013 to 2014-2020 (e.g. Poland, Portugal and Germany) (see Figure

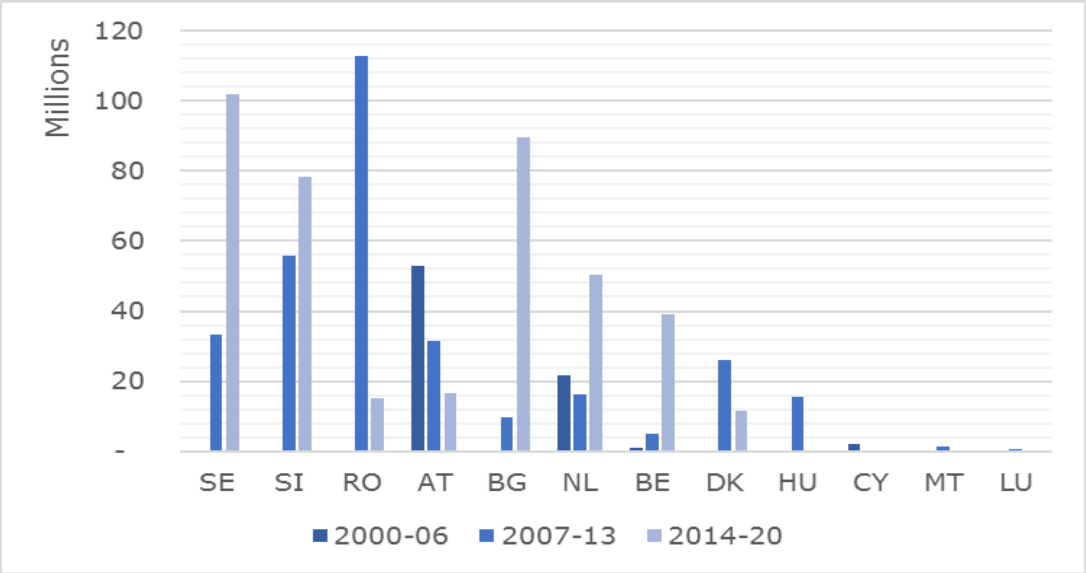
3-85 and Figure 3-86). Nonetheless, spending by both EU-15 and EU-13 Member States has increased, in particular in the 2014-2020 period: this may be related to the thematic concentration requirements and the focus on spending for the low-carbon economy in this period (see Figure 3-87).

Figure 3-85 *Allocations (EU amount in EUR million) to environment-related business development and R&D activities under ERDF and CF by Member State across the three financing periods*



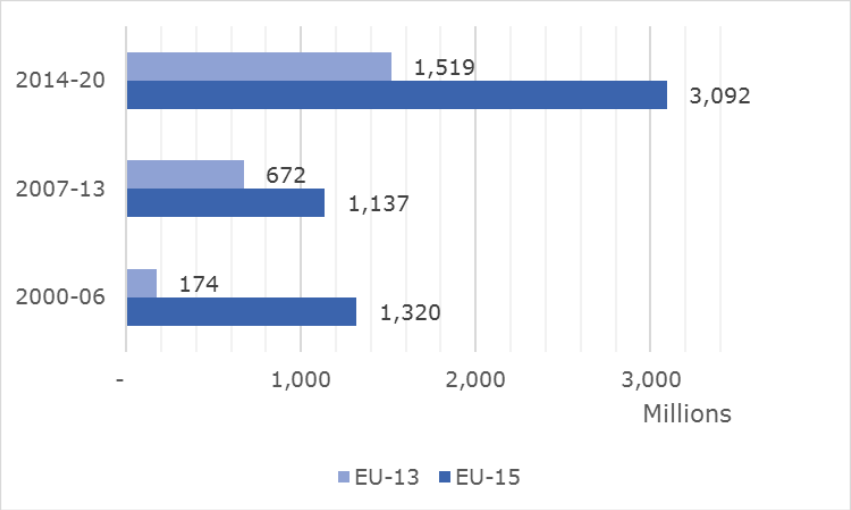
Source: DG Regional and Urban Policy (2016) for 2000-2006; DG Regional and Urban Policy (2016) for 2007-2013; InfoRegio, ESIF categorisation (2016) for 2014-2020.

Figure 3-86 *Allocations (EU amount in EUR million) to environment-related business development and R&D activities under ERDF and CF by Member State across the three financing periods (Member States with under EUR 120 million in allocations per programming period)*



Source: see Figure 3-85.

Figure 3-87 *Allocations (EU amount in EUR million) of EU-15 versus EU-13 countries to environment-related business development and R&D activities under ERDF and CF across the three financing periods*

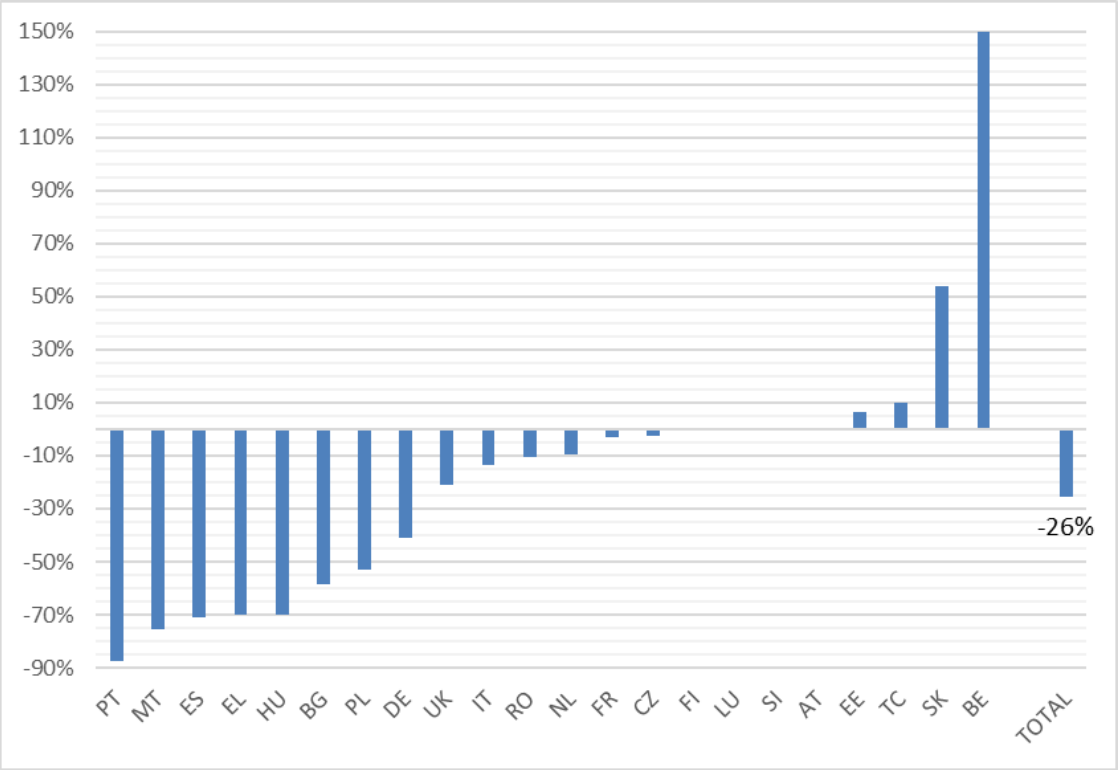


Source: see Figure 3-85.

3.8.4.2 Reallocations and expenditure rates in the 2007-13 programming period

Allocations for business development and R&D fell by 26% over the programming period. Only three Member States increased their allocations, as did territorial cooperation projects, while 14 Member States saw reductions (see Figure 3-88).

Figure 3-88 Reallocations in the 2007-2013 financing period, environment-related business development and R&D

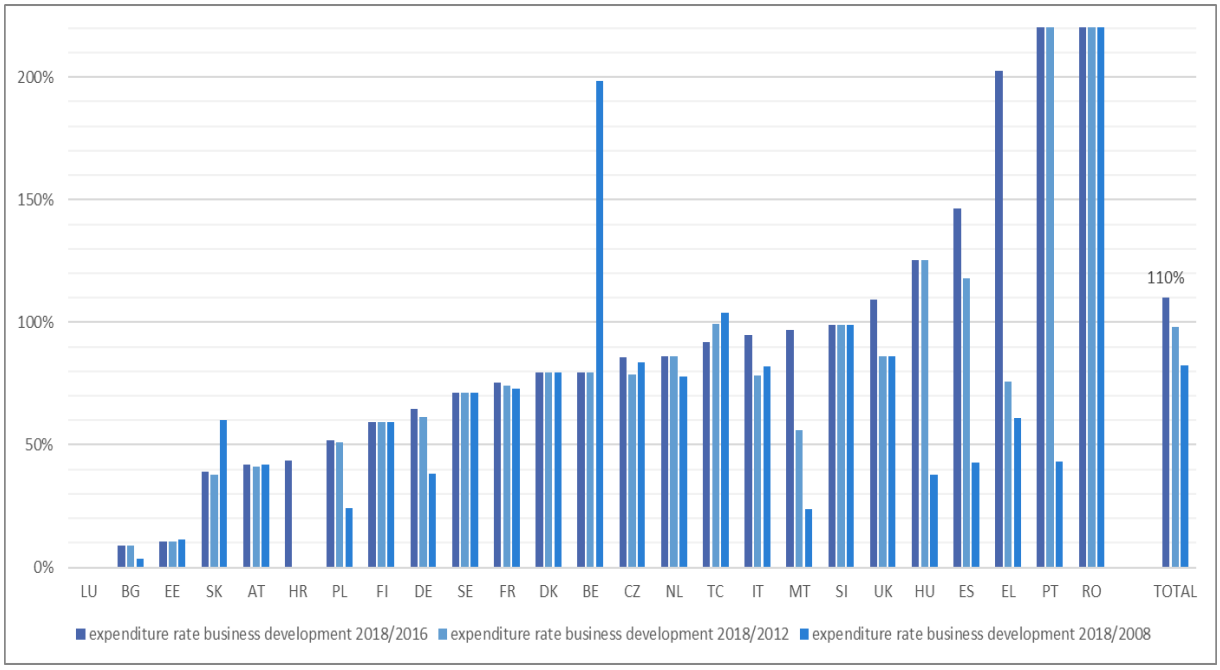


Source: DG REGIO (2016)

Note: No data on allocations for Lithuania

Overall expenditure rate in 2018 was 110%, compared to 2016 allocations, which is the highest among the sectors of indirect environmental investments. Six Member States (UK, Hungary, Spain, Greece, Portugal, Romania) saw expenditure rates exceeding 100% (see Figure 3-89), while six (Luxembourg, Bulgaria, Estonia, Sweden, Austria, Croatia) had expenditure rates below 50%.

Figure 3-89 Expenditure rates in the 2007-2013 financing period, environment-related business development and R&D



Source: DG REGIO (2016)

Note: No OP allocations for Cyprus, Latvia and Lithuania. Ratio of expenditure to allocation 2018/2016 for Greece equals 203%, for Portugal 328%, and for Romania 434%. Ratio 2018/2012 for Portugal equals 224% and for Romania both ratios for 2018/2012 and 2018/2008 equal 389%. These have been cut at 200%. The aggregate OP allocations for Greece, Portugal and Romania in 2016 constitute approximately 8% of total OP allocation to the selected categories.

4 Horizontal integration of environmental concerns

This chapter presents our findings with respect to horizontal integration of environmental concerns in Cohesion Policy. The chapter is organised according to the main analytical dimensions as outlined in the methodology (ref. section 2.3.5):

- Section 4.1 concerns the integration of horizontal principles and objectives in OPs and looks in particular at how key principles and concerns are reflected in chapter 11 of the selected OPs.
- Section 4.2 reviews result indicators for the selected OPs to assess the extent to which they capture environmental concerns.
- Section 4.3 provides an analysis of the effectiveness of Strategic Environmental Assessment in ensuring integration of environmental concerns
- Section 4.4 contains a review of how selection criteria have worked as a vehicle for integration of environmental concerns
- Section 4.5 looks at investments in the transport and energy sectors in particular and how environmental concerns have been integrated
- Section 4.6 provides some methodological considerations on the contribution of Cohesion Policy to green jobs creation and the circular economy

As explained in section 2.3.5 the analysis focuses on the current programming period (2014-2020) based on analysis of a set of selected OPs. The selection includes 32 OPs (of which 6 are ERDF + ESF multifund OPs), including 27 national and regional OPs covering 11 Member States, as well 5 European Territorial Cooperation programmes (ETCs). It also reflects on the development over the three programming periods based on a desk review of relevant regulatory documents and studies concerning the two previous programming periods (2000-2006 and 2007-2013).

4.1 Integration of horizontal principles and objectives

The key question addressed in this section is: *To which extent have environmental concerns been integrated in the OPs?*

We assess how OPs promote the integration of environmental concerns through[153]:

[153] In addition to the dimensions mentioned in the list, we have also reviewed OP principles for selection criteria: We have reviewed the guiding principles for selection of operations for the selected OPs, to assess the extent to which they take into account environmental concerns.

- The elaboration of sustainable development as a horizontal principle (section 4.1.1).
- The intention to encourage the use and prioritization of projects entailing the use of GPP, as this is indicated in OPs (section 4.1.2).
- The delineation of the polluter pays principle and how it is foreseen to be implemented by the OPs (section 4.1.3).

In each of the following sub-sections, we first discuss relevant aspects of the regulatory and guideline framework. We then present literature review findings that concern primarily the previous two programming periods drawing among others on:

- the 2011 study by IEEP '*Cohesion Policy and Sustainable Development, A report for DG Regio'*[154] (hereafter referred to as the "IEEP study"), as well as
- the ENEA-MA 2016 report on ' Mainstreaming the environment in cohesion policy in 2014-2020'*[155]* (hereafter referred to as the " ENEA-MA report").

Finally, we present the findings from our review of 32 selected OPs (including 6 ERDF/ESF multi-funds) from the 2014-2020 programming period.

4.1.1 Consideration of sustainable development as a horizontal principle

4.1.1.1 Regulatory and guidelines framework

Since the 2000-2006 period, Cohesion Policy OP development and implementation have been increasingly subject to a more systematic and comprehensive framework for integrating environmental considerations.

The Structural Funds General Provisions Regulation for the **2000-2006 period**, included several references to the concept of sustainable development and environmental integration. For example, Article 1 (Objectives) mentions that in pursuing its efforts to strengthen economic and social cohesion "*the Community shall contribute to the harmonious, balanced and sustainable development of economic activities, the development of employment and human resources, the protection and improvement of the environment, and the elimination of inequalities, and the promotion of equality between men and women*"[156]. It stipulated that the plans submitted shall include "*a description of an appropriate strategy to attain the objectives referred to in Article 1 and*

[154] Hjerp, P., Medarova-Bergstrom, K., Cachia, F., Evers, D., Grubbe, M., Hausemer, P., Kalinka, P., Kettunen, M., Medhurst, J., Peterlongo, G., Skinner, I. and ten Brink, P., (2011) Cohesion Policy and Sustainable Development, A report for DG Regio, October 2011

[155] ENEA-MA (2016), Mainstreaming the environment in cohesion policy in 2014-2020, Report of the European Network of Environmental Authorities – Managing Authorities (ENEA-MA) working group, September 2016, http://ec.europa.eu/environment/integration/pdf/enea/ENEAMA_eport_April_2017_24.pdf

[156] Ref. Article 1 (Objectives), COUNCIL REGULATION (EC) No 1260/1999 of 21 June 1999 laying down general provisions on the Structural Funds, http://ec.europa.eu/regional_policy/sources/docoffic/official/regulation/content/en/02_pdf/00_1_sf_1_en.pdf

the priorities selected for the sustainable development and conversion of regions and areas",

Sustainable development as a horizontal principle was further expounded in the Commission guidelines for programmes in the period 2000-06, which made reference to the Amsterdam Treaty emphasis on sustainable development and stipulated that "*environmental considerations, and in particular compliance with community environmental and nature protection legislation, must be incorporated into the definition and implementation of measures supported by the Structural Funds and the Cohesion Fund*"[157]. Programme development was informed by Commission guidance documents on horizontal integration.

In the reform of the Cohesion Policy in the **2007-2013 period**, sustainable development became a binding cross-cutting principle for all funding objectives. In addition to referring to the concept of sustainable development in its Objectives (Article 3), the General Regulation for the 2007-2013 period, includes a separate article on sustainable development (Article 17), stipulating that "t*he objectives of the Funds shall be pursued in the framework of sustainable development and the Community promotion of the goal of protecting and improving the environment as set out in Article 6 of the Treaty*"[158]. The environmental pillar of sustainable development remained a key dimension, strengthened also by requirements to carry out SEAs and EIAs. The Community strategic guidelines on cohesion for the same period called attention to the principle of sustainable development in taking on board the renewed Lisbon agenda in the programmes: "*Member States and regions should pursue the objective of sustainable development and boost synergies between the economic, social and environmental dimensions. The renewed Lisbon strategy for Growth and Jobs and the National Reform Programmes emphasise the role of environment in growth, competitiveness and employment. Environmental protection needs to be taken into account in preparing programmes and projects with a view to promoting sustainable development*"[159].

The Common Provisions Regulation (CPR) for the **2014-2020 period** goes beyond the relatively general provisions on sustainable development of the 2007-2013 period by operationalising the sustainable development principle and ensuring an evaluation feedback of Partnership Agreements[160]: the CPR operationalises the principle by including specific provisions on how it should be implemented in practice. *"[It] starts with a broader formulation of the Article 8 on Sustainable Development and lists specific elements which should be taken into account (e.g. resource efficiency, climate change or*

[157] page 2, European Commission (1999), THE STRUCTURAL FUNDS AND THEIR COORDINATION WITH THE COHESION FUND - Guidelines for programmes in the period 2000-06, Communication from the Commission, 1.7.99

[158] Council Regulation (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999, http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006R1083&from=EN

[159] COUNCIL DECISION of 6 October 2006 on Community strategic guidelines on cohesion (2006/702/EC), http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006D0702&from=EN

[160] p.10, ENEA-MA report

biodiversity). It also integrates sustainable development as a cross-cutting principle in the provisions of the Partnership Agreement and OPs. As regards the latter, it requires not only that an SEA (if applicable), but also an ex ante evaluation to assess the adequacy of planned measures to promote sustainable development"[161].

4.1.1.2 Data on the 2000-2006 period

The ex-post evaluation of the 2000-2006 programming period, WP5B on *Environment and Climate Change*[162] - done on the basis of a review of 22 OPs - found that: None of the analysed OPs contained a comprehensive analysis of how environmental issues may interact with the economic and social development of the regions. Decisions on the allocation of funds were driven by sectoral approaches rather than addressing the regional needs from a more integrated perspective. The interventions in the environmental sector were designed to address the main environmental issues within the framework of sectoral policies and were not integrated into a regional perspective. This was particularly true for the major sectoral programmes covering environment that were oriented towards environmental objectives.

WP11 '*Management and Implementation Systems*' of the evaluation of the same period included a task to assess sustainable development, which comprised 10 case studies. The study noted the trend from environmental inclusion towards a broader three-dimensional approach to sustainable development, and that a momentum for integrating sustainable development had been initiated with good practice examples existing in some Member States. However the absence of national or regional sustainable development strategies and the non-familiarity with the concept of sustainable development meant that it was not obvious who should represent the theme or what method to be followed. As part of the overall conclusions, the study found that sustainable development as a horizontal theme got little attention in programme design and implementation – mostly seen as a question of fulfilling regulatory requirements rather than developing the concept[163]. The study recommended better EU guidance and methodologies and stronger reliance on EU, regional and national sustainable development strategies.

Along similar lines, the guidance on '*Greening projects for jobs and growth*' by the GRDP project[164] emphasised examples of good practise from the 2000-2006 period, which shows that there were countries that had made progress in this area already during this period. So even if the WP5B evaluation concluded that generally, integration of environmental concerns was limited, other studies show that some countries were working with this issue in a systematic way and generating good practise in the area.

4.1.1.3 Data on the 2007-2013 period

The IEEP study discusses some insights from early experience in applying three types of environmental integration instruments (strategic, procedural, organisational) for

[161] p.10, ENEA-MA report

[162] ADE (2009), Ex post Evaluation of Cohesion Policy Programmes 2000-2006 co-Financed by the European Fund for Regional Development (Objectives 1 and 2) – Work Package 5b: Environment and Climate Change

[163] EPRC (2009), Ex post Evaluation of Cohesion Policy Programmes 2000-2006 co-Financed by the European Fund for Regional Development (Objectives 1 and 2) – Work Package 11: Management and Implementation Systems for Cohesion Policy, p. 149-150

[164] http://www.interreg4c.eu/uploads/media/pdf/5_Greening_Projects_for_Growth_and_Jobs_GRDP.pdf

environmental integration in the 2007-2013 period, including the application of sustainable development as a horizontal principle, on the basis of 26 case studies. It found that a number of Member States and regions had framed sustainable development as a horizontal principle in the OPs; however, the actual integration of sustainability concerns proved challenging during the implementation of programmes (particularly in terms of translating them into the system of generating, appraising and selecting projects for financing). In particular, the newer Member States struggled to operationalise the complexity of sustainable development into what it should concretely mean for project development. In Hungary, for instance, it was reported that horizontal objectives are seen merely as an administrative obligation (subsequently a new legislative act was adopted in Hungary, describing how to integrate horizontal requirements into operational programmes and support schemes in 2014-2020 programming period). In other cases, such as in Malta, environmental considerations and sustainability were not discussed as a horizontal priority, but were pursued only in a separate Priority Axis.

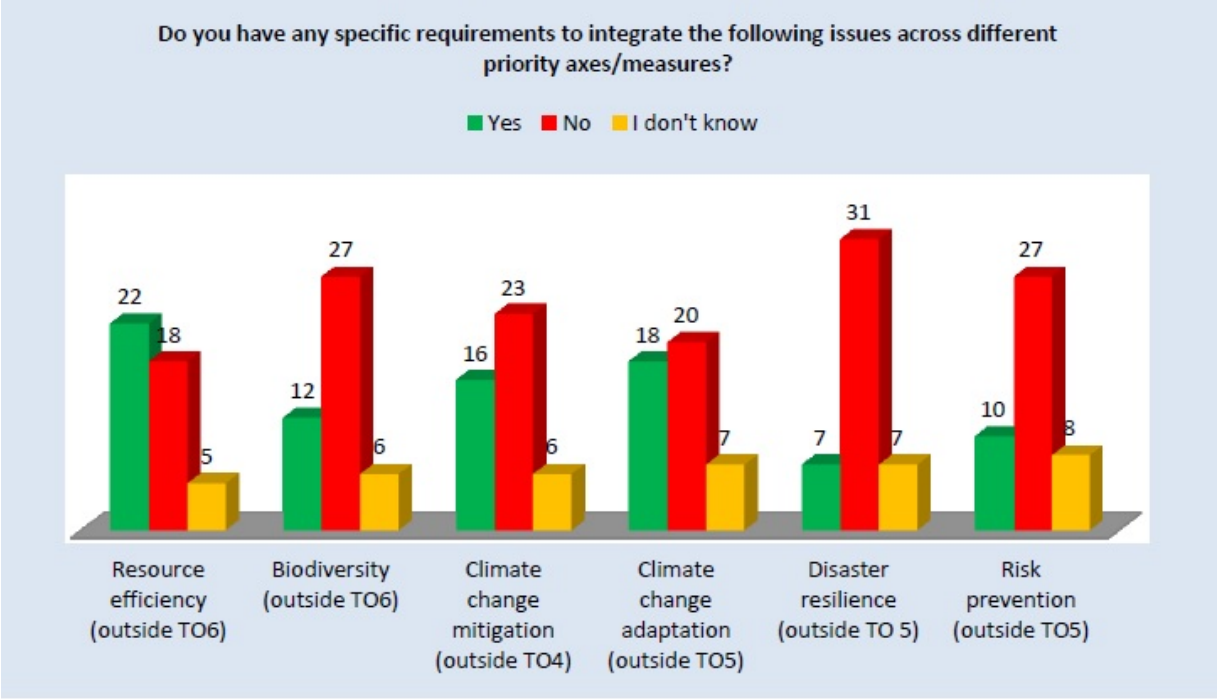
4.1.1.4 Data on the 2014-2020 period

By 2014-2020 there is some evidence that authorities were responding to the increased emphasis at the EU level on horizontal integration of sustainable development: 40 of 49 Managing Authorities surveyed for the ENEA-MA report could identify some sort of arrangements to apply legal requirements (20) or other arrangements (20) to apply environmental integration/sustainable development as a horizontal principle[165].

Further, the same survey asked about specific requirements in relation to the specific environmental issues mentioned in the CPR Art. 8. The following graph indicates that these measures do not always really translate into issue-specific requirements.

[165] p. 27, ENEA-MA report

Figure 4-1 Survey results on requirements for integration of environmental issues



Source: ENEA-MA report, p. 28

The ENEA-MA report did a sample analysis which showed great variance in how the section on 'Sustainable Development' (OP section 11.1) in the OPs was tackled in the various Member States (p. 30-31): several Member States refer to Art. 8 of the CPR and to EU level policies to describe the integration of sustainable development or include references to national sustainable development strategies, while in some cases the section included very specific integration measures and requirements with respect to eligibility criteria.

4.1.1.5 Review of OPs from the 2014-2020 period

We have reviewed OP section 11.1 on 'Sustainable Development' (chapter 8 for the case of ETCs) for 32 OPs from the 2014 -2020 programming period (for an overview of the selected OPs, see section 2.3.5.2 as well as Appendix A).

We present detailed observations for each reviewed OP in Appendix J. Similar to the ENEA-MA report findings, we also found a significant variance in the approach taken by the OPs to tackle this section of the OP. Yet some commonalities are still present and the following general observations can be drawn:

- Close to half of the OPs reviewed (14/32) make reference in chapter 11 on Sustainable Development to the process of SEA as the means through which environmental sustainability has been integrated in the elaboration of the OP.
    - A few of these programmes allude more explicitly to a (potentially) more continuous role for the SEA as an instrument of decision support in all phases of definition of the programme and the selection of operations though the specification of project selection criteria in conformity with the OP SEA (e.g.

Attica OP, ES Sustainable growth ERDF 2014-20 OP, IT National Operational Programme on Infrastructures and Networks).

- Close to a third of the reviewed OPs (10/32), either refer to those priority axes that encompass environmental investments and describe how these are set to bring about environmental benefits, or how planned activities directly or indirectly address environmental concerns and contribute to sustainable development. Thus, the consideration of "vertical environmental integration" in the OP appears to form part of the elaboration of the chapter on horizontal principles.

- Some OPs put emphasis on the key role of the Managing Authorities during implementation in ensuring full integration of environmental protection requirements and sustainable development.

- Most programmes that encompass transport-related investments refer to the principle of respecting the EIA Directive (or corresponding national) provisions, as well as the Habitats Directive.

- The encouragement of use and prioritisation of projects entailing the use of GPP is mentioned in chapter 11 of close to half of the OPs (14/32 OPs). [More details about the consideration of GPP practices in the OPs are presented in section 4.1.2. of this report]

- In terms of environmental areas/themes (as in those mentioned in the CPR), resource efficiency (mostly interpreted as waste management and reuse and energy resource efficiency) was the most frequently addressed by the section on sustainable development as a horizontal principle. References to environmental protection requirements (mostly in the context of biodiversity and sometimes air quality) and climate change came second in frequency.

4.1.2 Integration of environmental concerns through Green Public Procurement

Green public procurement (GPP) is one of the tools that can facilitate environmental integration in Cohesion Policy, and is essentially about integrating environment-related ("green") criteria into calls for tender by public and semi-public organisations, as well as using whole life costing to calculate the total costs of products and services.

In this section, we look primarily at the aspect of how Cohesion Policy could promote the uptake of GPP by making its application part of the selection/reward criteria for funding (in the selection of projects by MAs as the procurement activity), but we also consider the role of Cohesion Policy in encouraging the establishment of GPP schemes.

4.1.2.1 Regulatory and guidelines framework

For the 2000-2006 period, neither the EC Regulations governing the funds nor the Community Support Guidelines mention GPP. This was still the case for the 2007-2013

period regulations and guidelines, despite prior relevant recommendations of the EU Sustainable Development Strategy. In 2009, the EEA[166] recommended a) the development of guidelines for the application of GPP in Structural and Cohesion Funds, to demonstrate best practices in Member States and to promote GPP as a priority for spending by the Operational Programmes; and b) that the European Commission undertake an evaluation of the GPP in the 2007-2013 spending cycle, with the view to incorporating the guidelines into the Regulations for the next spending cycle.

Subsequently, a reference to GPP was included in the CPR governing the funds for the 2014-2020 period (No 1303/2013), in Annex I of the Common Strategic Framework (CSF), which provides strategic guiding principles in order to achieve an integrated development approach using the ESI Funds. More specifically section 5.2 of the CSF states that "*Managing authorities shall undertake actions throughout the programme lifecycle, to avoid or reduce environmentally harmful effects of interventions and ensure results in net social, environmental and climate benefits. Actions to be undertaken may include […] increasing the use of green public procurement*".

4.1.2.2 GPP in the 2000-2006 and 2007-2013 periods

According to the IEEP study[167], the use of GPP was fairly limited during 2000-2006 period, although EU funds programmes offered a substantive opportunity in this respect.

For the 2007-2013 period, the IEEP study found evidence from case studies that in some countries there was growing practice in the application of GPP and other voluntary instruments in conjunction with EU funded programmes and projects, despite the fact that the relevant regulations did not require the deployment of such instruments as cross-cutting conditionality in the OPs. One of the case studies carried out in the context of the IEEP study, noted GPP as an indicator in the field of sustainable consumption and production and its use by the Autonomous Community of the Basque Country to monitor the region's progress towards the target set for the share of GPP in total public procurement. Although the monitoring of the GPP indicator was not used as a criterion for allocating funds to applicants, it might have still encouraged regions to design OPs that advance GPP.

The IEEP study recommended that Cohesion Policy promote more sustainable patterns of consumption by public organisations by: a. making the application of GPP a conditionality requirement for funding; and b. providing financial assistance for projects to establish GPP schemes. To foster more investment in such measures, the study proposed the definition of a specific spending category for institutional development and capacity building for GPP.

4.1.2.3 Review of GPP in 2014-2020 period OPs

Our review of OPs found that the encouragement of use and prioritisation of projects entailing the use of GPP is mentioned in chapter 11 of close to half of the reviewed OPs (14/32 OPs).

[166] EEA. 2009. Analysis of environmental aspects of the EU Cohesion Policy in selected countries. EEA technical report 10/2009.

[167] Hjerp, P., Medarova-Bergstrom, K, Skinner, I., Mazza, L. and ten Brink, P. (2011) *Cohesion Policy and Sustainable Development-Policy Instruments,* Supporting Paper 5. A report for DG Regio, February 2011.

The majority of the OPs that mention GPP in chapter 11 do not develop the concept further, but rather make a more generic reference to the aspiration of applying GPP horizontally throughout the programme or encouraging GPP where possible, through integration in project selection requirements or as a factor for the prioritization of projects. In one case (the ROP Lazio ERDF), the operationalisation of the concept is further elaborated upon in chapter 11, where it is explained that GPP practices will be implemented through the use of Minimum Environmental Criteria (CAM) as identified by the National Action Plan on GPP (as revised by MoE Decree of 04.10.2013) and that CAM will be identified where possible as an award criterion. This reflects the fact that a national GPP programme in Italy sets minimum criteria for GPP that should be applied by public administrations – also relevant for projects financed by Cohesion Policy. Another programme (Danube ETC) refers to GPP as a requirement in relation to the procurement of energy-consuming products (products shall comply with the energy efficiency requirements set out in Annex III of the Energy Efficiency Directive (2012/27/EU) for products subject to public procurement).

The use of GPP in project selection is seldom specified in connection with specific planned activities and Investment Prioirities (IPs) of the OPs (chapter 2). One exception is the Italian Infrastructure and Networks OP, which in addition to aspiring to promote GPP throughout the programme, specifically mentions that the MA is to encourage GPP in connection with IP7a which covers specific objectives on strengthening the railway system and optimising air traffic. Another Italian OP (Veneto ROP) mentions GPP in relation to project prioritisation under IP9b Providing support for physical, economic and social regeneration of deprived communities in urban and rural areas.

Several environment and Managing Authorities that participated at the ENEA-MA workshop commented that in some Member States although the use of GPP is often mentioned in a general way in OPs, it is not well followed in practice. And the contrary might also be true: there might be cases where GPP is not mentioned explicitly in the OP text but still is applied for project selection.

In our OP review, we also identified a case where planned activities aim at establishing/strengthening GPP schemes: the ROP Campania ESF foresees actions under IP11i to enhance competences and institutional capacity of the Public Administration staff on issues such as tackling climate change, sustainable mobility, blue and green economy, GPP and environmental assessment capacity.

Most interesting is the case of ROP Lazio ERDF, which includes an action that will support the creation of Pre-commercial Public Procurement instrument linked to sectors of the green economy (among other sectors). This is more specifically in the context of IP1b / SO1.3 "Promoting new markets for innovation" that includes action 1.3.1 "Strengthening and qualification of the demand for innovation of the Public Administration by supporting Pre-commercial Public Procurement and Procurement Innovation": The action aims to promote the creation of a market for innovative products and services created thanks to the thrust of demand for innovation by the Public Administration. The instrument will allow to verify emerging priorities and the launch of technical dialogue on innovation needs between the administration and economic operators. The Public Administration

driven strategy focused on the themes of Smart Specialisation, intends to use the needs of administrations and citizens as a trigger factor for focusing research efforts and technology transfer of businesses and the public research system. Sectors covered are those in the Regional Smart Specialisation Strategy, which among others cover the Green Economy.

Therefore, Pre-commercial Public Procurement has the potential to direct demand and research to "green" pathways, in relation to areas mentioned in Lazio's Regional Smart Specialization Strategy, for example eco-innovation, cradle to cradle process and conversion practices (including waste to energy), participatory processes for the development of smart and sustainable cities (Smart City) between public administrations, industries and citizens, supporting the development of circular economy enabling technologies (recycling, increasing the life time and reuse of products, improving the entire production cycle).

4.1.3 Integration of environmental concerns through the polluter pays principle

The polluter pays principle is a key principle in EU law and is enshrined in the Treaty (Article 191(2) TFEU). The Treaty integrates the polluter pays principle as a foundation of all European policies. The principle is also mentioned in both the Water Framework Directive and the Waste Framework Directive. In its essence, the polluter pays principle implies that the polluter should bear the expense of carrying out the measures decided by public authorities to ensure that the environment is in an acceptable state.

The preventive function of the polluter pays principle is based on the assumption that the polluter will reduce pollution as soon as the costs which he or she has to bear are higher than the benefits anticipated from continuing pollution. As the polluter would have to bear the costs from any damage that occurs, he or she has an incentive to reduce risks and invest in appropriate risk management measures. Finally, the polluter pays principle has a curative function, which means that the polluter has to bear the clean-up costs for damage already occurred.

Text Box 4-1 Polluter pays and cost recovery principles in key environmental Directives

The cost recovery principle and the polluter pays principle are to be observed as per Article 9 of the **Water Framework Directive** (2000/60/EC). According to this directive, Member States shall take account of the principle of recovery of the costs of water services, including environmental and resource costs, having regard to the economic analysis conducted according to Annex III of the WFD, and in accordance in particular with the polluter pays principle. Member States may in so doing have regard to the social, environmental and economic effects of the recovery as well as the geographic and climatic conditions of the region or regions affected.

Under the **Waste Framework Directive** (2008/98/EC), Member States must ensure that the costs of waste management are borne by the original waste producer or by the current or previous waste holders. Member States may decide that the costs of waste management are to be covered partly or wholly by the producer of the product from which the waste came and that distributors of the products from which the waste came may share these costs. (Article 14). Therefore, it is only if Member States use this possibility that producers of the product from which the waste came may bear the costs of management of waste.[168]

The **Environmental Liability Directive** (Directive 2004/35/EC) establishes a framework based on the polluter pays principle to prevent and remedy environmental damage.

The polluter pays principle has been clearly established as part of the Regulations that govern the Cohesion Policy funds in all three funding periods. In the current funding period, the CPR, article 8 on sustainable development reads:

The objectives of the ESI Funds shall be pursued in line with the principle of sustainable development and with the Union's promotion of the aim of preserving, protecting and improving the quality of the environment, as set out in Article 11 and Article 191(1) TFEU, taking into account the polluter pays principle.[169]

Further, the application forms for major projects for the period 2014-2020 require extensive information to underpin the application of the polluter pays principle in section E.1.4, which deals with tariffs and affordability and in section F.1, which concerns the consistency of the project with environmental policy[170].

In addition, the application of the polluter pays principle for the 2014-2020 period, is further reinforced in Cohesion Policy through some of the ex-ante conditionalities that are aimed at ensuring that framework conditions for effective investment are in place in Member States, for example:

- General ex-ante conditionality 6 which requests the existence of arrangements for the effective application of EU environmental legislation related to EIA and SEA. Their effective application enables that environmental damage preventive action or rectification be taken up by the polluter.

[168] Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste, European Commission, June 2012

[169] REGULATION (EU) No 1303/2013, article 8

[170] COMMISSION IMPLEMENTING REGULATION (EU) 2015/207 of 20 January 2015

- For the case of the water sector, ex-ante conditionality 6.1 requires that water pricing policy takes into account the polluter pays principle. More specifically, it requires the existence of: a) a water pricing policy which provides adequate incentives for users to use water resources efficiently and b) an adequate contribution of the different water uses to the recovery of the costs of water services at a rate determined in the approved river basin management plan for investment supported by the programmes.

A 2016 study examining the implementation of ex-ante conditionalities highlighted their value "*in encouraging the fulfilment of EU regulatory requirements faster than might have been the case in their absence and reinforcing effectiveness through associated strategies in the policy areas supported by ESI Funds*"[171]. Regarding thematic ex-ante conditionality involving the 'water sector' (6.1), the study noted that it had proved most difficult to fulfil during the programming phase, remaining at about 20% of fulfilment at the Partnership Agreement level. With still significant progress to be made in this area, the process of ex-ante conditionalities has allowed to form an improved understanding of the situation in Member States in this respect and give additional importance to the concerned issues.

More recently (March 2017), the Commission published a first assessment of ex-ante conditionalities[172] confirming their added-value with respect to being a powerful incentive for Member States and regions to carry out reforms which would have otherwise been delayed or not implemented. They effectively addressed delays and shortcomings in transposition of the EU acquis (e.g., in the energy, water and waste sectors), thereby improving the quality and legality of relevant investments. According to the assessment, the water sector ex-ante conditionality "*has been a driver for many Member States to implement improvements in areas such as pricing policies […]*". More specifically, it has triggered amendments of the water pricing policies to the agricultural sector in Bulgaria, Cyprus, Hungary, Italy, Malta and Slovakia that should provide incentives to farmers to use water resources more efficiently.

Under **State aid rules for environmental protection and energy,** state aid is not an appropriate instrument and cannot be granted insofar as the beneficiary of the aid could be held liable for pollution under existing Union or national law[173].

[171] Metis GmbH (July 2016), The implementation of the provisions in relation to the ex-ante conditionalities during the programming phase of the European Structural and Investment (ESI) Funds. Final report abstract, http://ec.europa.eu/regional_policy/sources/policy/how/studies_integration/impl_exante_esif_report_en.pdf

[172] European Commission (2017), The Value Added of Ex ante Conditionalities in the European Structural and Investment Funds, SWD(2017) 127 final, http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/value_added_exac_esif_en.pdf

[173] European Commission guidelines on state aid for environmental protection and energy 2014-2020 (2014/C 200/01) http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0628(01)&from=EN

Text Box 4-2 Polluter pays principle and aid for contaminated site remediation

According to European Commission guidelines on state aid for environmental protection and energy for the period 2014-2020, state aid cannot be granted insofar as the beneficiary of the aid could be held liable for pollution under existing Union or national law[174]. The guidelines make specific reference to the case of contaminated site remediation:

"*The Commission will consider that aid for contaminated sites can be granted only when the polluter — i.e. the person liable under the law applicable in each Member State without prejudice to the Environmental Liability Directive (Directive 2004/35/EC) and other relevant Union rules in this matter — is not identified or cannot be held legally liable for financing the remediation in accordance with the 'polluter pays' principle*".

The promoters of contaminated site remediation projects thus need to make the case that the responsible entities for the contamination of the site cannot be made to bear the costs (in line with the polluter pays principle) before they are able to access Cohesion Policy funding.

For example, this was the case for a project in Lithuania concerning the remediation of the contaminated site of the former AB Skaiteks factory in the city of Vilnius city". The Lithuanian authorities submitted information showing that the site was considerably polluted, as well as that the responsible entity for the contamination of the site could not be held legally liable for financing the remediation costs as it had gone bankrupt. According to the Lithuanian Law on Environment Protection in case the polluter is unable to take remedial action, local authorities and/or State-authorised institutions must take such measures. For further information on this project, please see project fiche number 8 in Appendix M.

Below, we provide the observations regarding the extent to which the polluter pays principle is integrated in the OPs and major projects during the three programming periods based on our review of documents and the 32 OPs for the period 2014-2020. We note that the current study has not comprised a review of individual projects (major or non-major) and it is therefore not possible to draw findings on the extent to which the polluter pays principle is in fact applied in the current programming period. However, as noted above, the application forms for major projects require extensive information to underpin the application of the polluter pays principle. This in itself is a strong indicator that the principle is observed in practise.

4.1.3.1 Polluter pays principle in 2000-2006 period

The ex-post evaluation of the 2000-2006 programming period, WP5B on *Environment and Climate Change* (ADE) did not comment directly on how the polluter pays principle has been integrated in the OPs. It emphasised that in the situation where this principle is applied in its entirety there is no need for public funding, i.e. no need for Cohesion Policy spending either. It then provided some general findings on the extent to which the polluter pays principle was implemented in practise, stating that: *"In countries where the level of GDP is low and the ability of households to fund these services is limited, public funds are able to guarantee and preserve the public good that is the environment and quality of natural resources. To the extent that the public good is also acting at a global level (as for example the quality of air/climate change), it seems justified that such international funding covers part of the cost of maintaining its quality level. In the group of EU-10 or the 4 CCs, where on the one hand, GDP per capita is lower than the EU average as well as the number of people paying for environmental services and the*

[174] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0628(01)&from=EN

prices charged and on the other hand, the need for investment in order to comply with EU standards are higher, additional resources are needed to support the investment programmes"[175].

4.1.3.2 Polluter pays principle in 2007-2013 period

A study by Nordregio and partners[176] found that the polluter pays principle was referred to explicitly in over half of the OPs that specified an environmental principle. The polluter pays principle was by far the most common environmental principle referred to in both the Convergence and the Competitiveness regions, and as far as the Competitiveness regions were concerned it was mainly used in relation to specific brownfield regeneration interventions. However, the Nordregio study did not discuss the ways in which the principle was operationalised. The IEEP study noted that the polluter pays principle "*has been to some extent incorporated into the practices of cost-benefit analysis for major projects; however, its 'extensions' such as 'full cost recovery' have had a fairly limited application in the context of Cohesion Policy*"[177].

The ex-post evaluation of Cohesion Policy funds 2007-2013 (WP6 *Environment*)[178] focused on a review of 20 major projects in the water and waste management sectors and considered the extent to which the polluter pays principle had been applied in these projects. It concluded that despite the fact that all projects reviewed claimed to adhere to the principle, this was only partially achieved. The problems referred to related to cross-subsidisation, i.e. a situation where payments made by various user groups do not correspond with the level of impact on the environment arising from their activities.

4.1.3.3 Polluter pays principle in 2014-2020 period

The review of the selected OPs indicated that only few OPs actually refer to the polluter pays principle in Chapter 11 on Sustainable Development or anywhere else in the OPs (7/32 OPs). However, this may not be due to a disregard for the principle, but simply because it is incorporated as a general principle in the regulatory framework and therefore OP drafters may not have considered it relevant for specific mention in OP section 11.

When mentioned, the application of the polluter pays principle is brought up in connection with project selection and prioritisation in general. There were two cases found (LT OP and CZ Environment OP) where the application of the principle is mentioned concerning specific IPs/ investments. More specifically, in the Lithuanian OP, the

[175] ADE (2009), Ex post Evaluation of Cohesion Policy Programmes 2000-2006 co-Financed by the European Fund for Regional Development (Objectives 1 and 2) – Work Package 5b: Environment and Climate Change. Final Report – Volume 1, p. 130

[176] Nordregio. European Policies Research Centre, Austrian Institute for Spatial Planning (ÖIR) and SWECO (2009) The potential of regional development instruments 2007-2013 to contribute to the Lisbon and Goteborg objectives for growth, jobs and sustainable development. Final report for the European Commission, DG Regional Policy, Evaluation Unit, July 2009

[177] p.129, IEEP study - Final Synthesis Report

[178] Martens B., et al (2016), Ex post evaluation of Cohesion Policy Programmes 2007-2013 – Work Package 6 – Environment (study by COWI and partners for the European Commission, DG Regional and Urban Policy), available at:
http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2007-2013/#7

application of the polluter pays principle is mentioned concerning investments in water supply and sanitation to ensure water efficiency, while in the case of the Czech Environment OP it is mentioned in relation to risk prevention investment, disaster resilience and management.

In two OPs on transport and infrastructure, a reference to national legislation incorporating the polluter pays princple was made (GR Transport and Infrastructure OP and CZ Transport OP)[179].

4.1.4 Main findings on horizontal principles

Since the 2000-2006 period, Cohesion Policy OP development and implementation have been increasingly subject to a more comprehensive framework for integrating environmental considerations. This has led a number of Member States and regions to frame sustainable development as a horizontal principle in the OPs. However, the actual integration of sustainability concerns proves more challenging during the implementation of programmes. A sample analysis by ENEA-MA as well as the review of 32 OPs under this study showed great variance in how the section on sustainable development as a horizontal principle (OP section 11.1) was tackled in the various OPs: from making reference to the process of SEA as the means through which environmental concerns are integrated in the programmes, reference to national or regional sustainable development strategies, the key role of the Managing and Environmental Authorities, to respecting /effectively applying the EIA and the Habitats Directives and the use of GPP, to specific considerations for project selection criteria and minimum requirements. A significant number of the reviewed OPs under this study describe as part of this chapter how "vertical environmental integration" has been considered.

While the use of GPP was fairly limited during 2000-2006 period, some evidence of growing practice in the application of GPP was already found in relation to 2007-2013 OPs in some countries, despite the fact that the relevant regulations did not require its deployment. For the 2014-2020 period, the encouragement of use and prioritisation of projects entailing the use of GPP is mentioned in chapter 11 of about half of the OPs reviewed under this study, reflecting perhaps the inclusion of a reference to GPP in the Regulation governing the funds in this period. The majority of these OPs make a more generic reference to the aspiration of applying GPP horizontally throughout the programme, and the use of GPP in project selection is seldom specified in connection with specific planned activities and IPs of the OPs. Several environment and Managing Authorities that participated at a February 2017 ENEA-MA workshop commented that in some Member States although the use of GPP is often mentioned in a general way in OPs, it is not well followed in practice. This would indicate that there is a potential for

[179] Greek OP: The polluter pays principle was incorporated into Greek law mainly by Presidential Decree 148/2009 on 'Environmental liability for preventing and remedying environmental damage - Alignment with the Environmental Liability Directive (2004/35/EC)'. In the Czech OP: Compliance with polluter pays principle is set out in Czech Republic's Strategic Framework for Sustainable Development.

Cohesion Policy to further encourage the establishment and of GPP schemes and enhance institutional capacity of Public Administration, for example in ESF OPs.

The polluter pays principle is a key principle in EU law (enshrined in Article 191(2) TFEU) and has also been clearly established as part of the Regulations that govern the Cohesion Policy funds in all three funding periods. Our review of the selected OPs in the 2014-2020 period has indicated that only few OPs actually refer to the polluter pays principle in Chapter 11 on Sustainable Development or anywhere else in the OPs (7/32 OPs). However, this may not be due to a disregard for the principle, but simply because it is incorporated as a general principle in the regulatory framework and therefore OP drafters may not have considered it relevant for specific mention in this section.

4.2 Integration of environmental concerns in OP indicators and monitoring systems

In this section, we look the extent to which indicators and monitoring systems have supported the integration of environmental concerns in Cohesion Policy.

4.2.1 Regulatory and guidelines framework

The use of indicators for monitoring and evaluation in the framework of Structural Funds became established practice in the mid-1990s. A Commission 1999 working paper[180] on indicators for monitoring and evaluation contributed to the clarification of the terminology used and provided a frame of reference.

The **2000-2006 programming period** brought about considerable progress in the systematic application of indicators for monitoring and evaluation of all programmes. The regulations concerning the 2000-2006 period (the main provisions concerning monitoring indicators are set out in Article 36 of the General Regulation) envisaged a move away from purely financial monitoring and existing monitoring, control, and evaluation procedures were expanded upon and enhanced to ensure a more effective deployment of the Funds. These improvements reflected "*a more decentralised approach to programming and programme management as well as a clearer definition of monitoring and evaluation responsibilities at the EU, national and regional level*"[181].

The document further suggested a set of indicative (non-obligatory) core indicators to facilitate the monitoring and evaluation of the programmes. In addition to suggesting a list of core indicators related to environmental investments (e.g. % increase in the capacity created in waste disposal facilities and/or recycling facilities), the document suggested a basic horizontal indicator of the mainstreaming of environmental priority

[180] DG REGIO (1999), Indicators for Monitoring and Evaluation: An indicative methodology, The New Programming period 2000-2006:
methodological working papers, WORKING PAPER 3
http://ec.europa.eu/regional_policy/sources/docoffic/working/doc/indic_en.pdf

[181] DG REGIO (1999), Indicators for Monitoring and Evaluation: An indicative methodology, The New Programming period 2000-2006:
methodological working papers, WORKING PAPER 3
http://ec.europa.eu/regional_policy/sources/docoffic/working/doc/indic_en.pdf

whereby all projects would be classified at the project-level application stage depending on whether they were positive, neutral or negative in environmental terms. It also suggested the use of a core impact indicator aimed at capturing the environmental impact from transport infrastructure networks expressed in terms of increased or decreased (%) pollution (CO_2, NOX …).

Overall, the indicator systems were found by the Commission to perform better and to contribute to more effective programme management. The main elements of the methodology presented in the 1999 working paper proved to be appropriate, and this meant that the aim for the 2007-2013 programming period was to build on the 2000-2006 period to improve and better communicate the main ideas of the methodology rather than fundamentally revise them[182].

In the **2007-2013 period**, the conceptual framework for the use of indicators as planning and monitoring tools is set out in a DG REGIO working document[183] that establishes an output-result-impact indicator system[184]. In addition to programme specific indicators that are at the heart of monitoring systems, Member States were also required to report on 'core indicators', a set of minimum reporting requirements linked to strategic objectives that could be aggregated at EU level, generating more comparable information across programmes. The guidelines list by thematic field (selected fields of codification system) the core indicators that should be integrated into the system of programme indicators for each Operational Programme that encompasses these fields.

Environment-related core indicators are defined for thematic fields covering both direct (e.g. for ERDF and Cohesion Fund, core indicator (26) "Additional population served by waste water projects") and indirect environmental investments (e.g. Core indicator (24) "Additional capacity of renewable energy production (MW)"). In general, no environment-related core indicators is listed for thematic fields covering non-environment investments, with the exception indicator (30) "Reduction greenhouse emissions (CO_2 and equivalents, kt)" applicable (in addition to direct and indirect environmental investments) to railway related investments (priority themes 16-17). The same document includes a chapter on the integration of horizontal principles, recommending

[182] European Commission, (2006): The New Programming Period 2007-2013, Indicative Guidelines on Evaluation Methods: Monitoring and Evaluation Indicators, Working Document No. 2., http://ec.europa.eu/regional_policy/sources/docoffic/2007/working/wd2indic_082006_en.pdf

[183] European Commission, (2006): The New Programming Period 2007-2013, Indicative Guidelines on Evaluation Methods: Monitoring and Evaluation Indicators, Working Document No. 2., http://ec.europa.eu/regional_policy/sources/docoffic/2007/working/wd2indic_082006_en.pdf

[184] With respect to impact indicators, the working document notes that obtaining meaningful values of impact indicators requires more developed data arrangements than what is possible to be obtained from the monitoring system, and that in many cases will only be possible through evaluations. As this work can demand quite substantial efforts, it is reasonable to define impact indicators only for the most important (e.g., in financial terms) priorities of a given programme. In many cases, it may improve the effectiveness of the indicator system to concentrate on setting up reliable, measurable result indicators rather than impact indicators of questionable value. Result indicators are a necessary building block for a subsequent development of impact indicators.

that the monitoring and evaluation of horizontal themes such as sustainable development should be embedded into the general indicator system of a programme and not a separate specific indicator system. Moreover, the working document underlines that in developing these indicator systems Member States should take a decision if and how the monitoring as required under the SEA Directive and the monitoring system of a particular OP as such should be integrated or complement each other.

For the **2014-2020 period**, the CPR stipulates that Fund-specific regulations set out common indicators. Accordingly, common output indicators, are set out for example in Annex I to the ERDF Regulation for the period (Regulation (EU) No 1301/2013). Similarly to the previous period, the list does not encompass environment-related indicators for investment priorities covering non-environment investments. Nonetheless, as noted by the ENEA-MA report, the most distinct way in which the CPR for 2014-2020 period goes beyond relatively general provisions on sustainable development of the 2007-2013 period still relates to the monitoring and the evaluation stage. "*In part, this is linked to an overall orientation towards results of the 2014-2020 period, which also affects how the cross-cutting principles, in particular sustainable development, are monitored. Whereas, the 2007-2013 General Regulation required merely that evaluations take account of sustainable development, the CPR introduced clear obligations for OP implementation reports and partnership agreement progress reports to set out information on, and assess action taken to promote it. Monitoring Committees have been also given a clear responsibility to examine 'actions to promote sustainable development'. Clear and binding monitoring and evaluation provisions will close the loop of 2014-2020 programming and produce feedback for the next programming period*"[185]. The evaluation process for 2014-2020 also focuses more on impact evaluations for the themes covered by the OPs, including environment and sustainable development.

Below, we provide our observations regarding how environmental concerns were reflected in the monitoring systems and indicators established for the OPs during the three programming periods.

4.2.2 Data on the 2000-2006 period

The IEEP study notes that during the 2000-2006 period, only a few front-running Member States had provisions for measuring results and outcomes for sustainable development through dedicated monitoring and reporting systems. The use of indicators in this regard was often limited to measuring progress towards sustainability by focusing primarily on economic measurements. Even if there were environmental and social indicators set out, they were usually treated separately and not in an integrated manner. Rarely any alternatives or trade-offs were quantified or reported, as noted in particular by the Work Package 11 study of the ex-post evaluation of 2000-2006 Cohesion Policy programmes [186]. Furthermore, environmental actors often lacked capacity to engage in the preparation of programmes and to participate in Monitoring Committees.

[185] p. 10, ENEA-MA report

[186] EPRC, METIS and University of Strathclyde Glasgow (2009). Ex-post evaluation of Cohesion Policy programmes 2000-2006 co-financed by the ERDF (Objective 1 and 2), Work package 11: management and implementation systems for Cohesion Policy, DG Regio

4.2.3 Data on the 2007-2013 period

According to the Nordregio evaluation study[187], most physical indicators used in the OPs pointed towards a strong programme commitment to contributing to the Lisbon agenda goals, with fewer indicators relating to sustainable development and the Gothenburg goals. The development of impact indicators linked to sustainable development has been difficult as often these are conceived as less tangible. Many programmes included core indicators, specifically to measure and monitor effects with regard to the additional capacity of renewable energy production and the reduction of greenhouse emissions (13 out of 27 Member States according to the study), however, it has been found that there were discrepancies in the interpretation of such indicators and the measurement units (CO_2, CO_2 equivalent) used across different countries that did not allow their aggregation.

The IEEP study notes that beyond the set of core indicators, proper monitoring of environmental impacts of EU Funds programmes and projects was maturing, however, it was still an exception rather than the norm. Some Member States, however, developed innovative indicator systems concerning wider environmental interventions and their impacts (e.g. the cases of Italy and Spain, which both introduced indicators in the 2007-2013 period to provide a better assessment of the link between spending and the extent to which it supported the attainment of results under the urban wastewater treatment Directive[188]).

The WWF/Suske study[189], which looked at biodiversity specifically, found the use of clear and applicable biodiversity-related indicators to be present in around 22% of the programmes analysed (total of 46 ERDF OPs in 10 countries). More than 60% of the analysed programmes used biodiversity indicators of limited practical use, while in the remaining 8 OPs (mainly Regional Programmes), such indicators were entirely missing.

The ex post evaluation of Cohesion Policy funds 2007-2013 (WP6 Environment)[190] found that core indicators were not sufficient to describe the progress towards environmental targets in the water and waste management sectors, which were the focus of the evaluation. For example, in the waste sector, the core indicator for the 2007-2013 programming period was the number of projects financed: this provides some indication

[187] Nordregio. European Policies Research Centre, Austrian Institute for Spatial Planning (ÖIR) and SWECO (2009) The potential of regional development instruments 2007-2013 to contribute to the Lisbon and Goteborg objectives for growth, jobs and sustainable development. Final report for the European Commission, DG Regional Policy, Evaluation Unit, July 2009

[188] As further described in: EEA. 2009. Analysis of environmental aspects of the EU Cohesion Policy in selected countries. EEA technical report 10/2009.

[189] WWF/Suske Consulting. 2011. SURF Nature, European Regional Development Funding for biodiversity: An analysis of selected operational programmes

[190] Martens B., et al (2016), Ex post evaluation of Cohesion Policy Programmes 2007-2013 – Work Package 6 – Environment (study by COWI and partners for the European Commission, DG Regional and Urban Policy), available at: http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2007-2013/#7

of progress to target but is not useful in terms of describing Cohesion Policy results in terms of better waste management. A general caveat of these core indicators might be that they were output focused, and whilst they allowed a (limited) understanding of environmental outputs of the spending (e.g. X number of population served by sewage and waste water treatment plants), they did not come close to enabling an understanding of the contribution to sustainable development, or the extent to which programmes integrated sustainability throughout. The study also found a great deal of variance in the programme specific indicators defined by the Member States.

4.2.4 Review of 2014-2020 period OP indicators

We have reviewed result indicators for the selected OPs, with a view on the one hand to get a feel for the extent to which they capture environmental concerns, and on the other hand to extract examples of innovative use of indicators.

4.2.4.1 Use of indicators across thematic objectives and specific objectives

For each of the OPs, we have reviewed the tables of Programme-specific result indicators included in chapter 2 for the different IPs, and we have made an assessment of whether the mentioned indicators cover environmental, social or economic aspects. This is based on our qualitative assessment (and thus a subjective judgement) and the same indicator can cover more than one aspect, for example both environmental and economic (e.g. energy savings), both social and economic (e.g. employment related indicators) or both environmental and social (fraction of population with access to water management infrastructure).

We first mapped for each of the OPs whether or not at least one of the result-indicators under the various specific objectives (SOs) within a given Thematic Objective (TO) covered each of the three aspects of sustainable development. For example, using the illustrative table below we take a hypothetical OP that covers in total 2 SOs within TO6. Let's assume that the first SO under TO6 includes result indicators that cover environmental aspects only while the second SO includes result indicators that cover both environmental and social aspects. In this case, we select (x) TO6, the environmental pillar and the social pillar once as illustrated in the following table.

Table 4-1 Illustrative example of the result-indicator mapping exercise for a reviewed hypothetical OP

TO covered by OP	Environmental pillar	Social pillar	Economic pillar
☐ **TO1**	☐	☐	☐
☐ **TO2**	☐	☐	☐
☐ **TO3**	☐	☐	☐
☐ **TO4**	☐	☐	☐
☐ **TO5**	☐	☐	☐
☒ **TO6**	☒	☒	☐
☐ **TO7**	☐	☐	☐
☐ **TO8**	☐	☐	☐
☐ **TO9**	☐	☐	☐

☐ **TO10**	☐	☐	☐
☐ **TO11**	☐	☐	☐

We then aggregated the number of times each TO was selected by the reviewed OPs, as well as the number of times environmental, social or economic aspects were covered by at least one of the result-indicators falling under that TO. This exercise generates the following illustrative table of the frequency with which environmental, social and economic aspects are captured by result indicators of the reviewed OPs by TO:

Table 4-2 Result indicators: environmental, social and economic aspects

	Frequency		
	Environmental pillar	**Social pillar**	**Economic pillar**
TO1 (Strengthening RTD and innovation)	0/19	2/19	18/19
TO2 (Enhancing access to, and use and quality of ICT	1/12	11/12	9/12
TO3 (Enhancing the competitiveness of SMEs)	2/14	1/14	14/14
TO4 (Supporting the shift towards a low-carbon economy)	21/23	9/23	20/23
TO5 (Promoting climate change adaptation, risk prevention and management)	11/12	6/12	2/12
TO6 (Preserving and protecting the environment and promoting resource efficiency)	18/20	11/20	11/20
TO7 (Promoting sustainable transport and removing bottlenecks in key network infrastructures)	5/14	9/14	11/14
TO8 (Promoting sustainable and quality employment and supporting labour mobility)	0/7	6/7	3/7
TO9 (Promoting social inclusion, combating poverty and discrimination)	0/13	13/13	5/13
TO10 (Investing in education, training and vocational training for skills and lifelong learning)	0/8	7/8	3/8
TO11 (Enhancing institutional capacity and efficient public administration)	0/6	6/6	1/6

Source: Review of OPs for present study

It comes as no surprise that environmental aspects are more frequently covered by result indicators in TO4, TO6, followed by TO5 and TO7. In our review, we found no

examples of environmental aspects being reflected in indicators for TO1, TO8, TO9, TO10 and TO11 IPs, while three examples were found for TO2 and TO3:

- TO2, IP 2c: Number of Cities of more than 20,000 inhabitants transformed into Smart Cities [ES Sustainable Growth ERDF OP]

- TO3: IP 3d: Investment, of which more than 50% of the total amount invested in the eco-innovative part [LT Operational Programme for EU Structural Funds Investments for 2014-2020]

- TO3, IP 3d: Power (MW) of offshore wind-farms in the North Sea [OP Niedersachsen ERDF-ESF 2014-2020]

The monitoring of air quality (NO_2, PM emissions, air Quality Index) is often integrated in result indicators for transport-related interventions under TO7 (e.g. CZ – Transport OP) or sustainable mobility interventions under TO4 (Pais Vasco). On one occasion (Lazio ROP) PM_{10} and NO_2 indicators will be monitored in the selected project areas even if this it is not integrated into result or output indicators. Even more frequently encountered are result indicators (and also output indicators) relating to the monitoring of greenhouse gas emissions from the transport sector in TO4 and TO7.

Greenhouse gas emissions are also reflected in result indicators relating to energy efficiency measures in buildings and production processes under TO4.

Result indicators integrating environmental aspects in ETC programmes seem to reflect the programmes' "softer" nature and might thus entail a complexity in their monitoring, for example:

- Result indicators in the North West Europe ETC for TO4, 6 and 7 are elaborate in integrating environmental concerns and cover e.g. the “Effectiveness of the NWE public organisations in the implementation of low carbon strategies” or “The status of the competences in the resource-intensive sectors in NWE for eco-innovation diffusion”. Their monitoring will rely on a multitude of sources /indices published in European Commission reports (e.g. Joint Research Centre 2013 - report “Covenant of Mayors in Figures”; “How to develop a Sustainable Energy Action Plan" - guidebook, European Commission 2010).

- The Danube ETC includes result indicators for environment-related IPs that will measure the intensity of cooperation of key actors in the various environmental fields e.g. the "Intensity of cooperation of key actors in the programme area in order to improve transnational water management and flood risk prevention" for IP6b. These will be survey-based composite indicators, with values established / recorded through a survey among selected key actors in the various fields.

Based on interviews with Managing Authorities as well as inputs received during the ENEA-MA workshop, we understand that there are several barriers for Member States to develop indicators reflecting the horizontal principle on sustainable development. The Member States express that they find this conceptually challenging and they have difficulties in finding ways to make it operational in the context of OP implementation. The challenges are similar to those described below for selection criteria (see section

4.4). Some Member States in particular called for a set of indicators at the EU level to guide such a process.

An overall key issue, we have identified is the general lack of integration between environmental monitoring (generally defined and dealt through SEA process) with OP monitoring (physical, procedural and financial). This is particularly true for non-environmental investments: while environmental investments are bound to encompass environment-related output and result indicators incorporated in the OP monitoring in order to capture the progress with respect to targets/expected positive environmental impacts, this is not true for non-environmental investments without an easily defined positive impact or even with potentially negative environmental impact. This has led some country authorities (e.g in Italy) to put a lot of emphasis on establishing an effective environmental monitoring system as the means of ensuring environmental integration and work towards creating the conditions that would allow moving towards integration of environmental monitoring with OP monitoring. We elaborate further on this in section 4.3.

4.2.4.2 Programme Monitoring Committee role in 2014-2020 period reviewed OPs

One way of ensuring the integration of environmental concerns in monitoring of the OPs is to ensure the mandate of the Programme Monitoring Committee (PMC) to oversee this as well as participation of relevant environmental authorities on the PMC. We reviewed the OPs to assess how this was handled.

More than half of the reviewed OPs do not explicitly state in chapter 7 or 11 of the OP that the PMC deals with environmental concerns / sustainable development and those that do only provide a brief reference. Some OPs more implicitly refer to this by referring to the fact that the partnership principle will be applied in implementation and monitoring and this will involve environmental partners, or that the Management and Control System that will be approved by the Programme Monitoring Committee will be in conformity with the OP SEA with respect to the specification of project selection criteria, and/or the evaluation and monitoring of environmental effects. For example:

- Malta OP 'Stimulating private sector investment for economic growth': The relevant entities responsible for climate mitigation and adaptation in the various stages of implementation of OPs will participate in the Monitoring Committee of the OP.

- Greek OP 'Transport Infrastructure, Environment and Sustainable Development': General reference to the parallel process of SEA as the means by which sustainability is taken into account, including through the specification of project selection criteria for each priority axis in conformity with the OP SEA, which will be included in the Management and Control System and approved by the Programme Monitoring Committee.

- The Italian National Operational Programme on Infrastructures and Networks: Horizontal integration of the environmental sustainability principle will be pursued through the evaluation and monitoring of the effects of co-financed interventions, made on the basis of what is defined as part of the environmental assessment

process, as well as by giving continuity to the experience gained in the 2007-2013 OP, as described in the SEA Environmental Report (ER). A report on the monitoring and management of the environmental aspects of the OP will be prepared on an annual basis. The report will take into account the trend of environmental indicators linked to the implementation of the program (reference to table of SEA Environmental Report (ER) non-technical summary) and the action taken to detect potentially adverse environmental effects associated with the implementation of OP and introduce appropriate corrective measures where necessary. The monitoring will also seek to capture the contribution of the Programme to achieving defined environmental sustainability objectives, including its contribution to the attainment of targets or the respect of limit values set by the applicable laws (as in the case of $PM_{2.5}$ limit values).

- Lazio ROP, Italy: From a strictly operational point of view, the assessment of operations relating to each axis will be based on the specific definition of objectives and measurable indicators to ensure an effective implementation of a sustainable development model encompassing economic sustainability, social sustainability, environmental sustainability (meaning the ability to maintain quality and renewability of natural resources) and institutional sustainability.

- Lithuanian OP 'EU Structural Funds Investments for 2014-2020' emphasises the issue of compliance monitoring with respect to the principle of sustainable development, an aspect that will be integrated into the overall monitoring system. The OP will focus on improving the overall information and data collection and reporting system, access to shared information resources and better information at national, regional and local levels.

The reviewed OPs generally do not mention whether the establishment of a specific sub-committee or cross-committee on sustainability might be foreseen.

4.2.5 Main findings on indicators and monitoring systems

The 2000-2006 programming period brought about considerable progress in the systematic application of indicators for monitoring and evaluation of all programmes. The concept of core /common indicators to facilitate the process has been introduced in Cohesion policy since at least the 2000-2006 period though their use has evolved from a "recommendation" to a requirement. In general, no environment-related core indicators are listed for thematic fields covering non-environment investments, with the exception of indicator "Reduction greenhouse emissions (CO_2 and equivalents, kt)" applicable to investments beyond the environment (e.g. railway related investments). At the same time, the 2014-2020 CPR has introduced clear obligations for OP implementation reports and partnership agreement progress reports to set out information on, and assess action taken to promote sustainable development, and therefore this can be expected to create an impetus for MAs to start establishing indicators in that direction. Yet the development of indicators reflecting the horizontal principle on sustainable development is conceptually a challenging exercise, and finding ways to make it operational in the context of OP implementation even more so. Input from authorities in some Member States during this study called for a set of indicators at the EU level to guide such a process.

We also underline the overall challenge still faced of a lack of integration between environmental monitoring (generally defined and dealt through SEA process) with OP monitoring (physical, procedural and financial). Already the guidelines from the 2007-2013 period recommended that the monitoring and evaluation of horizontal themes such as sustainable development should be embedded into the general indicator system of a programme and not a separate specific indicator system. Our review of result indicators for the 32 OPs from the 2014-2020 period, would seem to be indicative of a remaining low degree of integration: while it comes as no surprise that environmental aspects were more frequently covered by result indicators in TO4-TO7, however, we found no examples of environmental aspects being reflected in result indicators for TO1, TO8, TO9, TO10 and TO11 related IPs, while we found three examples for TO2 and TO3.

4.3 Effectiveness of the SEA as an instrument of integration of environmental considerations

The key question addressed under this component is *whether the Strategic Environmental Assessment (SEA) was an effective instrument to ensure integration of environmental considerations in the OPs*.

This is addressed through a literature review, a review of available reports and other documents providing information on the SEA processes for the 32 OPs reviewed[191], as well as interviews with Managing Authorities and inputs received during the ENEA-MA workshop.

Three main elements have been analysed (the structure of this section follows these three main elements, however, first we introduce the regulatory framework for SEA during the three programming periods):

1. SEA influence on OP priorities
2. SEA influence on guiding principles for selection criteria
3. SEA influence on monitoring programmes and indicators.

Overall, our analysis shows that SEA practise varies considerably across the Member States and opinions on its effectiveness and ways to improve it also differ between stakeholders. This is seen from previous studies in the area as well as the feed-back received from stakeholders during interviews and the workshop.

4.3.1 Regulatory and guidelines framework

For the **programming period 2000-2006**, Cohesion Policy OPs and RDPs were exempt from the application of the SEA Directive (Article 3(9)). At that time the requirement for ex ante evaluation of Cohesion Policy OPs specifically included environmental aspects.

[191] The documents on SEA for each OP were not complete. Where available, we reviewed: The environmental statement, the environmental report, summary of the environmental report and the ex-ante evaluation. However, for most OPs, only some of these documents were available.

Consequently, it is no surprise that few SEAs were undertaken as part of OP preparation for this period[192]. However, in 1998 DG ENV issued guidance on environmental assessment for regional development/SF programmes which essentially recommended a form of SEA[193]. Some of the CEE countries did voluntary SEAs of their programming documents for the 2004-2006 short funding period immediately after accession. These were funded by NGO/external grants, however, and done on a pilot basis.

For the **2007-2013 programming period**, the SEA Directive had come into force, and references to the ex ante evaluation for programmes were modified to refer to relevant Community legislation on SEA. Approximately 400 SEAs were produced for the OPs within Cohesion Policy and sent to the Commission in 2007 (Milieu, 2016). A guidance document was prepared by the INTERREG project GRDP for the 07-13 OPs, and was endorsed by the Commission and used in many Member States[194].

For the **2014-2020 programming period**, the CPR strengthened the application of SEA to programming documents for the ESI Funds through integration with ex ante assessment and ex ante conditionality. Following lessons learned from the 2007-2013 period, the guidance document for the ex ante evaluation of 2014-2020 ERDF, CF and ESF issued by DG Regional and Urban Policy in January 2014 provides several recommendations in relation to more effective use of SEA during the ex ante evaluation. Among these are recommendations to "*combine SEA with the ex ante meetings in order to infuse social and economic considerations; integrate the SEA process, in terms of temporally and administratively, in the programming process, e.g. through a single contracting with the ex ante evaluation; and to introduce public consultation early in the process reaching out beyond the customary authorities and stakeholders*" (Milieu, 2016).

The CPR for the 2014-2020 period further reinforces the link with the SEA Directive through the so-called '*ex ante conditionalities*'. These are specific conditions to be satisfied by Member States in order to benefit from the funds, and were introduced as part of reforms to ensure that all institutional and strategic policy arrangements were in place for effective investment. The general ex ante conditionality number 6, as provided for in the CPR requires Member States to demonstrate the existence of 'arrangements for the effective application of Union environmental legislation related to EIA and SEA'. More precisely, criteria for fulfilment of the conditionality require that the following arrangements are in place:

- Arrangements for the effective application of the EIA Directive and SEA Directive.
- Arrangements for training and dissemination of information for staff involved in the implementation of the EIA and SEA Directive.
- Arrangements to ensure sufficient administrative capacity.

Where an applicable ex ante conditionality was not fulfilled at the time of preparation of the OP, Member States needed to set out the actions to be taken to ensure it was fulfilled

[192] EPRC: Ex-post evaluation of Cohesion Policy Programmes 2000-2006, WP11

[193] http://ec.europa.eu/environment/archives/eia/sea-guidelines/handbook.htm

[194] http://ec.europa.eu/regional_policy/sources/docoffic/working/doc/sea_handbook_final_foreword.pdf

no later than the end of 2016, as well as the bodies responsible and an implementation timetable. In March 2017, the Commission published a first assessment of ex-ante conditionalities[195] noting that the ex-ante conditionality requiring Member States to effectively apply the EIA and SEA Directives "*has also resulted in the modification of national legislation in some Member States. Consequently, the regulatory framework for the environmental decision-making process has been clarified and the knowledge and skills of the authorities applying the EIA and SEA Directives have been improved*". [196]

Another ex ante conditionality related to SEA was introduced for investment priorities under the transport sector. Thematic ex ante conditionalities 7.1, 7.2 and 7.3 require the existence of a comprehensive plan(s) or framework(s) for transport investment, in accordance with Member States' institutional set up (including public transport at regional and local level), which supports infrastructure development and improves connectivity to the Trans-European Network – Transport (TEN-T) comprehensive and core networks. A specific criterion for fulfilment of this conditionality is that such plan(s) or framework(s) for transport investment comply with the legal requirements for SEA.

4.3.2 SEA influence on OP priorities

4.3.2.1 SEA in the 2000-2006 period

The ex-post evaluation of the 2000-2006 programming period (WP11 'Management and Implementation Systems') noted on the basis of studying 10 case OPs that Strategic Environment Assessments had been carried out in a few cases but that these did not influence the programme design[197].

4.3.2.2 SEA in the 2007-2013 period

According to the IEEP study[198], the application of the SEAs in the 2007-2013 EU Funds programmes has had a number of positive effects in terms of integrating environmental concerns in the programming process. For example, they have facilitated the involvement of environmental authorities in all phases of the decision-making process regarding OPs and aided the identification and establishment of environmentally relevant project selection criteria and indicator and monitoring systems.

At the same time, however, common challenges in applying SEA to the 2007-2013 OPs included short timelines, which often resulted in lower level of public participation and

[195] European Commission (2017), The Value Added of Ex ante Conditionalities in the European Structural and Investment Funds, SWD(2017) 127 final, http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/value_added_exac_esif_en.pdf

[196] This was also mentioned at the ENEA-MA workshop where Slovakia informed that the ex-ante conditionality on SEA led to new national legislation and a significant increase in the number of staff in the unit of the ministry dealing with SEA/EIA.

[197] EPRC (2009), Ex post Evaluation of Cohesion Policy Programmes 2000-2006 co-Financed by the European Fund for Regional Development (Objectives 1 and 2) – Work Package 11: Management and Implementation Systems for Cohesion Policy, p. 12

[198] Supporting Paper 5 "*Cohesion Policy and Sustainable Development-Policy Instruments*"

also varying quality of the environmental reports. Furthermore, SEAs were found to generally focus on potential synergies (win-wins) between economic development and environmental protection, and less on trade-offs. Therefore, the report noted that the use of SEA needed to be strengthened by enhancing institutional capacities and methodological approaches to carrying out SEA in view of aiding Managing Authorities responsible for OP management. Also the practice of applying SEA to the 2007-2013 OPs was found to vary significantly among Member States, for instance, some countries had set out special coordination committees or working groups to carry out the process of SEA of OPs in a consistent manner (Italy, Latvia, Belgium), some had developed common methodology for checklists to aid the SEAs (France), while others had established a single SEA process for all OPs, which resulted in one single report at the end (Portugal).

The IEEP study notes that the use of SEA as an evolving process did not appear to be widespread in the 2007-2013 period, though some case studies revealed such examples. Moreover, in several countries (Northern Ireland, Bulgaria and Denmark among others), there was uncertainty regarding the applicability of the requirement for SEAs for some OPs, which resulted in a delayed process with limited public participation and limited impact on OP priorities and objectives. Nonetheless, the study points out some examples of cases of innovative use of SEA:

- In Poland, SEA resulted in adding some environment-related indicators for the case of one OP, and for the case of another OP it was used as a tool to reconcile trade-offs between transport development and environmental sustainability through the re-routing of elements of a key trans-European transport corridor to void Natura 2000 sites.

- In Bulgaria, the SEA resulted into the establishment of environmental criteria for project selection within a number of OPs.

- In the framework of an Italian regional OP, the SEA was not only carried out exclusively before the programming phase, but also during the implementation period, ensuring the existence of a feedback mechanism into the implementation of the OP.

- The South-West of England has improved monitoring and evaluation systems of SEAs through a monitoring strategy developed by the Regional Development Agency (RDA).

- In Finland, the funding authority has to also consider the SEA and its categories in the assessment of project proposals, giving the SEA and its impact categories a continuous role to play.

4.3.2.3 SEA in the 2014-2020 period

In 2016, a study supporting the evaluation of the SEA Directive was completed by Milieu. The study looked at the application of SEA in general and application in relation Cohesion Policy planning (operational programmes) was considered as part of the analysis of coherence. The analysis found that almost one-third of Member States reported that they did not experience any problems in carrying out SEAs for ESI Funds programmes. For others, some of the most common issues identified were:

- The general nature of ESI Funds programmes makes an effective SEA difficult or even redundant.
- Timeframes imposed by the Commission.
- Ambiguity as to what is required from the practitioner[199]

The analysis did not lead to a firm conclusion with regard to the effectiveness of SEA in ensuring that environmental concerns are integrated in ESI Funds programmes. Overall, the report assessed that there is some sort of influence of the SEA in the planning process and there have been improvements in the way SEA is conducted that have led to better quality plans. The report identified a list of key factors that influence the effectiveness of the SEA[200].

The review of SEAs conducted for the 32 reviewed OPs on this study shows that the SEAs explain the recommendations made as a result of the assessment and how these were integrated in the OPs. Most often, these recommendations concern elements that provided minor amendments to the OPs – not radical changes in the strategy deployed. The amendments often address mitigating measures to ensure that negative environmental impacts of certain types of activities would be curbed or minimised. However, the mitigating measures often remain at a fairly generic level and involve mostly references to suggested selection criteria principles/considerations (e.g. focusing on sites that are already built up and reuse of buildings and materials) or to the future EIA/permitting process for the individual projects.

Interestingly, the SEA report for Malta's OP I (Fostering a competitive and sustainable economy) makes use of a 'sustainable development' rationale for choosing the preferred programme among three alternatives (do-nothing OP, chosen OP and a greener OP). It is argued that the proposed OP is preferable to the greener OP alternative due to the economic and social advantages.

The SEAs generally provide recommendations by environmental theme (water, biodiversity, etc.). As an example of a different approach, which could be seen as a practise whereby recommendations are easier to take into consideration for the OP drafting team, the Lazio SEA report provides recommendations structured by Priority Axis.

An observation from the reviews is that the SEAs vary considerably in the way they handle the fact that the OP is a framework for future selection of specific projects/operations. The Bulgarian SEA distinguishes clearly between 1) measures to be reflected in final OP; and 2) measures to be applied during OP implementation, including general measures/principles and measures by environmental theme. Other SEAs are less specific and some only provide recommendations for the OP itself but do not consider in detail how the process of environmental assessment should be organised for the implementation of the OP (except for a general reference to EIA obligations).

[199] Milieu, 2016: Study concerning the preparation of the report on the application and effectiveness of the SEA Directive, Final Study, p. 179.

[200] ibid, p. 122-124

Overall, the feedback given from national authorities during interviews and the workshop indicated that national expertise on SEA has improved over the three periods, however, none felt that the SEAs had a major impact: they led to some but not major improvements in OPs. The SEA is regarded as an important tool for integration of environmental considerations, however with some shortcomings. In general, the views expressed during interviews and the workshop confirmed the findings of the 2016 study on the evaluation of the SEA Directive (ref. above).

One important observation relates to the process of conducting the SEA in parallel with the OP and the extent to which the SEA team and the OP drafting team interact and exchange views during the process (formally and/or informally). DG Environment also mentioned examples of specific SEAs which led to important changes in OPs in early stages of OP development, but where this was not documented in the final SEA documents as it concerned preliminary versions of the OPs. There is thus evidence to suggest that the process in itself leads to an influence of the SEA on the OP design – and this may in some instances not be captured fully by the formal documentation.

Text Box 4-3 Experience with iterative processes of SEA and OP drafting

The Environment Statement of the Brussels ROP notes that "working in an iterative manner with the author of the SEA ER, the Brussels-Capital Region was able to take the conclusions of the environmental impact report directly into the drafting of the Operational Programme"201.

The SEA report for the Alpine Space OP shows in chapter 8 an interesting overview of how the OP evolved during the drafting process and the SEA analysis of the environmental impacts at different stages. The Alpine Space SEA report indicates the value of highly integrated process of OP design, ex-ante evaluation and SEA – and a process where the SEA analysis was actually repeated at several stages in the process (rather than trying to identify the most suitable time in the planning process).

Interviewees and participants at the ENEA-MA workshop had limited experience with combining the ex-ante assessment and SEA. Those who did have experience saw the integration of ex-ante evaluation and SEA as useful (more efficient). One comment was that ex-ante assessments have a strong impact, since they can take place as the OPs are in preparation and thus can influence drafts. In contrast, the SEA procedure is more formal, in particular as it involves a public participation phase, and paradoxically, this seems to limit its impact. This, again, is in line with findings of the 2016 evaluation study, which found that combining the two can have a positive effect in terms of emphasising the environment pillar vs economic and social aspects that are also required in the ex-ante assessment (Milieu, 2016).

In relation to the point about the public consultation rendering the SEA to be less effective, an example from Hungary points to one practise, which could help to improve this. In Hungary, the SEA consultant translated the SEA into regional impacts (rather than sectoral impacts which is the way the SEA is normally organised). This instigated interest and participation in the public consultation.

[201] p. 3-4, DÉCLARATION ENVIRONNEMENTALE RELATIVE AU PROGRAMME OPÉRATIONNEL FEDER 2014-2020 DE LA RÉGION DE BRUXELLES-CAPITALE, http://www.environnement.brussels/sites/default/files/user_files/feder_declaration_environnementale_fr.pdf

Experiences and limitations with respect to the application of SEA in the 2014-2020 programming period has been part of the discussions of a plenary session of the Italian Environmental Network (Rete Ambientale) at the end of 2015[202], summarised in the following text box. The views expressed to a large extent coincide with those raised by the majority of respondents in interviews and the workshop. They also confirm the main observations made in the 2016 study done by Milieu (referenced above).

Text Box 4-4 Experiences and limitations with respect to the application of SEA in Italy, discussed at Italian Environmental Network plenary session 30 Oct 2015

In Italy, a thematic meeting (held in October *2015*) focused on the contribution of SEA to regional OPs in the 2014-2020 period. Key issues that were raised included the following:

- The European Commission, in its negotiations over OPs for this period, addressed environmental issues in a generic fashion.
- Participatory processes were not very effective regarding environmental issues.
- It was not possible to align consultations, the Commission's comments and integration of the SEA for the OP
- The complexity of the OPs made it difficult to assess the coherence between environmental objectives and the strategies defined in measures and actions.
- The territorial component of measures and interventions was largely missing, and as a result evaluations were rather generic (including an assessment of alternatives). This level of assessment was often postponed to a later step.

The proposals for improving the SEA process are:

- Strengthening participatory processes, better definition of instruments (for example in the non-technical synthesis of the SEA) and the creation of a permanent forum for institutional collaboration
- Updating SEAs in subsequent phases with the territorial dimension of interventions and with the objective of preparing environmental monitoring (though it was also noted that it would be important not to make the process too resource intensive)
- For the Environmental Network, one step would be to include, in the agreements between the competent authorities and environmental authorities, also authorities responsible for SEAs.

An additional point that came up during interviews and the workshop was that for the 2014-2020 programming period, priorities were already fixed in the partnership agreement which was not subject to SEA. Therefore SEA in relation to OP comes at an advanced/late stage where certain strategic elements have already been fixed. Some respondents emphasised the important role of the partnership agreement in actually focusing on environmental targets as part of the strategic framework for the OPs. Some emphasised that the partnership agreement ought to be subject to SEA. However, there is a conflict with other views that OPs are too general to meaningfully conduct a SEA. This would apply even more to the partnership agreements.

Several issues related to administrative burdens and capacity constraints were made by national representatives during interviews and the ENEA-MA workshop. In general, the

[202] For a summary of discussions at the Rete Ambientale meeting of October 2015 see: http://reteambientale.minambiente.it/plenaria-della-rete-ambientale-roma-30-ottobre-2015

SEA process is viewed as cumbersome by the national representatives and this seems to relate to several factors:

- The OPs are felt to be strongly related and to a large extent based on existing national strategies and plans – and these have already been subject to a SEA. Some respondents therefore consider the OP SEA to be redundant.

- A SEA 'implementation culture' which is more focused on the procedural requirements than the content of the assessment (or at least equally focused). This combined with difficult timing issues of combining the OP drafting process with the time-consuming public consultation requirements of the SEA.

In respect to capacity of national administrations to deliver SEAs, the assessment on implementation of ex ante conditionalities[203] notes that the ex-ante conditionality requiring Member States to effectively apply the EIA and SEA Directives "*has also resulted in the modification of national legislation in some Member States. Consequently, the regulatory framework for the environmental decision-making process has been clarified and the knowledge and skills of the authorities applying the EIA and SEA Directives have been improved*". Slovakia: the ex-ante conditionality on SEA led to new national legislation and increased staff for SEA/EIA in the ministry (from 4 to 20+ staff in the unit of the ministry dealing with this).

However, based on inputs during interviews and the workshops, there are also concerns over the capacity for delivering the SEAs.

- In several countries, establishing a dialogue and common language between the different authorities involved in OP drafting and SEAs is a challenge.

- Despite guidelines being available, there seems to be uncertainties in respect to some elements of SEA and what the SEA should deliver. For example, respondents voiced questions on whether the SEA should make recommendations on selection criteria and on indicators (which it clearly should).

- SEAs are typically prepared by external consultants, who often lack adequate knowledge, especially regarding historical processes. SEA consultants are not always sufficiently creative and do not always know/understand the field and the guidance well enough (they do not fulfil their role as 'critical reviewers').

4.3.3 SEA influence on selection criteria

The environmental effects of programmes are difficult to assess at the SEA stage, since beyond the orientations taken in draft OPs, the actual effects and impacts of programming will be highly dependent on the selected projects. Recommendations from the SEA process with respect to selection criteria and the way they are formulated might

[203] European Commission (2017), The Value Added of Ex ante Conditionalities in the European Structural and Investment Funds, SWD(2017) 127 final, http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/value_added_exac_esif_en.pdf

enable OPs to more precisely define criteria of project eligibility and selection and thus provide a more operational basis for ensuring integration of environmental concerns.

We have observed that typically SEA recommendations with respect to selection criteria are provided by environmental theme/impact (e.g. SEA for the Greek Environment & Transport OP, the Attica ROP, and the Bulgarian Transport OP), rather than structuring them by Priority Axis or Specific Objective. Such recommendations tend to be general principles/measures primarily to minimise environmental impact and on some occasions on prioritisation of actions. These would influence the environmental requirements for selected project and hence the selection of projects. However, as they do not follow the structure of the OP, an explicit link between the measures and the specific activities foreseen by the various Priority Axes cannot be easily inferred, with a risk of possibly overlooking some.

One exception is the Lazio SEA recommendations which are provided by Priority Axis and are formulated largely as tips for increased environmental integration to be taken into account for project selection / prioritisation. According to the Environment Statement, these recommendations have been taken into account in the OP by each of the Priority Axes.

Some cases would seem to suggest that there could be room for more specific SEA recommendations with respect to selection criteria, and the consultation process with affected/knowledgeable stakeholders offers good input in this respect. For example, comments provided by Bruxelles Environnement (Brussels institute for environmental management) during the consultation process in relation to the Brussels ROP note that "*the draft programme would gain operationality and transparency if, beyond the principles, it defined more precisely the criteria of eligibility and selection of projects. Brussels Environment insists that these criteria make it possible in particular to select projects for the implementation of green and blue infrastructure in areas where there are deficiencies in green areas […]*"[204].

The reviewed SEAs in general put surprisingly limited emphasis on suggestions for selection criteria and the whole process of selection that happens 'downstream' of the OPs. The SEA provides room for making concrete suggestions for environmental assessment of project applications (besides the EIA, e.g. for projects that do not require a full EIA), but this is only partially addressed in some of the SEAs reviewed. This is a missed opportunity and a failure to recognise what should be the role of the SEA when applied to an OP, which is not a detailed plan but more a roadmap for spending that has significant potential to impact the environment. The focus seems to stop at assessing concrete impacts on the state of the environment, rather than understanding how the processes and procedures set forth in the OP can also have important influence on those impacts.

[204] p. 7-8, DÉCLARATION ENVIRONNEMENTALE RELATIVE AU PROGRAMME OPÉRATIONNEL FEDER 2014-2020 DE LA RÉGION DE BRUXELLES-CAPITALE, http://www.environnement.brussels/sites/default/files/user_files/feder_declaration_environnementale_fr.pdf

4.3.4 SEA influence on monitoring programmes and indicators

As mentioned above, the merits of the SEA as analysed for the two previous programming periods relate often to their contribution in terms of specifying monitoring programmes and indicators. However, previous studies have not analysed in great depth the outcomes of the SEAs in this regard.

On the basis of the SEA and OP review done for this study as well as views offered during interviews and the ENEA-MA workshop, the main outcome is that:

- The OPs use different environmental indicators than those recommended in SEA reports, e.g. in particular on the basis of experience achieved in previous programming cycles or based on output and result indicators.

- Environmental monitoring is generally not physically and procedurally integrated into the OP Monitoring System, so there are no specific information or reports about measuring of environmental indicators related to the OP contribution to environmental sustainability. The activity of the Managing Authority, which is committed to ensure the flow of information among the various authorities involved, should find appropriate responses in the issuance of environmental monitoring reports, in conjunction with monitoring of the implementation progress of the OP. I.e. there is scope for better integration of environmental monitoring to the OP monitoring.

The OP review identified some good examples of working with indicators shown in the box below.

Text Box 4-5 SEA and OP indicators – examples of good practise

The Lazio OP is very detailed with respect to describing the process for setting up the monitoring system and defining the framework of the work process/relations between the Managing Authority and Ethe Environmental Authority in that respect. The SEA ER distinguishes between indicators for monitoring the environmental context, and specific indicators to monitor the programme's impact on the environment. For the latter it proposes specific monitoring at project level by the beneficiaries. The ER seems to have taken into account the learnings and best practices of the previous period (e.g. Access database for project level monitoring). The ER proposes specific indicator headings without precisely specifying the units, as their precise definition will depend on the actual projects. In that sense the proposed indicators can be seen as more operational. ER notes that where quantitative assessment is not possible, qualitative judgements will have to be made.

Similarly, the SEA for the IT OP on Infrastructure and Networks (Transport) puts a lot of emphasis on an effective environmental monitoring system as the means of ensuring environmental integration. It capitalises and builds upon the learnings from the previous period monitoring system, and elaborates on elements of the system and how the involvement of specific entities would help address previously faced challenges, e.g. to move towards integration of environmental monitoring with OP (physical, procedural and financial) monitoring; involvement and constant dialogue with the creators of environmental data and information, with special reference to the regional level (e.g. Regions, ARPA, MA and environmental authorities of the regions concerned) etc.

The indicators provided for the environmental monitoring of the IT OP on Infrastructure and Networks have been defined and selected as part of a long consultative process between the Ministry of Transport, the Ministry of Environment and ISPRA, that ended in May 2014. There are three types of indicators provided for monitoring: i) context indicators; ii) Process indicators (programme progress); iii) Indicators of contribution.

The SEA report of the Bulgarian Transport OP proposes specific indicators, which would at the same time appear operational. Indicative of this is the fact that the statement issued by Ministry of Environment, which sets out the measures for OP implementation / monitoring, has largely taken on board the SEA proposed indicators.

4.3.5 Main findings on the use of SEA as an instrument of integration of environmental considerations

The requirements to SEA for the OPs have increased during the three periods and there is also evidence to suggest that SEAs have an influence on enhancing the consideration of environmental concerns in the OPs – both formally and informally. However, the influence seems often limited to small adjustments of OPs and the scope for influencing what happens 'downstream' of the OP in relation to project selection, implementation, monitoring and evaluation is not fully exploited in most SEAs, which tend to focus on the assessment of environmental impacts rather than the procedural aspects of OP implementation and how integration of environmental concerns can be safeguarded during the implementation stage.

The SEAs conducted in an iterative process with the OP drafting – sometimes integrated with the ex-ante evaluation - seem to have the best effect and the effects here are most likely greater than what can be determined from the formal documentation in the final environmental report and statement. The informal leverage of having the SEA requirement should not be underestimated. However, it must also be recognised that the regulatory framework for Cohesion Policy in itself also provides a strong impetus for integration of environmental concerns (ref. section 4.1.1.1).

As a new element in the 2014-2020 period, the Partnership Agreement (not subject to SEA) meant that priorities were already fixed in the initial stage. The OP SEA in that sense came at an advanced stage where it was too late to have a strong influence. It could be considered to require the preparation of SEA for the Partnership Agreements, in addition to – or instead of - the OPs. However, requiring both would add to the administrative burden. One possibility could be to have a formal SEA for the partnership agreement and to have special requirements for analysis of integration of environmental concerns in the ex-ante evaluation (but not a formal SEA).

There is scope for more guidance or outreach in regard to what the SEA should or should not cover. For example, as noted in the section above, it is not clear to the relevant authorities if it is within the SEA scope to look at indicators/criteria for selection. Further guidance on SEA could also elaborate on how the SEA can:

- Contribute with recommendations on indicators and monitoring systems to be more integrated with OP monitoring.

- Provide more operational suggestions for procedures for environmental assessment during OP implementation – in particular of projects not requiring Environmental Impacts Assessment (EIA).

4.4 Selection criteria as a mechanism for integration of environmental concerns

The key question addressed in this section concerns the extent to which environmental considerations have been taken into account when adopting guiding principles for operation (project) selection as well as concrete selection criteria[205].

We distinguish between two different steps in the process of setting criteria, which are reflected in the two separate sections below:

- The guiding principles for selection criteria set out in the OPs, and
- The actual selection criteria applied in the calls for projects and project selection instruments used at Member State level

4.4.1 Integration of environmental concerns through OP selection criteria principles

We have reviewed the guiding principles for selection of operations (sub-section 2.A.6.2 for each IP) for the selected OPs, to assess the extent to which they take into account environmental concerns. We distinguish among the following degrees of integration:

- Through elaborating on environmental concerns and providing environment-relevant criteria tailored to the specific IPs and content of the OP (high)
- Primarily through a generic reference to the horizontal principle of sustainable development, complemented by few additional considerations tailored to the specific IPs (medium)
- Through a generic reference to environmental concerns/ sustainable development as a horizontal principle (low)
- Environmental concerns are not mentioned/taken into account (none)

From the OP review we observe that:

- 9/32 OPs are assessed to have a "high" degree of integration, meaning that they are detailed in elaborating environmental concerns and providing environment-relevant criteria/principles tailored to the specific IPs/TOs and the content of the OP. The nine OPs are a mix of four national Environment and/or Transport OPs, three regional OPs that encompass environment specific IPs, one national OP on enterprises and competitiveness, as well as two ETC programmes. Of particular interest are the cases of OPs that encompass environmental-related guiding principles for IPs in TOs other than TO4-TO7. We also note that some of the OPs in this category [e.g. see text box below on the Danube ETC] describe the principles in the section on the horizontal principle of sustainable development (OP section 11.1 for ERDF/CF and ESF, or section 5.1.3 for ETC) rather than 2.A.6.2, where they provide a cross-reference.

[205] The analysis focuses only on selection criteria – not on eligibility criteria

- 14/32 of the OPs are assessed to have a "medium" degree of integration, meaning that they address environmental concerns through a general reference to the horizontal principle of sustainable development, complemented by few additional considerations tailored to specific IPs

- 8/32 OPs are assessed to have a "low" degree of integration, meaning that they simply refer to sustainable development as a horizontal principle to be taken into account in project selection, without providing additional IP-tailored considerations. None of the 8 OPs were national or regional OPs dedicated entirely to the environment.

- 1/32 OP (MT OP that is entirely dedicated to financial instruments) did not mention environmental concerns at all (in fact there is no OP section 11.1).

Overall, our review thus indicates that guiding principles with respect to criteria on sustainable development tend to remain rather generic (about 2/3 of the selected OPs). Table 4-3 takes as a starting point the nine OPs assessed as "high" and draws examples where guiding principles in relation to IPs other than those under TO4-TO7 were provided.

Table 4-3 Examples of environmental integration in the guiding principles for operations selection of IPs other than TO4 - TO7

Member State	OP	**Description**	**Fund**	**Examples** of environmental integration in the guiding principles for operations selection of IPs other than TO4 - TO7
Germany	OP Niedersachsen	Regional, innovation, SME, social inclusion, and climate mitigation	ERDF, ESF	• PA1, IP1a,1b: Generic, but particularly resource- and energy savings potential + SD • PA2, IP3d: For SZ 7, contribution to sustainable development as well as the CO_2 savings-potential must be demonstrated + SD • PA8, IP9i: Projects need to consider SD • PA9, IP10i: Projects need to consider SD
Italy	ROP Campania	Employment, social inclusion, competence development	ESF	• TO8: selection criteria have been set in operational terms, prioritizing projects that support employment in specific green sectors in line with the Smart Specialisation Strategy (energy, green chemistry, sustainable construction industry) and more widely the green and blue economy. • TO9: prioritisation of projects that promote the Urban Development Strategy. • TO10: priority will be given to projects that promote citizens behavioural changes, providing them with the essential skills necessary for achieving sustainable development. • TO11: priority to interventions that will be consistent with the Urban Development Strategy, in particular for the realization of investment projects in institutional capacity, in search of economic efficiency and sustainability solutions. Priority will be given to projects which will strengthen essential skills of municipal administration employees needed to achieve Sustainable Development.
	OP Enterprises and compet	National, less developed and transition regions	ERDF	• General: Eligibility / evaluation criteria will take account of the general principles set out in Articles 7 and 8 of the CPR; Sectors identified in national smart specialization strategy • IP1b: As regards the interventions concerning industrialization, the selection criteria may also refer to aspect of the recovery and

Member State	OP	Description	Fund	Examples of environmental integration in the guiding principles for operations selection of IPs other than TO4 - TO7
	itivenes s			redevelopment of abandoned or underutilized facilities. • IP3b: developed criteria will possibly seek to give priority to areas such as the green economy, eco-innovation, low-carbon economy and promoting the effective use of resources. To facilitate initiatives focused on environmental values, the establishment of reserves, the use of assessment grids that provide rewards scores or the anticipation of a fast track are foreseen. [+ Actions: Innovation focused investments will benefit from the integration of services developing more energy efficiency industrial sites.] • IP3c: for interventions to support process investment in machinery, equipment etc, operations will be selected based on criteria of innovativeness of the proposed investments, attributable to the acquisition of technologically advanced equipment and intangible assets that can increase the level of efficiency and flexibility in the conduct of economic activity, evaluated, for example, in terms of reducing environmental impact among other things (also lower costs, increase production capacity, improve safety etc)
ETC	North West Europe	Aims to stimulate transnational cooperation between various stakeholders.	ERDF (ETC)	• TO1: Among other principles to be observed, projects should demonstrate that they contribute to one or more key social, economic or environmental challenges of the NWE area.

Environmental areas frequently addressed in the principles include conformity with biodiversity/ecosystems requirements (e.g. Habitats Directive) and SEA/EIA and environment-related provisions in permitting rules, and to a lesser degree the Air-quality Directive and the Water Framework Directive.

Several OPs mention the prioritisation of energy efficiency projects with the greatest potential for energy savings or a conditionality in terms of minimum energy performance to be achieved (with reference to EPBD definitions).

Environment and Managing Authorities that participated at a February 2017 ENEA-MA workshop were of the general opinion that in practice the guiding principles for the selection of operations as laid out in the OP text do not have a heavy influence on the actual selection criteria and this is because the principles are not made operational. This is again linked to the difficulties in translating generic guiding principles such as 'sustainability' into specific selection criteria applicable to individual projects. Some of the participants also noted that a factor determining the degree of influence is that different ministries set the criteria and not all have the knowledge to think of/prioritise environmental aspects.

Text Box 4-6 Guiding principles for selection of operations: elaboration of environmental concerns in the sustainable development section of the Danube Transnational Programme

The Danube Transnational Programme (2014TC16M6TN001) supports in the Danube area the development of the policy framework, platforms, networks, tools, exchange of good practices, as well as joint initiatives, actions, projects to tackle common challenges, e.g. preparation of transnational investments (infrastructure, equipment) to be subsequently financed through other sources, development and practical implementation of training and capacity building, and dissemination activities.

The principles for selection of operations in chapter 2 of the ETC make reference to section 5.1.3 of the programme on sustainable development, which lays down both higher level principles and a list of more operational aspects to be considered if applicable in project selection:

1) At the operational level the following higher level aspects should be considered during programme implementation:

- Selection of investment-related projects in view of highest resource efficiency and sustainability
- Prevention of investments with considerable negative environmental and climate effects
- Develop a long-term perspective when comparing life-cycle costs of various investment options
- Increased use of sustainable procurement (GPP).

2) As a technical tool for the assessors the following aspects should be considered in project selection:

Contribution to energy efficiency, renewable energy use and reduction of greenhouse gas (GHG) emissions and improvement of air quality (e.g. reductions of PM and NO2)

- Contribution to efficient water supply, waste-water treatment and water reuse
- Application of GPP in a systematic manner
- Contribution to efficient waste management, re-use and recycling
- Contribution to the development of green infrastructures including Natura 2000 sites
- Contribution to reduced transport and mobility-related air pollution
- Contribution to sustainable integrated urban development
- Contribution to enhanced awareness of adaptation to climate change and risk prevention
- Contribution to more employment opportunities, education, training and support services in the context of environment protection and sustainable development

The estimated decrease of greenhouse gas emissions, the (potential) increase in energy efficiency and in renewable energy production are EU 2020 headline target indicators and should be monitored at operations level if applicable.

For projects involving purchasing products, the products shall comply with the energy efficiency requirements set out in Annex III of the Energy Efficiency Directive (2012/27/EU) for products subject to public procurement. If a project involves building construction and renovation, cost-optimal levels of energy performance according to Directive 2010/31/EU (Energy Performance of Buildings Directive) are required, and projects going beyond cost-optimal levels are favoured.

4.4.2 Integration of environmental concerns through selection criteria during OP implementation

This study has reviewed selection criteria related to some of the calls for projects that have come out under the reviewed OPs as well as documents on selection criteria related to some of the reviewed OPs. We also searched for reports and studies on integration of environmental concerns in selection criteria during the previous programming period, but found limited evidence to shed light on this.

An overall observation from the material reviewed and inputs received is that the institutional and procedural setting for selection criteria and selection procedures is complex and dynamic. Selection criteria change over time (for some OPs selection criteria change with each call for projects), procedures for deciding on criteria and on funding involve many different institutions in the Member States and these may also change over time. It is therefore only possible within the scope of this study to provide some indicative findings on the extent to which environmental concerns are integrated in the selection procedures and criteria.

4.4.2.1 Use of selection criteria for environmental integration in the 2000-2006 period

The ex-post evaluation of the 2000-2006 programming period, WP5B on Environment and Climate Change (ADE) - done on the basis of a review of 22 OPs - concluded that: *"In many OPs, environment was considered as a horizontal priority together with being a vertical component. But often it has been more a wishful thinking than a concrete commitment. Implementing this horizontal priority was generally very simple: each submitted project had to mention the expected impact on environment (positive/neutral/negative). In nearly all visited regions, the expected impact was not really assessed or was systematically marked as positive. This criterion was therefore pointless and was never mentioned as a reason for not selecting a project. In some cases, applying the horizontal priority was more complex. However the results have been disappointing in terms of effective integration of environment in the programmes"*[206].

The study on Management systems for the 2000-2006 ex-post evaluation looked more broadly at how Sustainable Development had been integrated and found that the approaches taken had differed a lot between the regions, where some had adopted models of project appraisal that included a horizontal specialised assistance from the administration, appointing Sustainable Development specialists (cross-cutting issues managers), applying special project selection techniques where sustainable development and environmental considerations were given special treatment or more weight in the scoring system[207]. At the same time difficulties were also emphasised echoing results of a previous study which found that taking sustainable development into consideration

[206] ADE (2009), Ex post Evaluation of Cohesion Policy Programmes 2000-2006 co-Financed by the European Fund for Regional Development (Objectives 1 and 2) – Work Package 5b: Environment and Climate Change. Final Report – Volume 1, p. 67

[207] EPRC, METIS and University of Strathclyde Glasgow. 2009. Ex-post evaluation of Cohesion Policy programmes 2000-2006 co-financed by the ERDF (Objective 1 and 2), Work package 11: management and implementation systems for Cohesion Policy, DG Regio

during project selection was sometimes obstructed due to difficulties in translating and enforcing a horizontal theme into the project scoring systems[208].

In sum, studies on the practises in relation to selection procedures and criteria in the 2000-2006 period are not entirely consistent. While some point to special techniques being applied to ensure that environmental issues and sustainable development issues were taken into consideration, others indicate that this was not it all the case. This is indicative of the great variation in practices across the Member States at that time

4.4.2.2 Use of selection criteria for environmental integration in the 2007-2013 period

The IEEP study considered that various tools helped to integrate sustainability considerations during the period, including the development of booklets, manuals and checklists especially in relation to project generation, appraisal and selection. However, the study did not make a detailed assessment of how environmental considerations were taken into account in selection criteria or procedures.

4.4.2.3 Use of selection criteria for environmental integration in the 2014-2020 period

For this study, we have sought to review selection criteria for some of the 32 selected OPs through checking calls for projects published by the relevant authorities as well as other available information on selection criteria related to the OPs. Further, we have discussed the subject with ENEA-MA representatives at the workshop.

In general, one unsurprising finding is that for OPs focusing on direct environmental investments (as well as indirect environmental investments to a certain extent), environmental concerns are at the core of the selection criteria and they are extensively described, i.e. the projects have to address the specific environmental issues in each sector.

For the direct environmental investments, the selection criteria are very much steered by the national goals and plans, which reflect legislative requirements.

For indirect environmental investments, the selection criteria relating to environmental aspects are more often a form of 'incentive' – i.e. projects are given extra points for including environmental concerns rather than being selected or deselected on that ground. However, there are also examples of more definitive criteria being applied. For instance, in the case of the Lithuanian OP, the selection criteria for projects on renovation of public buildings focus mainly on environmental sustainability and include criteria on energy efficiency and reduction of GHG emissions that projects must meet in order to be selected.

[208] GHK, PSI, IEEP, CE (2003) The thematic evaluation of the contribution of the structural funds to sustainable development, DG Regio, European Commission, Brussels.

The challenge with respect to the integration of environmental concerns in selection criteria arises mainly with regard to other types of projects (primarily investments in other sectors, and sometimes indirect environmental investments). For these projects, many authorities struggle to set clear criteria that would evaluate the extent to which projects integrate environmental concerns. In general, this seems to be addressed through requiring general references to compliance with environmental legislation and EIA. For example, in the selection criteria for Digital Poland OP, the projects only need to indicate and justify whether they are required by law to carry out an EIA. In the Greek OP operations/projects must simply state whether they are in compliance with national and EU environmental laws. In the Malta OP, project applications must make a specific reference to the 'Sustainable Development Strategy for the Maltese Islands 2007-2016' and to the 'Sustainable Development Act' while explaining how the project fits into this strategies.

There are however, some inspirational examples of addressing this challenge, as for example in the cases presented below.

In Latvia, a methodology for monitoring the implementation of the horizontal principle of sustainable development has been developed[209]. This methodology integrates the principle of sustainable development in the selection criteria. Projects are categorised according to the impact on sustainable development (direct positive impact, indirect or no impact). For instance, the projects with indirect positive impact can be granted additional points if they are specific with regard to implementation of the principle of sustainable development. Furthermore, the GPP principles is included in the selection criteria and depending on the project's impact, it can provide either extra points or be an exclusive quality criterion.

The Autonomous City of Ceuta (Spain) has put in place a mechanism to promote the adoption of voluntary commitments for sustainability and low-carbon economy in SMEs. The system is based on the inclusion of economic incentives (additional 2% of the funding) within SMEs competitiveness call for proposals, for those enterprises that voluntarily take on sustainability and low-carbon economy commitments. The voluntary commitment is formalized with a helpdesk specialized in giving environmental advice to enterprises, that is publicly provided for all SMEs applying for the ESI Funds. The incentives raise SMEs interest in sustainability while at the same time the helpdesk service generates awareness and sustainable actions.[210]

Bulgaria has developed guidelines on sustainable development (environmental authorities and MA in cooperation), which includes recommendations with respect to environmental selection criteria, that could be integrated as requirements or to give more points in project selection.

In Italy, it was noted that attention to environmental concerns varies across thematic OPs and regional OPs. The Ministry of Environment has provided input to the

[209] Latvian methodology to sustainable development in selection criteria: http://www.varam.gov.lv/in_site/tools/download.php?file=files/text/Finansu_instrumenti/koh_f/nac_prog_2014_2020//metodika_HP_IA_DP_2015_2.zip

[210] Source: ENEA-MA report Box 9 p. 45, and Annex 5 p. 71-72

development of selection criteria in some regions. Moreover, Italy's Network of the Environmental Authorities and Managing Authorities of Structural Funds (Rete Ambientale) plans to collect and share experiences with environmental selection criteria in regional OPs, and encourage learning.

To this end the Rete Ambientale Secretariat compiled at the beginning of the 2014-2020 programming cycle a document[211] encompassing tables listing the selection criteria foreseen in the regional OPs (distinguishing strictly between issues with direct environmental relevance (TO4-TO7) and issues with indirect relevance/effect (TO1-TO3 and TO8-TO10). This document is kept updated with additional criteria approved from the monitoring committees or more detailed selection criteria as indicated in the calls for proposals, with separate columns for those suggested by the relevant regional Environment Authority or the Italian Ministry of the Environment (see text box below for an overview of the document version from December 2015). Based on the compiled information, Rete Ambientale intends at a later stage to evaluate the effectiveness of the implementation of these criteria.

[211] Review of Environmental Selection Criteria identified in ERDF/ESF OPs/ROPs of the 2014-2020 period [Rassegna dei criteri ambientali per la selezione degli interventi individuati nei PON/POR FESR-FSE della Programmazione 2014-2020], http://reteambientale.minambiente.it/sites/default/files/criteri-ambientali_20151223.pdf

Text Box 4-7 Overview of Rete Ambientale's document listing environmental selection criteria for the financing period 2014-2020

Rete Ambientale's document presents an overview of the environmental selection criteria for the financing period 2014-2020. The final aim is to support and provide guidance to the Managing Authorities that implement the measures envisaged in the OP. The December 2015 version covers 20 OPs for the ERDF, 21 OPs for the ESF and 8 OPs that relate to multiple funds.

The document is structured around the following environmental sectors:

- Land rehabilitation, falling under TO3 and TO6;
- Energy efficiency and CO2 emissions, falling under TO4;
- Sustainable transport, falling under TO4 and TO7;
- Hydrogeological instability and climate, falling under TO5;
- Water, falling under TO6;
- Waste, falling under TO6;
- Biodiversity and natural assets, falling under TO6;
- Indirect environmental measures, falling under TO1, TO2, TO3, TO8, TO9, TO10.

For each of these sectors, information on the TO, the expected results and the measure envisaged is presented. For each measure specific selection criteria, which are broken down into eligibility criteria (minimum requirements) and evaluation criteria (used for scoring eligible applications), are indicated.

In the table below we have extracted some examples of selection criteria for measures in TOs other than TO4-TO7 from Rete Ambientale's document.

TO	Selection criteria	
	Example of eligibility criteria	**Example of evaluation criteria**
TO1	Environmental sustainability, including evaluating whether management environmental tools and/or social responsibility certificates exist.	Not identified
TO2	Promoting environmental sustainability.	Not identified
TO3	Existence of certified environmental management tools in the companies asking for support; application of minimum environmental standards on green purchases as indicated by the law.	Priority should be given to business models that imply a reduced environmental impact or characterized by a more environmentally sustainable management.
TO8	Business activities that offer development opportunities in the blue and green economy.	Minimum environmental standards defined by the legislation and GPP.
TO9	Development training for jobs in the green economy sector.	Not identified
T10	Priority should be given to measures with positive impact on the climate.	Minimum environmental standards defined by the legislation and GPP.

In the implementation of the Attica OP, interview data shows how environmental considerations can be integrated in selection criteria in an indirect way through defining

the scope of specific calls, e.g. the scope of a call concerning energy efficiency in buildings call might focus on "buildings built prior to 1980" and as such respect the guiding principle of seeking to maximise energy savings potential.

Based on interviews and inputs from the ENEA-MA workshop, some challenges to developing further on integration of environmental concerns in selection criteria were identified.

- Various institutions are involved in the Member States and not all of them have a good understanding of environmental concerns.
- Finding a common language in the multi-governance system is not easy
- The lack of indicators on sustainable development can translate into difficulties in establishing appropriate selection criteria.

4.4.3 Main findings on selection criteria

OP guiding principles with respect to selection criteria on sustainable development tend to remain rather generic, but there are examples of OPs which have developed more comprehensive frameworks. Developing more operational criteria mirroring the overall principles of sustainable development is a methodological challenge. Guiding principles on selection criteria are found to have a limited influence on the actual selection criteria used in calls for project applications.

Actual selection criteria are set in a complex and dynamic institutional context – and they change over time. This makes comprehensive analysis of their character a challenge. Findings presented in this study are therefore indicative. Selection criteria for the environmental OPs tend to be related to the relevant national plans and as such provide a good 'steer' for environmental investments. Selection criteria for the indirect environmental OP / thematic objectives tend to be more in the form of 'incentives' (i.e. favouring certain types of investments without requiring them). Some Member States have worked with selection criteria in a more structured and comprehensive way and there could be scope for more exchange of lessons learned between Member States. Further, focusing on establishment of indicators for environmental concerns / sustainable development could also have a positive influence on the establishment of selection criteria as the challenges in this area are related to the lack of indicators.

4.5 Environmental integration in energy, transport and industrial investments

Our review of 32 OPs encompassed a number of OPs, which focused on investments in energy, transport and industrial investments. Out of the reviewed OPs, 23 programmes support investments within transport, 22 - energy and 17 - industry.

Investments supported under the transport sector (or TO7) focus on sustainable forms of transport and sustainable urban mobility (e.g. rail and metro systems) with the emphasis on reduction of GHG emissions. Investments in the energy sector (or TO4) support

projects within energy efficiency (e.g. renovation of public buildings), smart energy management, and promotion and production of renewable energy. As noted in chapter 3.8 of this report, indirect environmental investment in these sectors have increased considerably during the three programming periods.

The findings in respect to these OPs and how horizontal integration of environmental concerns have been dealt with are integrated in sections 4.1 to 4.4 above. Most importantly, it is noted that the transport related OPs refer to the fulfillment of EIA Directive as well as the Habitat Directive in how sustainable development will be ensured in implementation. Further, we found that the OPs involving thematic objectives in energy (TO4, TO5) make use of environmental indicators to a large extent. Those involving thematic objectives in transport (TO7) do so to a medium extent (5 out of 13 OPs). Those involving thematic objectives targeting the business sector (TO1, TO2, TO3) rarely do so. Many of the OPs with the focus on energy, transport and industry, include environmental indicators on air quality (NO_2, PM emissions, air Quality Index) and reduction of GHG emissions.

4.6 Cohesion Policy contribution to green jobs and circular economy

The contribution of Cohesion Policy to green jobs and circular economy concerns key policy ambitions where the framework for measurement of outputs and results does not lend itself easily to establish data to inform an assessment. Terms such as "green jobs", and "circular economy" are new terms that Managing Authorities might not be prepared to monitor before definitions and guidelines from the Commission are provided, as well as time and the specific legislative framework. The objective of this study has been to come up with some methodological considerations and suggestions for how contributions of Cohesion Policy funds to green jobs and circular economy can be measured.

In this chapter, we provide some observations based on a) searching a database developed by COWI under the previous assignment “Mainstreaming of climate change into ESI Funds 2014-2020” for DG CLIMA[212]; b) reviewing of the selected OPs (see Appendix A for the list of reviewed OPs) for the two areas of "green jobs", and "circular economy"; and c) reviewed key literature on the topics. We then provide some methodological considerations for assessing Cohesion Policy Funds contribution to the creation of green jobs and the circular economy.

4.6.1 Contribution to green jobs

When developing a methodology for assessing green jobs, it is important to recognise that different types of OPs support the creation of green jobs in different ways. A search in the database from the “Mainstreaming of climate change into ESI Funds 2014-2020” project led to an initial identification of 34 programmes with explicit references to green

[212] The database developed by COWI for DG CLIMA under the assignment “Mainstreaming of climate change into ESI Funds 2014-2020”, includes environmental and climate action information from all adopted Cohesion Fund OPs under the 2014-2020 period. The database includes among other things information on the scope of the OP, the strategy of the OP, considerations for selection criteria, horizontal principle on sustainability, and financial information on priority axis, thematic objectives, and intervention fields.

jobs (15 ESF ones, 14 national or regional ERDF/CF ones and 5 ETC ones). These comprise competence development programmes (see example in Text box 4-8) as well as programmes with concrete investments in 'green sectors' generating jobs. This only serves to illustrate the complexity in programmes and projects which can have green job effects. Based on our knowledge, more OPs will focus on green job creation, but in a less evident manner.

Text box 4-8 Example of an OP with Green Jobs (2014AT05SFOP001 - OP Employment Austria 2014-2020)

The OP includes in the strategy the need for the implementation of the Master Plan for Green Jobs contributing in supporting the transition to a low-CO2 economy. It takes into account green jobs in all training measures that will be implemented in the four priority axes, especially the innovation-oriented sectors. The selection principles in education and training measures, innovation-oriented areas such as green jobs will be taken into account. Furthermore, the possibility for training on "energy savings" or "energy consulting" is also integrated into the curriculum as a contribution to support the climate targets and CO2 reductions.

A key challenge is that there is no agreed definition of 'a green job'. Existing definitions tend to be quite broad and many types of jobs can be regarded as green. Job creation (employment increase in supported enterprises) is a core indicator which is applied for productive investments, but not in other investment categories. I.e. some ESIF data on job creation can be found but only for 'productive investments' and even here the share of 'green jobs' is unknown.

In order to provide methodological indications of how the contribution towards green jobs can be assessed, we have:

- Reviewed key literature on defining and measuring green jobs[213].
- Reviewed in detail the OPs which have stated clear intentions to contribute to green job creation and solicit the kinds of interventions supported and definitions of green jobs applied.
- Reviewed core indicator data on job creation for productive investments, and other data, with a view to determine ways in which the share of green jobs can be determined

4.6.1.1 Defining green jobs

Despite national and international efforts[214] to define and measure the green economy and green jobs, the concept of green jobs has not been precisely defined and universally agreed as yet.

[213] E.g. 'Looking for Green Jobs, the Impact of Green Growth on Employment, Alex Bowen and Karlygash Kuralbayeva, March 2015' and GHK, 2009. The impacts of climate change on European employment and skills in the short to medium term: A review of the literature, Final Report to the European Commission Directorate for Employment, Social Affairs and Inclusion Restructuring Forum, Vol. 2. London: GHK International

This is also the case at the EU level, where different EU documents have made use of different high-level conceptual definitions. A 2015 European Parliament resolution on Green Employment[215] called for the adoption of an agreed definition of 'green jobs', based on that of International Labour Organization (ILO) and the International Conference of Labour Statisticians. Such an agreed definition would presumably go beyond being merely a conceptual one, to one that is operational and which enables measurement.

According to ILO[216], green jobs are decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency. Green jobs help:

- Improve energy and raw materials efficiency
- Limit greenhouse gas emissions
- Minimize waste and pollution
- Protect and restore ecosystems
- Support adaptation to the effects of climate change

At the enterprise level, green jobs can produce goods or provide services that benefit the environment, for example green buildings or clean transportation. However, these green outputs (products and services) are not always based on green production processes and technologies. Therefore, green jobs can also be distinguished by their contribution to more environmentally friendly processes. For example, green jobs can reduce water consumption or improve recycling systems. Yet, green jobs defined through production processes do not necessarily produce environmental goods or services. A distinction can thus be drawn between employment in green economic sectors from an output perspective (first component) and job functions in all sectors from an environmentally friendly process perspective (second component). Both of these components were reflected in the Commission's 2014 *Green Employment Initiative: Tapping into the job creation potential of the green economy*[217], which outlined employment challenges and opportunities of the current transition towards a green, low carbon, energy and resource-efficient economy.

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[214] E.g.: ILO/UNEP (2008) Green jobs: Towards decent work in a sustainable, low carbon world; UNSC (2012): System of Environmental-Economic Accounting (SEEA)- Central Framework; Eurostat (2009): Data Collection Handbook on Environmental Goods and Services Sector; UNECE/Eurostat/OECD Task Force on Measuring Sustainable Development (2013): Framework and suggested indicators to measure sustainable development; National definitions and estimates in US, Canada, France, Netherlands, Denmark, Sweden, Austria, Germany, UK, Australia, New Zealand, etc.

[215] European Parliament resolution of 8 July 2015 on the Green Employment Initiative: Tapping into the job creation potential of the green economy (2014/2238(INI)), http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+TA+P8-TA-2015-0264+0+DOC+PDF+V0//EN

[216] http://www.ilo.org/global/topics/green-jobs/news/WCMS_220248/lang--en/index.htm

[217] Commission Communication COM(2014)0446, http://www.ec.europa.eu/social/BlobServlet?docId=11963&langId=en

The above definition and its components can be visualised through a schematic produced by ILO as shown below. With the additional prerequisite that all such jobs also be decent, green jobs for the ILO are all those that fall in the dashed area of the following figure.

Figure 4-2 ILO definition of green jobs (dashed area)

Source: ILO website[218]

Green jobs thus comprise two distinct concepts/components, the measurement of which requires different methods. The two components cannot be aggregated (double counting) and separate statistics should be produced for each component. For instance, the US Bureau of Labor Statistics (BSL) until recently[219] conducted two separate data collection activities for each of these two components[220].

With respect to the use of the term 'green jobs' in Cohesion Policy, we found when reviewing OP relevant documentation that the Environmental Protection and Regional Development Ministry of Latvia has developed guidelines on how to determine / define a green job. In order to delineate it, the guidelines use both the ILO and EU conceptual definitions on green jobs.

[218] ILO website http://www.ilo.org/global/topics/green-jobs/news/WCMS_220248/lang--en/index.htm

[219] The US Bureau of Labor Statistics (BLS) received funding beginning in Fiscal Year 2010 to develop and implement the collection of new data on green jobs. All "measuring green jobs" products were eliminated by BLS in order to achieve spending savings ordered by the US President in March 2013

[220] The Bureau of Labor Statistics green jobs definition identifies categories of green goods and services and green technologies and practices (more info at: https://www.bls.gov/green/green_definition.htm); An overview of how the Bureau has approached measuring jobs related to a) the production of green goods and services; and b) the use of green technologies and practices, is provided at https://www.bls.gov/green/overview.htm#Overall

Text Box 4-9 Example of green jobs definition in Latvian ESIF 2014-2020

The Environmental Protection and Regional Development Ministry of Latvia have developed guidelines that among other things seek to determine what is considered to be a green job and how to identify it. In order to delineate it, the guidelines use both the International Labour Organization's definition on green jobs and other high-level definitions found at EU documents: *A green job is a job that promotes sustainable environmental conservation or restoration, whether in traditional industries such as manufacturing and construction, or new green sectors such as renewable energy and energy efficiency. Green jobs are also the ones that reduce the business and economic sectors' impact on the environment up to a sustainable level, and help to reduce energy, raw materials and water consumption, encourage low-tech carbon economy and reduce greenhouse gas emissions. Some examples of green jobs include environmental protection services, power supply, production process improvement development and green farms.*

4.6.1.2 Review of OPs with stated intention to contribute to green job creation

When reviewing OPs, we also reviewed whether and how they considered the creation of green jobs. Based on this, we set out a few observations (see Appendix K for detailed references to green jobs in the reviewed OPs):

- The Campania ESF ROP encompasses support actions with two types of potential effects, namely direct green job creation (under TO8-TO10) and indirect green job creation (under TO11). TO8, will prioritize the high growth potential sectors indicated in the Regional Innovation Strategy (RIS3), such as energy, environment, green chemistry, sustainable constructions etc. TO9 interventions will support social enterprises to employ people at risk of social exclusion in the green economy. TO10 will promote education and training programmes, addressing green economy sectors and the development of competences on risk prevention and the low-carbon economy. Moreover, the ROP recognises that green jobs might indirectly be promoted through the promotion of GPP (TO11).

- Attica's ROP regional development priority targets are linked to both components of the ILO green job definition. Regional development priority target A includes the gradual restructuring of the productive base by shifting to high value-added sectors and low environmental impact to create jobs among other things (this relates to component 2 of the ILO definition). Regional development priority target B refers to actions that aim to reap the potential offered by the environment as an emerging economic activity sector (this relates to component 1 of the ILO definition).

- With respect to environmental sectors and themes, references to green jobs in the reviewed OPs were made in relation to Natura 2000 sites, eco-tourism, access to finance, energy efficiency and renewable energy, low carbon economy, optimal material and natural resources (re)use, low-carbon transport solutions, green chemistry, sustainable constructions, risk prevention and management, research and innovation interventions, promoting SME entrepreneurship.

- Two ERDF OPs (one in Malta and one in Lazio) made a cross reference to the complementary scope of actions of the OP to ESF funded training measures aimed at green jobs in the Chapter 8 of the OP (Coordination Between the Funds).

- One OP (in Lithuania), mentions under IP8i (Improvement of access to, and prevention of dropping out of, the labour market) that priority support will be given to start-ups that create green jobs. Similarly, a Polish ROP (Łódzkie) notes that green jobs is to be taken into consideration when scoring candidate projects in a particular axis, in particular in relation to interventions under IP8i.

- The North West Europe ETC programme, includes an output indicator 'Number of jobs maintained in all economic sectors' for environment-related investment priorities and SOs (4e, 4f, 6f, 7c) (here we note that Cohesion Policy indicators with respect to job creation relate to new jobs and not jobs maintained).

4.6.1.3 Review of available green job related data

In the EU, along the spirit of the first component of the ILO green job definition, Eurostat publishes a dataset that provides estimates of the full-time equivalent employment (as well as production, value added and exports) of the environmental goods and services sector (EGSS). The EGSS is the part of the economy that generate environmental products, i.e. those produced for the purpose of environmental protection and resource management. Environmental protection includes all activities and actions, which have as their main purpose the prevention, reduction and elimination of pollution and of any other degradation of the environment. Those activities and actions include all measures taken in order to restore the environment after it has been degraded. Resource management includes the preservation, maintenance and enhancement of the stock of natural resources and therefore the safeguarding of those resources against depletion.

According to the Eurostat statistics the full-time equivalent employment for environmental goods and services sector in EU Members States amounted in 2014 to a total of 4,164,000, about 1,000,000 more compared to 2005 estimates (ref. table below). Although country-level data appears to be fragmented and not available for all countries every year, looking at data over the past couple of years it can be observed that countries with large populations like Germany, France and Poland account for a large share of the grand total (more than 400,000 each of full-time equivalent employment). Looking at per capita figures, however, Austria ranks first, followed by Luxembourg and Latvia.

Table 4-4 Eurostat statistics on full-time equivalent employment of the environmental goods and services sector for EU Members States in selected years

	2005	2010	2011	2012	2013	2014
European Union (28 countries)	3,136,000	3,938,000	4,153,000	4,158,000	4,171,000	4,164,000
Belgium	74,208	87,332	91,490	93,338	95,961	:
Bulgaria	:	:	26,671	29,080	42,239	:
Czech Republic	:	:	:	96,875	96,381	:
Denmark	:	:	:	66,660	65,307	:
Germany	:	442,320	470,356	490,558	:	:
Ireland	:	:	:	:	16,171	:
Spain	:	:	:	:	:	:
France	:	434,949	446,351	443,573	442,422	:
Italy	:	:	:	:	:	:
Latvia	:	26,446	27,431	28,675	27,774	:
Lithuania	:	32,522	35,697	37,879	38,969	:
Luxembourg	:	9,918	9,735	9,757	:	:
Netherlands	:	:	:	124,700	125,700	:
Austria	:	170,192	171,245	180,729	182,534	:
Poland	:	:	:	:	:	423,185
Portugal	:	:	:	:	:	:
Romania	268,418	118	130,266	146,026	144,596	:
Slovenia	:	:	:	:	25,976	:
Finland	:	:	:	:	:	:
Sweden	:	:	:	:	71,957	:

Source: EUROSTAT dataset on *Employment in the environmental goods and services sector,* http://ec.europa.eu/eurostat/web/products-datasets/-/env_ac_egss1

As per the measurement of the second component of green jobs, there does not appear to be as yet a methodology at EU level delineating how it could be measured, or any available estimates.

4.6.1.4 ESIF output indicators in relation to direct new jobs

Looking at ESIF-related data, what is available is output indicator data on direct job creation in general, including new direct jobs and new researchers in full time equivalents. We use the data available on InfoRegio website[221] for the two output indicators "new researchers" and "new direct jobs" in relation to the 2014-2020 programming period to provide an illustrative methodological indication on how the creation of green jobs could be measured. More precisely, with a view to capturing employment in environment-related sectors we have filtered this data for all IPs in TO4, TO5 and TO6, as well as IP7c (low carbon transport) and 7e (includes EE, RES). We note that the filtering comes with the major caveat that it does not capture potential green jobs created through TO3 interventions supporting SME entrepreneurship, business development and innovation, which could also relate to the green economy. Similarly, it does not capture direct green job creation under TO8-TO10 or indirect green job creation

[221] "Achievements" data set visualised on the Open Data platform, available on InfoRegio website at http://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/

under TO11 (e.g. enhancing institutional capacity of public authorities with respect to GPP might indirectly promote green jobs).

Table 4-5 "New researchers" and "new direct jobs" output indicators (full time equivalent) for all IPs under TO4, TO5 and TO6, as well as IP7c and IP7e

Member State	CCI Number	OP Title	Indicator Short Name	IP	TARGET Value (Full time equivalents)
Austria	2014AT16RFOP001	Investments in Growth and Employment Austria 2014-2020	RTDI: New researchers	4f	85
Finland	2014FI16M2OP001	Sustainable growth and jobs 2014-2020	FIRMS: New direct jobs	4f	4,900
France	2014FR16M0OP012	Regional programme Nord-Pas de Calais 2014-2020	RTDI: New researchers	4f	30
Greece	2014GR16M2OP001	COMPETITIVENESS, ENTREPRENEURSHIP AND INNOVATION OP	FIRMS: New direct jobs	4a	193
Greece	2014GR16M2OP001	COMPETITIVENESS, ENTREPRENEURSHIP AND INNOVATION OP	FIRMS: New direct jobs	4a	7
Greece	2014GR16M2OP012	ATTICA OP	FIRMS: New direct jobs	4b	30
Spain	2014ES16RFOP003	Andalucía ERDF 2014-20 OP	FIRMS: New direct jobs	4b	50
Sweden	2014SE16RFOP005	Stockholm	FIRMS: New direct jobs	4f	50
Sweden	2014SE16RFOP006	North-Central Sweden	FIRMS: New direct jobs	4b	20
Sweden	2014SE16RFOP006	North-Central Sweden	FIRMS: New direct jobs	4f	40
Interreg	2014TC16RFCB023	Interreg V-A - Germany-The Netherlands	FIRMS: New direct jobs	4f	40
Interreg	2014TC16RFCB023	Interreg V-A - Germany-The Netherlands	RTDI: New researchers	4f	11
Interreg	2014TC16RFCB048	Interreg V-A - United Kingdom-Ireland (Ireland-Wales)	FIRMS: New direct jobs	6c	10
Total					5,466

In the above table, we note that interventions under IP4f of the Finnish ERDF/ESF funded Operational Programme “Sustainable growth and jobs 2014-2020 – Finland's structural funds programme” account for 90% of the total.

Of course the above figures and figures on job creation in general as an indicator of outcomes in ERDF programmes need to be taken with extra caution as they are not without limitations. A 2013 study for the European Commission[222] concerned with the comparability of the figures reported and how far they can be meaningfully aggregated across programmes, noted that in most countries the indicator was not used in OPs relating to transport, energy and the environment since job creation was not a primary aim of intervention. Besides finding that the use of the indicator varied significantly between measures, OPs and Member States, the study identified several limitations in the use of the indicator, for example: The definition of the indicator and calculation methods were inadequately described in many cases and even where there was satisfactory guidance this was not implemented in practice and the methods used differed across regions; In most countries, there were problems in aggregating the data to calculate national totals and only in few countries there were efforts to ensure consistency; Divergences from the Commission guidelines according to which the data reported should relate to actual permanent jobs, adjusted to full-time equivalents, directly created as a result of interventions, added to the lack of comparability of the figures reported. In some cases the non-adjusted to full-time equivalents number of jobs was reported, in about half the countries both temporary as well as permanent jobs were counted, in some cases jobs reported were expected rather than actual, while in other cases indirectly created jobs were also included. All in all figures are hard to interpret given the caveats noted above and it is hard to judge whether they are likely to overstate or understate the true values.

As previously mentioned, the starting point for extracting the table above was to filter by IPs identified as relevant to the green economy (and a different selection of IPs could be used).

4.6.2 Contribution to the circular economy

In this section we present methodological indications for a tracking methodology based on the categories of spending to evaluate roughly the contribution of Cohesion Policy to the circular economy. This is in particular a challenge because the circular economy is such a broad concept as also outlined in the horizontal application of the Circular Economy Package[223].

[222] DG Regio (2013), *Job creation as an indicator of outcomes in ERDF programmes*, Synthesis Report of country reports produced by members of the Expert evaluation network delivering policy analysis on the performance of Cohesion policy 2007-2013 set up by DG Regional Policy, http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/eval2007/job_creation/evalnet_task1_job_creation_synthesis.pdf

[223] See http://ec.europa.eu/environment/circular-economy/index_en.htm and http://europa.eu/rapid/press-release_IP-15-6203_en.htm

For the purpose, we take inspiration in the following documents and practices:

- The guideline document put together by DG REGIO that reflects on the Cohesion Policy support for the Circular Economy[224].
- The common methodology for tracking and monitoring climate expenditure under the European Structural and Investment Funds (2014-2020)[225]
- The case of ESF, for which a new dimension - "ESF Secondary Theme" – has been added, to capture data on ESF expenditure contributing to cross cutting objectives, e.g. "*supporting the shift to a low-carbon, resource efficient economy*".

The Circular Economy Package makes reference to the €5.5 billion of funding foreseen under the structural funds for waste management in the current financing period that will be key in enabling the transition towards a circular economy at national level.

Cohesion Policy support for the circular economy goes beyond waste management, as also pointed out in a guideline document by DG REGIO on the topic[226]. It also supports the transition to a circular economy through funding interventions in relation to innovation, SME competitiveness, resource efficiency and low-carbon investments, and planned resources for these in the current financing period total €150 billion.

[224] DG REGIO Guide, *Cohesion Policy support for the Circular Economy,* http://ec.europa.eu/regional_policy/sources/docgener/guides/cohesion_policy_circular_economy.pdf

[225] As set out in Commission Implementing Regulation No 215/2014, http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0215&from=EN

[226] DG REGIO Guide, Cohesion Policy support for the Circular Economy, http://ec.europa.eu/regional_policy/sources/docgener/guides/cohesion_policy_circular_economy.pdf

Text Box 4-10 Overview of DG REGIO's Guide on Cohesion Policy support for the Circular Economy

In the new investment framework for 2014-2020:

- There is €5.5 billion for improved waste management and focus on waste prevention, reuse and recycling are the preferred waste treatment options in the EU.
- Cohesion Policy invests €2.3 billion in environmentally-friendly production processes and resource efficiency in SMEs.
- The Circular Economy Package also promotes water reuse. Cohesion Policy can support this through its €15 billion investment in the water sector during the 2014-2020 period.
- The circular economy starts at the beginning of a product's life. Cohesion Policy invests in new and better products.
- Important research and innovation funding opportunities are also available and the circular economy is a priority in the Smart Specialisation Strategies that steer these investments.

Beyond funding, the structural fund framework encompasses a strategic policy approach enabling the transition. For example:

- As a pre-condition for funding, the planned Cohesion Policy investments in waste need to follow the waste management plans.
- It also addresses the obstacles to a circular economy on the ground, by improving administrative capacity in local and regional authorities.
- It includes the training and reinforcement of a qualified workforce with specific and sometimes new skills.
- Cross-border and transnational cooperation programmes are crucial to foster interregional cooperation on circular economy activities, promote industrial symbiosis, awareness-raising and the exchange of knowledge and best practices.

With respect to the above mentioned figures we note that:

- They provide an indication of the magnitude of planned investment types that have the potential to contribute to support the transition to a circular economy, in other words they thus tend to provide an upper bound estimate within the concerned investment category. For example, part of the €15 billion planned for investments in the water sector do support the circular economy for the case of investments within this category that promote water savings and reuse, however another part of the total might still be linked to more conventional water infrastructure projects.

- On the other hand, the figures would not capture the contribution of Cohesion Policy from applying circular economy criteria horizontally for project selection, or from specifying circular economy criteria for GPP.

The first point above is linked to the caveat that the definition of the existing of Intervention Field (IF) categories used for categorising financial allocations was not necessarily done with circular economy in mind as a cross cutting objective (the Circular Economy Package was adopted after the current financing framework). E.g. there is no specific IF for investment in water reuse. On the other hand, climate change as a cross cutting objective in defining the 2014-2020 financing framework, is reflected in more targeted IFs around this topic[227]. However, the further sub-division of IF categories or

[227] For example, targeted IF categories encompassing climate objectives are defined for: support of R&D and innovation focusing on the low-carbon economy and resilience to climate change (IF65), or for the promotion of

the creation of new ones, would come with a trade-off of increasing the overall number of categories and thus the complexity of assigning IF codes to financial allocations, and also reduce the comparability of data across programming periods. Another consideration as noted in chapter 3.2 regarding the water sector would be that often projects have an integrated nature and might at the same time address several primary objectives, which means for example that a project the entire financial allocation of which has been assigned to IF code 20 '*Provision of water for human consumption (extraction, treatment, storage and distribution infrastructure)*', might still have certain elements of water conservation and reuse that would be relevant for the circular economy and could have also been assigned to IF code 21 '*Water management and drinking water conservation*'.

4.6.2.1 Review of OPs with stated intention to contribute to circular economy

As part of reviewing the 32 OPs from the current programming period, we have reviewed whether and how they considered their contribution to the circular economy, allowing to draw out ideas and inputs on how to measure the contribution towards the circular economy (see Appendix L for details). In particular our review covers OPs that encompass concrete measures to promote re-use and stimulate industrial symbiosis, economic incentives for producers to put greener products on the market and support recovery and recycling schemes, as well as R&D and innovation on the topic. Similarly, the review covers OPs with interventions aimed at the integration of resource efficiency and the circular economy in activities relating to enhancing institutional capacity of public administration, as well as education and training initiatives.

4.6.2.2 Considerations for a circular economy expenditure tracking methodology inspired by climate tracking methodology

As mentioned above, climate change was a cross-cutting objective when shaping the current period framework and structural funds have been identified as a key contributor to achieving the political target of 20% of EU spending being for climate action objectives.[228]. This is partly reflected in several of the defined IF categories reflecting the importance of the topic, as discussed above.

Moreover, a methodology has been developed to track the magnitude of the contribution of the EU budget to climate change requires[229]. The methodology consists of assigning a specific weighting to the support provided under the funds at a level which reflects the extent to which such support makes a contribution to climate change mitigation and adaptation goals, with the specific weighting assigned differentiated on the basis of

business development of enterprises providing services contributing to the low carbon economy and to resilience to climate change (IF71).

[228] In its February 2013 Conclusions, the European Council stated that climate action objectives will represent at least 20 % of EU spending in the 2014-2020 period. Structural Funds constituting 42 % of the EU 2014-2020 budget (the Multiannual Financial Framework), and are thus a key contributor to achieving the political target of 20% of EU spending being for climate action objectives.

[229] The underlying EU regulation for climate marking of expenditures is set out in regulation 215/2014

whether the support makes a significant (100% weighting) or a moderate contribution (40% weighting) towards climate change objectives or no contribution (0%)[230].

In the table at the end of this section (Table 4-6), we draw on this climate tracking methodology for IF codes 1-101 that apply to the European Regional Development Fund and the Cohesion Fund, as inspiration for a similar approach potentially being developed for the circular economy as a cross-cutting issue. To the right of the column with the defined climate weighting another column has been added where we provide a first assessment of the IF possible relevance to the circular economy.

4.6.2.3 The circular economy as a "secondary theme"

For the case of ESF, a new dimension - "ESF Secondary Theme" – has been added in the current programming period, to capture data on ESF expenditure contributing to cross cutting objectives. There are 8 different possible secondary themes, namely:

1 Supporting the shift to a low-carbon, resource efficient economy
2 Social innovation
3 Enhancing the competitiveness of SMEs
4 Strengthening research, technological development and innovation
5 Enhancing the accessibility, use and quality of information and communication technologies
6 Non-discrimination
7 Gender equality
8 Not applicable.

With respect to tracking the contribution of Cohesion Policy to the circular economy, a similar approach could be envisaged to the one described above:

- For ESF: Introducing a secondary theme on the contribution to the circular economy by for example further dividing ESF Secondary Theme 1 (Supporting the shift to a low-carbon, resource efficient economy) into two categories, one concerning a low carbon economy and one more specific to the circular economy

- For ERDF/CF: introducing a similar approach of secondary themes could be considered also for the case of ERDF/CF, with one of the possible secondary theme categories being "circular economy".

In case such an approach is to be developed, the process could be informed by the experience gained developing the existing approach for ESF, and various considerations such as whether secondary themes would be discrete categories, or two (or more) secondary themes could equally be relevant for the same operation.

[230] Article 8 of the CPR sets out that Member States shall provide information on the support for climate change objectives using such a tracking methodology.

Table 4-6 Outline of circular economy tracking methodology

Intervention Field				Climate change weighting (%)	Preliminary assessment of IF possible relevance to the circular economy – No or low (N), medium (M), high (H)	Comments
I	Productive investment (ERDF/CF)	1	Generic productive investment in SME's	0	N	
		2	Research and innovation in large enterprises	0	M	Medium relevance assuming that Smart Specialisation Strategies tend to reflect resource efficiency / circular economy
		3	Productive investment in large enterprises linked to the low-carbon economy	40	H	
		4	Productive investment linked to the cooperation between large enterprises and SMEs for developing ICT products and services, e-commerce and enhancing demand for ICT	0	N	
II	Infrastructure providing basic services and related investment, energy infrastructure (ERDF/CF)	5	Electricity (storage and transmission)	0	M	Medium relevance assuming that storage enables greater use of renewables and levelling electricity peak loads
		6	Electricity (TEN-E storage and transmission)	0	M	Medium relevance assuming that storage enables greater use of renewables and levelling electricity peak loads
		7	Natural gas	0	N	
		8	Natural gas (TEN-E)	0	N	
		9	Renewable energy: Wind	100	M	
		10	Renewable energy: Solar	100	M	
		11	Renewable energy: Biomass	100	M	
		12	Other renewable energy	100	M	

Intervention Field				Climate change weighting (%)	Preliminary assessment of IF possible relevance to the circular economy – No or low (N), medium (M), high (H)	Comments
		13	Energy efficiency renovation of public infrastructure, demonstration projects and supporting measures	100	H	
		14	Energy efficiency renovation of existing housing stock, demonstration projects and supporting measures	100	H	
		15	Intelligent Energy Distribution Systems at medium and low voltage levels (incl. smart grids and ICT systems)	100	M	Medium relevance assuming that this enables greater use of renewables and levelling electricity peak loads
		16	High efficiency co-generation and district heating	100	M	
		17	Household waste management (incl. minimisation, sorting, recycling measures)	0	H	
		18	Household waste management (incl. mechanical biological treatment, thermal treatment, incineration and landfill measures)	0	M	Medium relevance assuming that waste treatment can involve converting waste into useful input production material
		19	Commercial, industrial or hazardous waste management	0	H	
		20	Provision of water for human consumption (extraction, treatment, storage and distribution infrastructure)	0	M	
		21	Water management and drinking water conservation	40	M	Water efficiency
		22	Waste water management	0	M	Relevant for water reuse

Intervention Field				Climate change weighting (%)	Preliminary assessment of IF possible relevance to the circular economy – No or low (N), medium (M), high (H)	Comments
		23	Environmental measures aimed at reducing and/or avoiding GHG (incl. treatment and storage of methane gas and composting)	100	H	
II	Infrastructure providing basic services and related investment, transport (ERDF/CF)	24	Railways (TEN-T core)	40	N	
		25	Railways (TEN-T comprehensive)	40	N	
		26	Other railways	40	N	
		27	Mobile rail assets	40	N	
		28	TEN-T motorways and roads - core network (new build)	0	N	
		29	TEN-T motorways and roads - comprehensive network (new build)	0	N	
		30	Secondary road links to TEN-T road network and new nodes (new build)	0	N	
		31	Other national and regional roads (new build)	0	N	
		32	Local access new roads (new build)	0	N	
		33	TEN-T reconstructed or improved road	0	N	
		34	Other reconstructed or improved road (motorway, national, regional, local)	0	N	
		35	Multimodal transport (TEN-T)	40	N	
		36	Multimodal transport	40	N	
		37	Airports (TEN-T)	0	N	
		38	Other airports	0	N	
		39	Seaports (TEN-T)	40	N	

Intervention Field				Climate change weighting (%)	Preliminary assessment of IF possible relevance to the circular economy – No or low (N), medium (M), high (H)	Comments
		40	Other seaports	40	N	
		41	Inland waterways and ports (TEN-T)	40	N	
		42	Inland waterways and ports (regional and local)	40	N	
		43	Clean urban transport infrastructure and promotion (incl. equipment and rolling stock)	40	M	
		44	ITS (incl. the introduction of demand management, tolling systems, it monitoring, control and information systems)	40	M	
II	ICT infrastructure (ERDF/CF)	45	ICT: backbone/backhaul network	0	N	
		46	ICT: highspeed broadband network	0	N	
		47	ICT: very highspeed broad band network	0	N	
		48	ICT: other types of ICT infrastructure/large scale computer resources/equipment	0	N	
III	Social, health and education infrastructure and related investment (ERDF/CF)	49	Education infrastructure for tertiary education	0	N	
		50	Education infrastructure for vocational education and training and adult learning	0	N	
		51	Education infrastructure for school education (primary and general secondary education)	0	N	
		52	Infrastructure for early childhood education and care	0	N	
		53	Health infrastructure	0	N	
		54	Housing infrastructure	0	N	

Intervention Field				Climate change weighting (%)	Preliminary assessment of IF possible relevance to the circular economy – No or low (N), medium (M), high (H)	Comments
		55	Other social infrastructure contributing to regional and local development	0	N	
IV	Development of endogenous potential: research and development and innovation (ERDF/CF)	56	Investment in infrastructure, capacities and equipment in SMEs directly linked to research and innovation activities	0	M	
		57	Investment in infrastructure, capacities and equipment in large companies directly linked to research and innovation activities	0	M	Innovation related to reuse, repairability, new and better products, knowledge/awareness on circular economy
		58	Research and innovation infrastructure (public)	0	M	
		59	Research and innovation infrastructure (private, incl. science parks)	0	M	
		60	Research and innovation activities in public research centres and centres of competence incl networking	0	M	
		61	Research and innovation activities in private research centre incl. networking	0	M	
		62	Technology transfer and university -enterprise cooperation primarily benefitting SMEs	0	M	
		63	Cluster support and business networks primarily benefitting SMEs	0	M	
		64	Research and innovation processes in SMEs (incl. voucher schemes, process, design, service and social innovation)	0	M	

Intervention Field				Climate change weighting (%)	Preliminary assessment of IF possible relevance to the circular economy – No or low (N), medium (M), high (H)	Comments
		65	Research and innovation infrastructure, processes, technology transfer and cooperation in enterprises focusing on the low-carbon economy and resilience to climate change	100	H	
IV	Development of endogenous potential: business development (ERDF/CF)	66	Advanced support services for SMEs and groups of SMEs (incl. management, marketing and design services)	0	N	
		67	SME business support development, support to entrepreneurship and incubation (incl. support to spin offs and spin outs)	0	N	
		68	Energy efficiency and demonstration projects in SMEs and supporting measures	100	H	
		69	Support to environmentally-friendly production processes and resource efficiency in SMEs	40	H	
		70	Promotion of energy efficiency in large enterprises	100	H	
		71	Development and promotion of enterprises specialised in providing services contributing to the low carbon economy and to resilience to climate change (incl. support to such services)	100	H	
		72	Business infrastructure for SMEs (incl. industrial parks and sites)	0	N	
		73	Support to social enterprises (SMEs)	0	N	

Intervention Field				Climate change weighting (%)	Preliminary assessment of IF possible relevance to the circular economy – No or low (N), medium (M), high (H)	Comments
		74	Development and promotion of commercial tourism assets in SMEs	0	N	
		75	Development and promotion of commercial tourism services in or for SMEs	0	N	
		76	Development and promotion of cultural and creative assets in SMEs	0	N	
		77	Development and promotion of cultural and creative services in or for SMEs	0	N	
IV	Endogenous potential: ICT (ERDF/CF)	78	e-government services and applications	0	N	
		79	Access to public sector information	0	N	
		80	e-inclusion, e-accessibility, e-learning and e-education services and applications, digital literacy	0	N	
		81	ICT solutions addressing the healthy active ageing challenge and e-health services and applications	0	N	
		82	ICT services and applications for SMEs	0	N	
IV	Development of endogenous potential: Environment (ERDF/CF)	83	Air quality measures	40	N	
		84	Integrated pollution, prevention and control (IPPC)	40	M	
		85	Protection and enhancement of biodiversity, nature protection and green infrastructure	40	M	

Intervention Field				Climate change weighting (%)	Preliminary assessment of IF possible relevance to the circular economy – No or low (N), medium (M), high (H)	Comments
		86	Protection, restoration and sustainable use of Natura 2000 sites	40	N	
		87	Adaptation to climate change measures and prevention and management of climate related risks, e.g. erosion, fires, flooding, storms and droughts, incl. awareness raising, civil protection and disaster management systems and infrastructures	100	M	
		88	Risk prevention and management of non-climate related natural risks (i.e. earthquakes) and risks linked to human activities (e.g. technological accidents) incl. awareness raising, civil protection and disaster management systems and infrastructures	0	N	
		89	Rehabilitation of industrial sites and contaminated land	0	M	
		90	Cycle tracks and footpaths	100	M	
		91	Development and promotion of the tourism potential of natural areas	0	N	
		92	Protection, development and promotion of public tourism assets	0	N	
		93	Development and promotion of public tourism services	0	N	
		94	Protection , development and promotion of public cultural and heritage use	0	N	

Intervention Field				Climate change weighting (%)	Preliminary assessment of IF possible relevance to the circular economy – No or low (N), medium (M), high (H)	Comments
		95	Development and promotion of public cultural and heritage services	0	N	
IV	Development of endogenous potential: Other (ERDF/CF)	96	Institutional capacity of public administrations and public services related to implementation of the ERDF or actions supporting ESF institutional capacity initiatives	0	N	
		97	Community-led local development initiatives in urban and rural areas	0	N	
		98	Outermost regions: compensation of any additional costs due to accessibility deficit and territorial fragmentation	0	N	
		99	Outermost regions: specific action to compensate additional costs due to size market factors	0	N	
		100	Outermost regions: support to compensate additional costs due to climate conditions and relief difficulties	40	N	
		101	Cross-financing under the ERDF (support to ESF-type actions necessary for the satisfactory implementation of the ERDF part of the operation and directly linked to it)	0	N	

Appendix A Overview of OPs reviewed for horizontal integration

Member State	Horizontal integration - OPs from the 2014-2020 period			
	Operational programme	Description	Fund	Key subjects*
Belgium	OP Brussels Capital Region	Regional OP. Smart, sustainable inclusive growth.	ERDF	CE, E, T, I
Bulgaria	OP Environment	National, water and waste	ERDF+CF	I
	OP Good governance	E-governance, energy efficiency, training	ESF	CE
	OP Transport and infrastructure	Road and rail infrastructure	ERDF+CF	T
Czech Rep.	OP Environment	National environment programme	ERDF+CF	E, I
	OP Transport	National transport programme	ERDF+CF	E, T
	OP Prague growth pole	Regional research, development, innovation	ERDF, ESF	E, T
Germany	OP Niedersachsen	Regional, innovation, SME, social inclusion, and climate mitigation	ERDF, ESF	GJ, E, T, I
	OP Nordrhein-Westfalen	Regional, innovation, competitiveness of SMEs, sustainable urban development, climate	ERDF	E, I
Greece	Transport infrastructure, environment, and sust.developme nt	National OP	ERDF+CF	E, T, I
	Attica OP	Regional, research and innovation, SME, environment, climate	ERDF+ESF	
Ireland	Southern, Eastern regional OP	Regional: Research, innovation, SMEs, sustainable urban development	ERDF	E, T
Italy	ROP Veneto	Regional, SMEs, research innovation	ERDF	E, T
	ROP Campania	Employment, social inclusion, competence development	ESF	
	OP infrastructure and networks	National transport, rail	ERDF	T
	OP Enterprises and competitiveness	National, less developed and transition regions	ERDF	E, I
	ROP Lazio	Regional, SMEs, energy efficiency, urban mobility	ERDF	CE, E, T, I
Lithuania	OP for EU Structural Funds Investments for 2014-2020	National OP on smart economic growth based on sustainable use of resources	ERDF+CF +ESF	GJ, E, T, I
Malta	Fostering a competitive and sustainable economy	National, productivity, Research and innovation	ERDF+CF	GJ, E, T, I
	Stimulating	National, SME, access to finance, joint	ERDF	

Member State	Horizontal integration - OPs from the 2014-2020 period			
	Operational programme	Description	Fund	Key subjects*
	private sector investment for economic growth	instrument with other funds		
Poland	Infrastructure and Environment	National OP	ERDF+CF	E, T, I
	ROP5 Lodzkie	Regional OP, innovation, competitiveness, transport, energy	ERDF+ESF	GJ, E, T, I
	OP Digital Poland	National OP covering areas related to strengthening digital foundations. Includes aspects of ICT investments that relate to the environment (e.g. pollution data).	ERDF	
	ROP Malopolskie	Regional OP covering knowledge economy, ICT, entrepreneurship, regional energy policy, environmental protection, regional heritage, modern transport infrastructure, labour market, social inclusion, lifelong learning, revitalization and social infrastructure.	ERDF+ESF	GJ, E, T
Spain	Sustainable growth OP	National sustainable development, climate change	ERDF	E, T, I
	Andalucia	SMEs, energy, environment	ERDF	CE, E, T
	Pais Vasco	Research, innovation, SME, environmental protection, climate	ERDF	CE, E, T
European Territorial Cooperation	(Interreg V-A) IT-SI - Italy-Slovenia	Promotes innovation, sustainability and cross-border governance to create a more competitive, cohesive and liveable area.	ERDF (ETC)	CE, T, E, I
	(Interreg V-A) SI-HU - Slovenia-Hungary	Smart, sustainable and inclusive growth	ERDF (ETC)	CE, T
	Alpine Space	Provides a framework to facilitate the cooperation between economic, social and environmental key players.	ERDF (ETC)	GJ, T, I
	North West Europe	Aims to stimulate transnational cooperation between various stakeholders in the NWE area. Supports the implementation of low-carbon technologies and strategies and seeks to reduce GHG emissions in the transport sector. Supports climate protection strategies in urban areas.	ERDF (ETC)	CE, E, T, I
	Danube	Supports development of the policy framework, platforms, networks, tools exchange of good practices, as well as joint initiatives, actions, projects. PA2 mainly focuses on ecological networks, and water and flood management	ETC	CE, E, T, I

Member State	Horizontal integration - OPs from the 2014-2020 period			
	Operational programme	Description	Fund	Key subjects*
		issues.		

*GJ=Green jobs, CE=circular economy, E=Energy, T=Transport, I=Industrial

Appendix B OP review template for review of horizontal integration

OP title: **CCI**: **Country:** **Fund:** **Scope**:

1. Integration of environmental concerns in OP horizontal principles, objectives and priorities

1.1 Consideration of sustainable development as a horizontal principle, Green public procurement (GPP) and the Polluter pays principle in the OP

1) *Which environmental effects/areas does chapter 11 of the OP consider?*
   a) ☐ Environmental protection requirements
   b) ☐ Resource efficiency
   c) ☐ Climate change mitigation and adaptation
   d) ☐ Biodiversity
   e) ☐ Disaster resilience
   f) ☐ Risk prevention and management
   g) ☐ Other (please specify):

Comments / further info:
OP section / info source:

2) *What is the general approach to sustainable development / environmental concerns as described in chapter 11 of the OP?*

Describe the approach:

3) *Is GPP mentioned as a principle in chapter 11 of the OP?*
   a) ☐ Yes
   b) ☐ No

Comments / further info:
OP section / info source:

4) *Is GPP further described in chapter 11 of the OP?*
   a) ☐ Yes
   b) ☐ No

Comments / further info:
OP section / info source:

5) *Is GPP considered and mentioned in chapter 11 in connection with principles for selection criteria?*
   a) ☐ Yes, and it is elaborated
   b) ☐ Yes, briefly mentioned
   c) ☐ Not mentioned

Comments / further info:
OP section / info source:

6) *Is the application of GPP described in more detail in connection with specific Investment Priorities (chapter 2)?*
   a) ☐ Yes, briefly mentioned
   b) ☐ Yes, the application of GPP is a conditionality requirement for project funding
   c) ☐ Yes, operations will provide financial assistance for projects to establish/promote GPP schemes
   d) ☐ Yes, GPP is part of the monitored indicators
   e) ☐ Yes, other (please specify):
   f) ☐ No

Comments / further info *(please provide more info on the relevant IPs)*:
OP section / info source:

7) *Is Polluter pays principle mentioned as a principle in chapter 11 of the OP?*
   a) ☐ Yes
   b) ☐ No

Comments / further info:
OP section / info source:

8) Is the polluter pays principle further described in chapter 11 of the OP?

a) ☐ Yes
b) ☐ No

Comments / further info:
OP section / info source:

9) Is the polluter pays principle considered and mentioned in chapter 11 in connection with principles for selection criteria?

a) ☐ Yes, and it is elaborated
b) ☐ Yes, briefly mentioned
c) ☐ Not mentioned

Comments / further info:
OP section / info source:

10) Is the application of the polluter pays principle described in more detail in connection with specific Investment Priorities (chapter 2)?

a) ☐ Yes, and it is elaborated/operationalised
b) ☐ Yes, briefly mentioned
c) ☐ Not mentioned

Comments / further info *(please provide more info on the relevant IPs)*:
OP section / info source:

11) Does the OP elaborate on how environmental issues may interact with the economic and social development of the regions?

a) ☐ Yes, it includes a comprehensive analysis
b) ☐ Yes, by providing references/extracts to relevant national/regional strategies
c) ☐ Yes, but only a quick mention
d) ☐ No

Comments / further info:

OP section / info source:

12) For ESF: Has the secondary theme code 1 been selected?

a) ☐ Yes
b) ☐ No
c) ☐ Not applicable (OP does not cover ESF)

Comments / further info:
OP section / info source:

13) For ESF: Does the selection of secondary theme code 1 match the description of actions/expected results?

a) ☐ Yes, it is strongly matched
b) ☐ Yes, but it is vaguely matched
c) ☐ Not matched
d) ☐ Not applicable (ESF *secondary theme code 1 is not selected)*

Comments / further info:
OP section / info source:

14) References (chapters, IPs, page numbers) to green jobs

a) General sections references:
b) ERDF IP references:
c) ESF IP references:

15) References (chapters, IPs, page numbers) to circular economy (including resource efficiency and recycling/reuse)

(*Simple reference to circular economy, resource efficiency and recycling/reuse etc*)

16) *References to Financial Instruments*

(*Simple reference to specific the IPs with "Planned use of financial instruments" by reviewing table 2.A.6.3 for each IP*)

17) Does the OP address Integrated Sustainable Urban Development?

a) ☐ Yes, the entire OP is dedicated to the theme of Integrated Sustainable Urban Development
b) ☐ Yes through including a specific priority axis on Integrated Sustainable Urban Development
c) ☐ Yes by foreseeing the use of the Integrated Territorial Investment (ITI) tool
d) ☐ Yes by foreseeing the use of the Community-Led Local Development (CLLD) tool
e) ☐ Yes, other (please specify):
f) ☐ No

Comments / further info:
OP section / info source:

18) Observations in relation to this OP and suggestions for interview questions

▪

2. Integration of environmental concerns in monitoring systems

2.1 To which extent do OPs include relevant, and effective monitoring systems for sustainable development?

19) Do the result indicators described in the OP (chapter 2) cater especially for monitoring the three pillars of sustainable development?

TO covered by OP	Environmental pillar	Social pillar	Economic pillar
☐ TO1	☐	☐	☐
☐ TO2	☐	☐	☐
☐ TO3	☐	☐	☐
☐ TO4	☐	☐	☐
☐ TO5	☐	☐	☐
☐ TO6	☐	☐	☐
☐ TO7	☐	☐	☐
☐ TO8	☐	☐	☐
☐ TO9	☐	☐	☐
☐ TO10	☐	☐	☐
☐ TO11	☐	☐	☐

Comments / further info (*please give examples of environmental related indicators and highlight examples especially for TOs other than TO6, and innovative examples; please also reflect on differences among the funds, e.g. is the environmental pillar only considered by CF and not ERDF*?):

OP section / info source: OP chapter 2, Review Table 3 for each ERDF SOs and Table 4 for ESF SOs

2.2 Does the programme monitoring committee (PMC) address the issue of sustainable development, or has the Managing Authority set up a specific sub-committee, e.g. as cross-cutting committee for sustainability?

20) Is it explicitly stated in chapter 7 or 11 of the OP that the programme monitoring committee (PMC) deals with sustainable development?

a) ☐ Yes, and it is elaborated
b) ☐ Yes, briefly mentioned with cross reference to detailed elaboration to other OP section
c) ☐ Yes, but only briefly mentioned
d) ☐ Yes implicitly, the OP states that the partnership principle will be applied for monitoring and this will involve environmental partners
e) ☐ Not mentioned

Comments / further info:
OP section / info source:

21) Is the establishment of specific sub-committee or cross-committee for sustainability foreseen?

a) ☐ Yes it is foreseen
b) ☐ It is mentioned that it is to be examined
c) ☐ Not mentioned

Comments / further info:
OP section / info source:

3. Integration of environmental concerns through OP selection criteria principles

22) Is there an overall mention in Chapter 11 of the OP of the need to take into account considerations on sustainable development and environmental considerations in the selection criteria?

a) ☐ Yes
b) ☐ No

Comments / further info:

OP section / info source:

23) How are environmental concerns taken into account in the principles for selection criteria?

a) ☐ Through elaborating on environmental concerns and providing environment-relevant criteria tailored to the specific IPs and content of the OP
b) ☐ Primarily through a generic reference to the horizontal principle of sustainable development, complemented by few additional considerations tailored to the specific IPs
c) ☐ Through a generic reference to environmental concerns/ sustainable development as a horizontal principle
d) ☐ Other (please specify):
e) ☐ Environmental concerns are not mentioned/taken into account

Comments / further info:
OP section / info source:

Appendix C Comparing spending categories across programming periods

Direct environmental investments

Terminology used in the report	2000-2006 Fields of intervention	2007-2013 Priority Themes	2014-2020 Intervention fields
Environmental protection			
Waste	343. Urban and industrial waste	44. Management of household and industrial waste	17. Household waste management (including minimisation, sorting, recycling measures)
			18. Household waste management (including MBT, thermal treatment, incineration and landfill measures)
			19. Commercial, industrial or hazardous waste management
Water	345. Sewerage and purification	46. Water treatment (waste water)	22. Waste water treatment
	344. Drinking water	45. Mgmt. and distribution of water (drinking water)	20. Provision of water for human consumption
			21. Water management and drinking water conservation
Air quality	341. Air	47. Air quality	83. Air quality measures
	342. Noise		
		48. Integrated prevention and pollution control	84. Integrated pollution prevention and control (IPPC)
Biodiversity and nature	127. Improving and maintaining the ecological stability of protected woodlands	51. Promotion of biodiversity and nature protection (including NATURA 2000)	85. Protection and enhancement of biodiversity, nature protection and green infrastructure
	353. Protection, improvement and regeneration of the natural environment		86. Protection, restoration and sustainable use of Natura 2000 sites

Land rehabilitation	351. Upgrading and rehabilitation of industrial and military sites	50. Rehabilitation of industrial sites and contaminated land	89. Rehabilitation of industrial sites and contaminated land
	352. Rehabilitation of urban areas		
Climate mitigation and adaptation - Risk prevention			
Climate mitigation and adaptation, risk prevention		49. Mitigation and adaptation to climate change	23. Environmental measures aimed at reducing and/or avoiding greenhouse gas emissions
			87. Adaptation to climate change measures and prevention and management of climate related risks
		53. Risk prevention	88. Risk prevention and management of non-climate related natural risks
		54. Other measures to preserve the environment and prevent risks	

Indirect environmental investments

Terminology used in the report	2000-2006 Fields of intervention	2007-2013 Priority Themes	2014-2020 Intervention fields
	Energy		
Renewable energy	332. Renewable sources of energy (solar power, wind power, hydro-electricity, biomass)	39. Renewable energy: wind	9. Renewable energy: wind
		40. Renewable energy: solar	10. Renewable energy: solar
		41. Renewable energy: biomass	11. Renewable energy: biomass
		42. Renewable energy: hydro, geothermal and other	12. Other renewable energy
Energy efficiency	333. Energy efficiency, cogeneration, energy control	43. Energy efficiency	13. Energy efficiency renovation of public infrastructure
			14. Energy efficiency renovation of existing housing stock

Terminology used in the report	2000-2006 Fields of intervention	2007-2013 Priority Themes	2014-2020 Intervention fields
			15. Intelligent Energy Distribution Systems
			16. High efficiency co-generation and district heating
			68. Energy efficiency and demonstration projects in SMEs
			70. Promotion of energy efficiency in large enterprises
	Transport		
Sustainable transport		52. Promotion of clean urban transport	43. Clean urban transport infrastructure and promotion
	319. Intelligent transport systems	28. Intelligent transport systems	44. Intelligent transport systems
	3123. Cycle tracks	24. Cycle tracks	90. Cycle tracks and footpaths
	Tourism		
Sustainable tourism		55. Promotion of natural assets (in tourism)	91. Development and promotion of the tourism potential of natural areas
		56. Protection and development of natural heritage (in tourism)	
	Business development, Research and innovation		
Environment-related business development, R&D	162. Environmentally -friendly technologies, clean and economical energy tech. (SMEs and the craft sector)	06. Assistance to SMEs for the promotion of environmentally-friendly products and production processes…	69. Support to environmentally-friendly production processes and resource efficiency in SMEs
	152. Environmentally -friendly technologies, clean and economical energy technologies (large business)		3. Productive investment in large enterprises linked to the low-carbon economy
			71. Development and promotion of enterprises specialised in providing services contributing to the low carbon economy and to resilience to climate change (including support to such services)
			65. Research and innovation, processes, technology transfer and cooperation in enterprises focusing on the low carbon economy and on resilience to climate change

Energy, transport, tourism, business development and R&D categories not environment-related

Terminology used in the report	2000-2006 Fields of intervention	2007-2013 Priority Themes	2014-2020 Intervention fields
	Energy		
Other energy	331. Electricity, gas, petroleum products, solid fuel	33. Electricity	5. Electricity (storage and transmission)
		34. Electricity (TEN-E)	6. Electricity (TEN-E storage and transmission)
		35. Natural gas	7. Natural gas
		36. Natural gas (TEN-E)	8. Natural gas (TEN-E)
		37. Petroleum products	
		38. Petroleum products (TEN-E)	
	Transport		
Other transport	311. Rail	16. Railways	26. Other railways
		17. Railways (TEN-T)	24. Railways (TEN-T Core)
			25. Railways (TEN-T comprehensive)
		18. Mobile rail assets	27. Mobile rail assets
		19. Mobile rail assets (TEN-T)	
	312. Roads		34. Other reconstructed or improved road (motorway, national, regional or local)
			33. TEN-T reconstructed or improved road
	3121. National roads	22. National roads	
	3122. Regional/ local roads	23. Regional/ local roads	30. Secondary road links to TEN-T road network and nodes (new build)
			31. Other national and regional roads (new build)
			32. Local access roads (new build)
	313. Motorways	20. Motorways	28. TEN-T motorways and roads — core network (new build)

Terminology used in the report	2000-2006 Fields of intervention	2007-2013 Priority Themes	2014-2020 Intervention fields
		21. Motorways (TEN-T)	29. TEN-T motorways and roads — comprehensive network (new build)
	314. Airports	29. Airports	37. Airports (TEN-T)
			38. Other airports
	315. Ports	30. Ports	39. Seaports (TEN-T)
			40. Other seaports
	316. Waterways	31. Inland waterways (regional and local)	42. Inland waterways and ports (regional and local)
		32. Inland waterways (TEN-T)	41. Inland waterways and ports (TEN-T)
	317. Urban transport	25. Urban transport	
	318. Multimodal transport	26. Multimodal transport	36. Multimodal transport
		27. Multimodal transport (TEN-T)	35. Multimodal transport (TEN-T)
	Tourism		
Other tourism	1310. Encouragement for tourist activities	57. Other assistance to improve tourist services	74. Development and promotion of tourism assets in SMEs
	171. Physical investment (information centres, tourist accommodation, catering, facilities)		
	172. Non-physical investment (development and provision of tourist services, sporting, cultural and leisure activities, heritage)		75. Development and promotion of tourism services in or for SMEs
	173. Shared services for the tourism industry (including promotional activities, networking, conferences and trade fairs)		92. Protection, development and promotion of public tourism assets
	174. Tourism-specific vocational training		93. Development and promotion of public tourism services
	Business development, Research and innovation		

Terminology used in the report	2000-2006 Fields of intervention	2007-2013 Priority Themes	2014-2020 Intervention fields
Business development, R&D	151. Investment in physical capital (plant and equipment, co-financing of state aid) for large firms	1. R&TD activities in research centres	1. Generic productive investment in small and medium – sized enterprises ('SMEs')
	153. Business advisory services (internationalisation, etc.) for large firms	2. R&TD infrastructure (physical plant, etc.) and centres of competence in a specific technology	2. Research and innovation processes in large enterprises
	154. Services to stakeholders (health and safety, providing care for dependants) for large firms	3. Technology transfer and improvement of cooperation networks etc.	4. Productive investment linked to the cooperation between large enterprises and SMEs for developing information and communication technology ('ICT') products and services, e-commerce and enhancing demand for ICT
	155. Financial engineering for large firms	4. Assistance to R&TD, particularly in SMEs (including access to R&TD services in research centres)	56. Investment in infrastructure, capacities and equipment in SMEs directly linked to research and innovation activities
	161. Investment in physical capital (plant and equipment, co-financing of state aid) for SMEs	5. Advanced support services for firms and groups of firms	57. Investment in infrastructure, capacities and equipment in large companies directly linked to research and innovation activities
	163. Business advisory services (information, business planning, etc.) for SMEs	7. Investment in firms directly linked to research and innovation (innovative technologies, etc.)	58. Research and innovation infrastructure (public)
	164. Shared business services (business estates, etc.) for SMEs	8. Other investment in firms	59. Research and innovation infrastructure (private, including science parks)

Terminology used in the report	2000-2006 Fields of intervention	2007-2013 Priority Themes	2014-2020 Intervention fields
	165. Financial engineering for SMEs	9. Other measures to stimulate research and innovation and entrepreneurship in SMEs	60. Research and innovation activities in public research centres and centres of competence including networking
	166. Services in voluntary/third sector (care for dependants, etc.) for SMEs		61. Research and innovation activities in private research centres including networking
	167. SME- and craft-specific vocational training		62. Technology transfer and university-enterprise cooperation primarily benefiting SMEs
			63. Cluster support and business networks primarily benefiting SMEs
			64. Research and innovation processes in SMEs (voucher schemes, etc.)
			66. Advanced support services for SMEs and groups of SMEs (…)
			67. SME business development, support to entrepreneurship and incubation (…)
			72. Business infrastructure for SMEs (…)
			73. Support to social enterprises (SMEs)
			76. Development and promotion of cultural and creative assets in SMEs
			77. Development and promotion of cultural and creative services in or for SMEs

Appendix D Major projects

This Appendix presents an overview of the role of major projects in the field of environment. It shows the number of major projects, their costs and rate of co-financing, as well as a comparison with other sectors. To be classified as major projects under the ERDF and Cohesion Fund, projects have to meet certain thresholds for total eligible costs (see box below). Major projects are often large-scale infrastructure projects in sectors such as transport, energy and environment.

Criteria for major projects

According to article 39 of the Council Regulation (EC) No 1083/2006[231], for the financial perspective 2007-2013 two thresholds were applicable to major projects financed by the ERDF and the Cohesion Fund: EUR 25 million in total project costs in the case of environment and EUR 50 million in other fields. This threshold for major environmental projects was changed during the 2007-2013 financing period to EUR 50 million. However, Article 100 of the Regulation (EU) No 1303/2013[232] has modified these thresholds for the 2014-2020 financing period: EUR 50 million in total eligible costs for all projects, except those supporting thematic objective 7 on transport[233], to which a threshold of EUR 75 million applies.

Due to data limitations for the 2000-2006 period, only major projects for the financing period 2007-2013[234] are presented and analysed. The first sub-section of this Appendix focuses on major projects for direct environmental investments and presents data by group of countries and category on EU amount, co-financing rate and number of projects, while the second sub-section shows the same type of data concerning indirect environmental investments. Finally the third sub-section of this Appendix highlights the role of environmental in major projects compared to other sectors.

[231] COUNCIL REGULATION (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999.

[232] REGULATION (EU) No 1303/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17 December 2013 laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006

[233] Thematic objective 7 refers to 'promoting sustainable transport and removing bottlenecks in key network infrastructures'.

[234] Data on major projects for the financing period 2007-2013 is retrieved from DG REGIO, *Major Projects Monitoring* (October 2016).

Direct environmental investments

This sub-section presents results on major projects that contribute directly to environmental protection, identified on the basis of the priority themes selected for direct environmental investments (see Appendix C).

Major projects are concentrated in the water sector[235], both in terms of EU contribution amount and number of projects, followed by waste and risk prevention (see Appendix Table 1). On the contrary, air quality measures represent a very small number of major projects directly related to environment. Although the threshold for major projects in the environmental sector was originally equal to EUR 25 million and increased to EUR 50 million (referring to total costs) during the financing period 2007-2013, the average size of the projects coming out of the calculations based on available data is much higher (see Appendix Table 1 below). The high average project size for biodiversity (EUR 245 million) can be considered a biased result since it relates to a single project in Greece[236]. Overall, the average investment size of direct environmental major projects is equal to EUR 84 million.

Appendix Table 1 Major direct environmental projects during the financing period 2007-2013, amount (EUR million), co-financing rates and number of projects by category

Category	Total decision amount[237]	Total Community amount[238]	Average investment size[239]	No. of projects
Management and distribution of water (drink water)	3,967	3,324	101	66
Water treatment (waste water)	4,563	3,913	76	84
Management of household and industrial waste	1,995	1,596	78	39
Air quality	558	168	81	10
Integrated prevention and pollution control	125	11	106	2
Promotion of biodiversity and nature protection	47	38	245	1

[235] As noted for Task 1, many water projects finance both drinking water and waste water treatment. These are presented separately here, as differences were seen between the categories.

[236] The project consists in the recreation of Lake Karla in the region of Thessaly. The lake was drained in the 1960s and later partly reconstituted thanks to EU ESI funds. The major project under the financing period 2007-2013 aims to complete the reconstruction of Lake Karla and its eco-system (IEEP et al., *Cohesion Policy and Sustainable Development – Supporting paper 4: case studies,* October 2011).

[237] Decision Amount refers to the total eligible costs multiplied by the funding gap. It is important to notice that total eligible costs are lower than, or equal at maximum, to total costs.

[238] Community Amount refers to the decision amount multiplied by the co-financing rate of the priority axis in the Operational Programme that the major project belongs to.

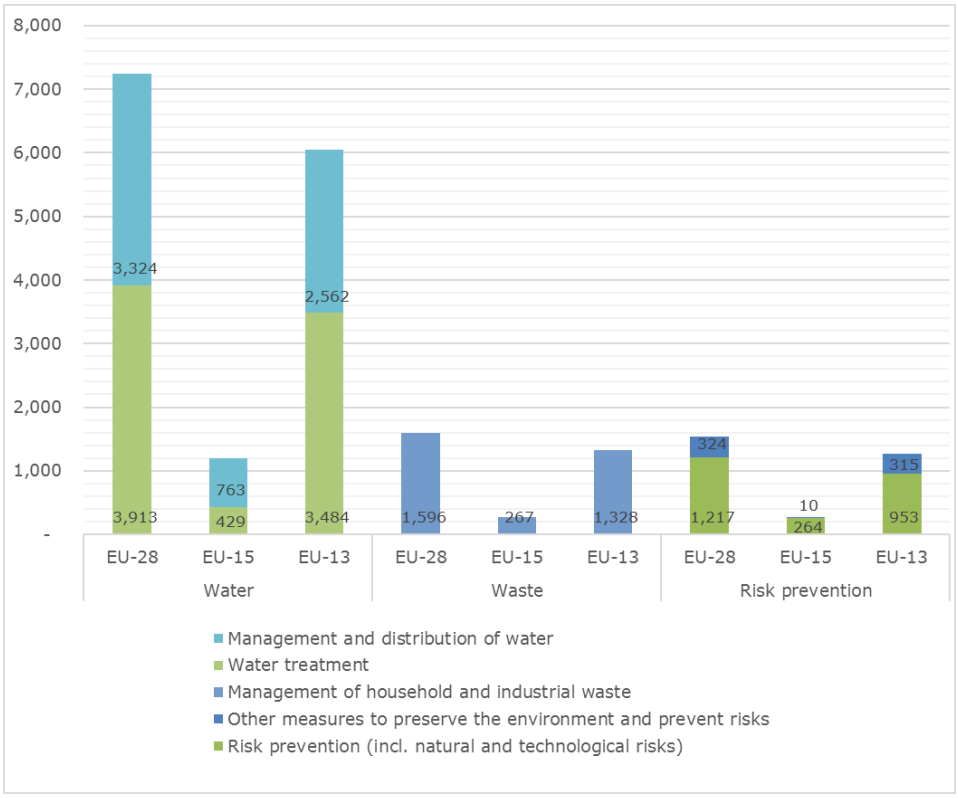
[239] The average investment size of major projects by category is based on total investment cost data, given that major projects thresholds in the 2007-2013 period applied to total investment costs.

Category	Total decision amount[237]	Total Community amount[238]	Average investment size[239]	No. of projects
(including Natura 2000)				
Rehabilitation of industrial sites and contaminated land	229	191	58	5
Risk prevention	1,447	1,217	80	20
Other measures to preserve the environment and prevent risks	400	324	71	7
Total direct environmental inv.	**13,331**	**10,782**	**84**	**234**

Source: DG REGIO, Major Projects Monitoring (October 2016).

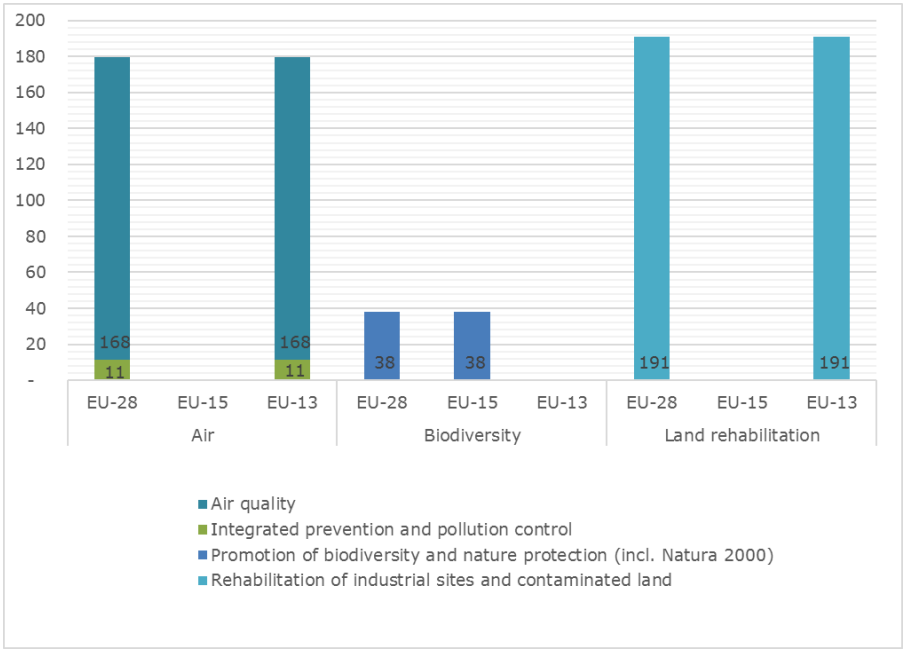
Appendix Figure 1 and Appendix Figure 2 below depict the distribution of major projects (in terms of the amount of EU funds) by category for the whole EU, EU-15 countries and EU-13 countries. In general, during the financing period 2007-2013, EU-13 countries had much higher amounts of EU funding going to major projects that contribute directly to environmental protection (EUR 9 billion) compared to EU-15 countries (EUR 1.8 billion). This is particularly the case for projects related to water, waste and environmental risk prevention (see Appendix Figure 1): in EU-13 countries, EUR 6 billion went to major projects in the water sector, EUR 1.3 billion to major projects in the waste sector and EUR 1.3 billion to major projects in environmental risk prevention. The respective amounts in the EU-15 countries were EUR 1.2 billion for water, EUR 267 million for waste and EUR 274 million for environmental risk prevention. Biodiversity is the only area where EU-15 countries had major projects while EU-13 countries did not. On the contrary, none of the EU-15 countries had major projects for air measures and for land rehabilitation, while in EU-13 countries major projects for air measures received EUR 179 million and those for land rehabilitation received EUR 191 million (see Appendix Figure 2).

Appendix Figure 1 Total Community amount (EUR million) of major projects in water, waste and risk prevention, by EU-28, EU-15 and EU-13 countries



Source: DG REGIO, Major Projects Monitoring (October 2016).

Appendix Figure 2 Total Community amount (EUR million) of major projects in air, biodiversity and land rehabilitation measures, by EU-28, EU-15 and EU-13 countries



Source: DG REGIO, Major Projects Monitoring (October 2016).

Appendix Table 2 Major projects for direct environmental investments in terms of percentage of total CP spending for the whole EU, EU-15 and EU-13 countries, by category

Category	EU total	EU-15	EU-13
Management and distribution of water (drinking water)	45%	23%	65%
Water treatment (waste water)	27%	10%	35%
Management of household and industrial waste	30%	19%	34%
Air quality	14%	n.a.	15%
Integrated prevention and pollution control	3%	n.a.	7%
Promotion of biodiversity and nature protection (including Natura 2000)	1%	3%	n.a.
Rehabilitation of industrial sites and contaminated land	8%	n.a.	14%
Risk prevention	21%	11%	31%
Other measures to preserve the environment and prevent risks	19%	2%	38%
Total	**26%**	**13%**	**37%**

Source: own calculations based on DG REGIO, Major Projects Monitoring (October 2016).

Major projects play a particularly important role in the EU-13, where they represent 37% of all direct environmental investments, compared to only 13% in the EU-15 (see Appendix Table 2 above). For the EU-28 as a whole, they represent 26% of the total Cohesion Policy spending for direct environmental investments. The percentage of major projects compared to the overall spending within the same category is particularly low for integrated prevention and pollution control and for biodiversity measures. It is interesting to notice that for EU-13 countries a large majority (65%) of drinking water projects under structural funds is represented by major projects. For waste water and solid waste management, major projects received just over one-third of allocations.

Indirect environmental investments

This sub-section gives an overview of major projects under ERDF and the Cohesion Fund that contribute indirectly to environmental protection (for the list of priority themes considered refer to Appendix C).

Clean urban transport represents by far the area where most indirect environmental investments that meet the major projects threshold can be identified. Indeed, clean urban transport projects represented 62 out of the 80 major projects, or 90% of the Community amount invested in major projects in the category of indirect environmental investments, for a total EU amount of EUR 6.9 billion (see Appendix Table 3). The overall average investment size of indirect environmental projects is equal to EUR 145 million, which is much higher than the average size of direct

environmental major projects (EUR 84 million). Major projects related to solar energy, clean urban transport and natural heritage[240] seem to have the highest investment average.

Appendix Table 3 Major indirect environmental projects during the financing period 2007-2013, amount (EUR million), co-financing rates and number of projects by category

Category / country	Total decision amount[241]	Total Community amount[242]	Average investment size[243]	No. of projects
Renewable energy: wind	317	82	66	7
Renewable energy: solar	46	35	171	2
Renewable energy: biomass	138	42	100	3
Energy efficiency, co-generation, energy management	117	70	53	3
Promotion of clean urban transport	6,943	5,187	161	62
Intelligent transport systems	47	40	59	1
Protection and development of natural heritage	91	24	144	2
Total	**7,699**	**5,480**	**145**	**80**

Source: DG REGIO, Major Projects Monitoring (October 2016).

As for direct environmental investments, the majority of major projects for indirect environmental investments were found in the EU-13. Appendix Figure 3 and Appendix Figure 4 represent graphically the Community amount invested in major projects that contribute indirectly to environmental protection by group of countries, i.e. EU-28, EU-15 and EU-13. Out of EUR 5.2 billion of EU funds invested in major projects for clean urban transport across the EU, around EUR 4 billion is attributed to major projects in EU-13 countries, compared to EUR 1.2 billion in EU-15 countries (see Appendix Figure 3). Similarly, EU-13 countries have invested a larger amount (EUR 169 million) of structural funds in major projects in sustainable energy compared to EU-15 countries (EUR 61 million). However, the areas of investment for major projects vary between the two groups of countries: the EU-13 has allocated greater resources to energy efficiency measures. Major projects for wind energy were found only in the EU-13, and those for solar energy only in the EU-15. Moreover, only EU-15 countries have invested EU funds in major projects supporting the protection and development of natural heritage (categorized as sustainable tourism in Appendix Figure 4), for a total of EUR 24 million (see Appendix Figure 4).

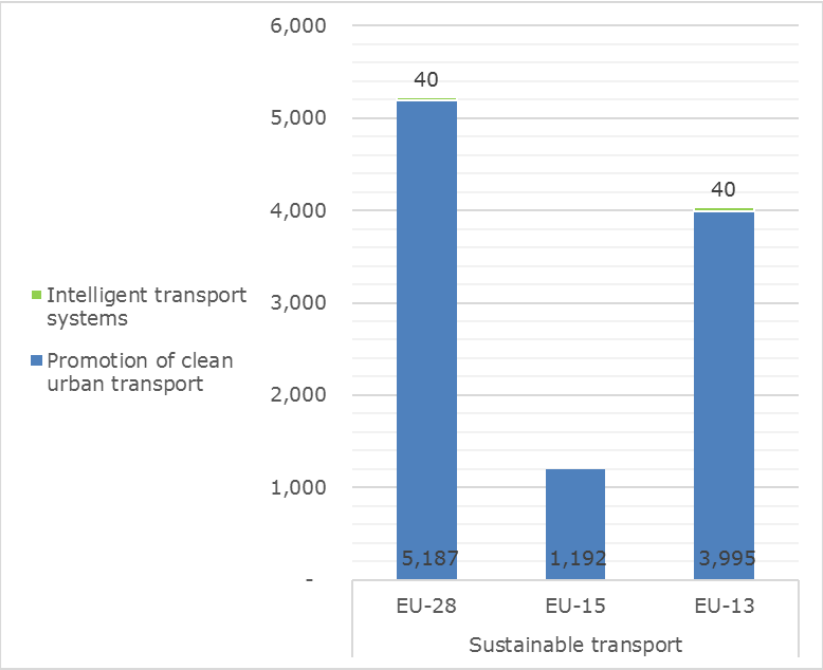
[240] The high investment cost for natural heritage projects is driven in particular by a French project in Mont-Saint-Michel (EUR 211 million).

[241] See definition given in Appendix Table 1.

[242] See definition given in Appendix Table 1.

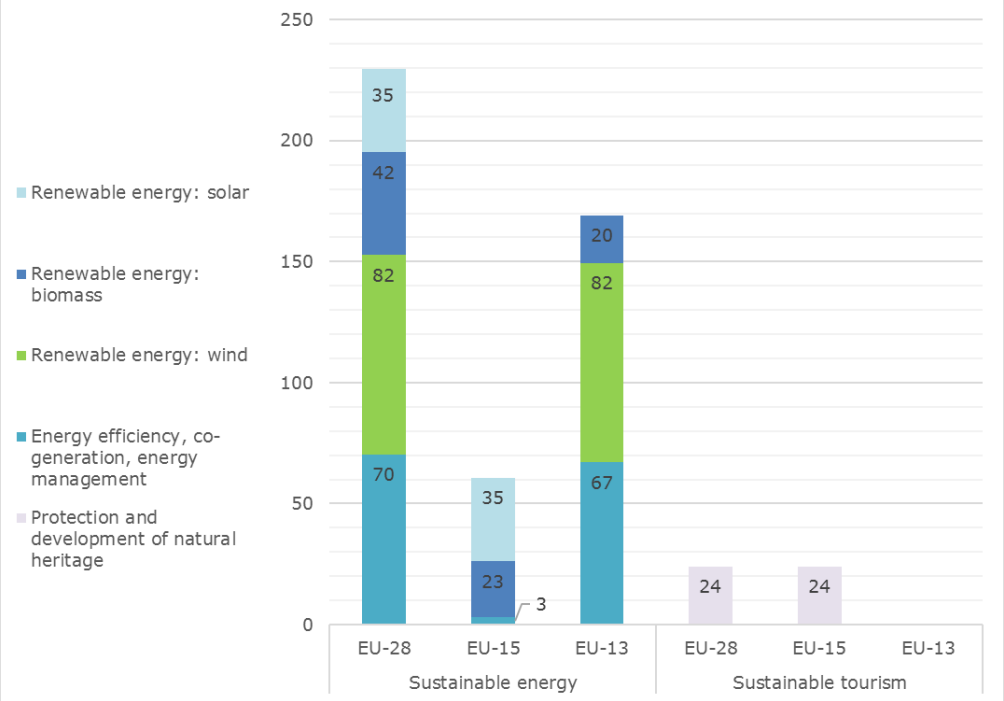
[243] The average investment size of major projects is based on total investments data given that the threshold to define major projects apply to total investment costs.

Appendix Figure 3 Total Community amount (EUR million) granted to sustainable transport major projects, by group of countries



Source: DG REGIO, Major Projects Monitoring (October 2016).

Appendix Figure 4 Total Community amount (EUR million) granted to major projects contributing indirectly to environmental protection by category and by group of countries



Source: DG REGIO, Major Projects Monitoring (October 2016).

Appendix Table 4 shows major projects for indirect environmental investments as a percentage of the total Cohesion Policy spending by category for the whole EU, EU-15

and EU-13 countries. Major projects that contribute indirectly to environmental protection represent a higher share of the total Cohesion Policy spending for the EU-13 countries (44%) compared to the EU-15 (21%).

Notably, in the category of clean urban transport, major projects account for 87% of the whole Community contribution to this sector. This is even more accentuated in the EU-13, where 94% of the Community funding for clean urban transport goes to major projects. Overall, major projects for indirect environmental investments across the whole EU represent 31% of the corresponding Cohesion Policy spending, a higher share than for direct environmental investments.

Appendix Table 4 Major projects for indirect environmental investments in terms of percentage of total CP spending for the whole EU, EU-15 and EU-13 countries, by category

Category	EU total	EU-15	EU-13
Renewable energy: wind	14%	n.a.	26%
Renewable energy: solar	3%	5%	n.a.
Renewable energy: biomass	3%	5%	2%
Energy efficiency, co-generation, energy management	1%	0.1%	2%
Promotion of clean urban transport	87%	71%	94%
Intelligent transport systems	4%	n.a.	6%
Protection and development of natural heritage	2%	5%	n.a.
Total	**31%**	**21%**	**44%**

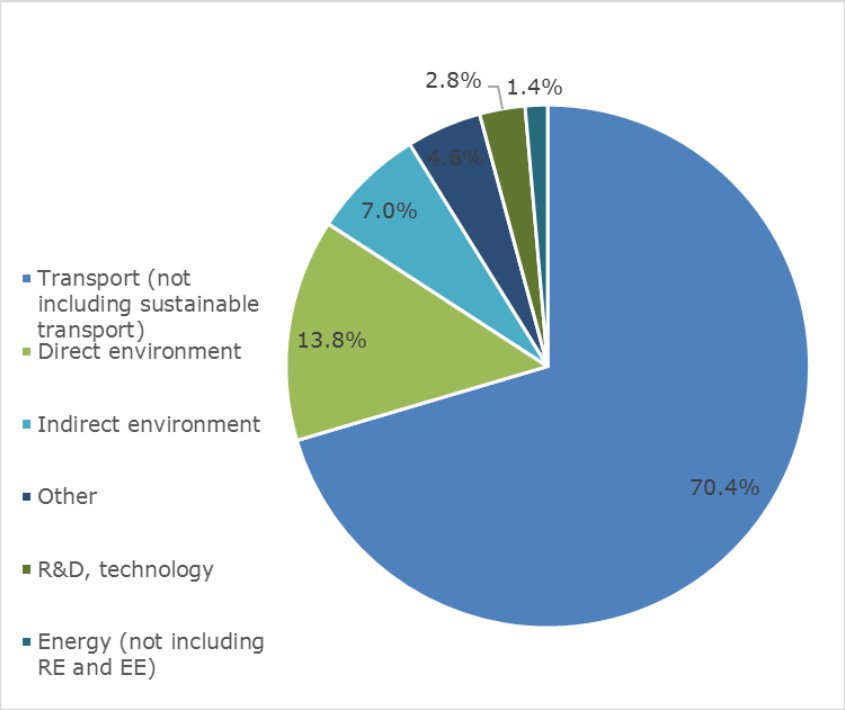
Source: own calculations based on *DG REGIO, Major Projects Monitoring (October 2016)*.

Environmental major projects in comparison to other sectors

When looking at all major projects, those for direct environmental investments represent 13.8% of the total Community funding, while major projects for indirect environmental investments account for a further 7.0% (see Appendix Figure 5).

The overwhelming majority, 70.4% of major projects during the financing period 2007-2013, were in the transport sector. In this analysis, transport does not include sustainable transport (which is counted among indirect environmental investments); it does include motorways, railways, airports and urban transport other than clean urban transport. For these transport investments, major projects represent 67% of the total Cohesion Policy funding during the period.

Appendix Figure 5 Major projects by sector, as % of total Community amount



Source: own calculations based on DG REGIO, Major Projects Monitoring (October 2016).

Note: 'Transport' includes motorways, railways, airports and urban transport other than the category of clean urban transport and intelligent transport systems – these two categories are included under indirect environmental investments. 'Energy' includes electricity and natural gas, while it excludes renewable energy and energy efficiency, which are included under 'indirect environmental investments' in this report.

Appendix E Detailed data on major projects by Member State

Direct environmental investments

The table below presents data related to direct environmental investments implemented as major projects in the period 2007-2013, by category of spending and by Member State. In addition to the Decision Amount and the Community Amount, the Total Investment Cost data is provided for completeness.

Appendix Table 5 Major direct environmental projects during the financing period 2007-2013, amount (EUR million) and number of projects by category

Category / country	*Total investments*	Decision Amount	Community Amount	No. projects
Management and distribution of water (drinking water)	***6,696***	**3,967**	**3,324**	**66**
BG	*63*	60	51	1
CZ	*29*	21	18	1
EE	*99*	70	59	2
ES	*1,202*	604	476	13
FR	*1,144*	157	80	2
HR	*29*	23	20	1
HU	*165*	116	98	1
IT	*141*	69	52	2
LV	*39*	28	21	1
PL	*1,260*	845	718	15
PT	*238*	182	155	4
RO	*2,099*	1,676	1,477	20
SI	*41*	28	24	1
SK	*146*	89	76	2
Water treatment (waste water)	***6,375***	**4,563**	**3,913**	**84**
BG	*25*	19	16	1
CY	*45*	35	30	1
CZ	*344*	222	188	5
EL	*51*	42	42	1
ES	*351*	297	237	7
FR	*106*	47	26	1
HR	*143*	119	101	5
HU	*612*	450	383	8
IT	*66*	15	11	5
LT	*63*	34	29	1
MT	*70*	70	59	1
PL	*1,596*	949	807	15
PT	*209*	133	113	2

Category / country	*Total investments*	Decision Amount	Community Amount	No. projects
RO	*2,272*	1,853	1,634	23
SI	*104*	71	60	2
SK	*318*	207	176	6
Management of household and industrial waste	***3,026***	**1,995**	**1,596**	**39**
BG	*107*	149	84	1
CY	*12*	9	8	1
ES	*221*	147	118	1
FR	*199*	99	52	1
HR	*72*	60	51	2
HU	*196*	118	100	3
MT	*59*	31	27	1
PL	*1,228*	661	551	9
PT	*138*	115	97	1
RO	*651*	515	430	18
SI	*144*	91	78	1
Air quality	***815***	**558**	**168**	**10**
PL	*464*	339	33	6
RO	*350*	218	136	4
Integrated prevention and pollution control	***211***	**125**	**11**	**2**
PL	*211*	125	11	2
Promotion of biodiversity and nature protection (including Natura 2000)	***245***	**47**	**38**	**1**
EL	*245*	47	38	1
Rehabilitation of industrial sites and contaminated land	***291***	**229**	**191**	**5**
CZ	*111*	86	73	2
LV	*30*	28	21	1
MT	*31*	26	22	1
RO	*120*	89	74	1
Risk prevention (...)	***1,604***	**1,447**	**1,217**	**20**
BG	*50*	50	43	1
CZ	*58*	58	50	1
EL	*82*	82	69	1
ES	*113*	80	59	2
HU	*328*	322	274	4
IT	*4*	4	3	1

Category / country	*Total investments*	Decision Amount	Community Amount	No. projects
MT	*63*	53	45	1
PL	*427*	334	284	3
PT	*158*	156	133	2
RO	*129*	115	94	2
SI	*33*	33	28	1
SK	*160*	160	136	1
Other measures to preserve the environment and prevent risks	***494***	**400**	**324**	**7**
EE	*33*	33	30	1
FR	*55*	23	8	1
HU	*172*	172	146	3
IT	*70*	2	1	1
RO	*164*	170	139	1
Total	***19,756***	**13,331**	**10,782**	**234**

Source: DG REGIO

Note: The amount of total investments is presented for completeness, although it was not used in the analysis. The decision amount represents the total eligible costs multiplied by the funding gap[244], while the community amount is given by the multiplication of the decision amount times the co-financing rate of the OP's priority axis which the major project belongs to.

Indirect environmental investments

For indirect environmental investments, the table below provides data by category and Member State, including the Total Investments listed in Commission statistics, which is provided for information.

Appendix Table 6 Major projects in indirect environmental investments during the financing period 2007-2013, amounts (EUR million) and number of projects by category

Category / country	Total investments	Decision Amount	Community Amount	No. projects
Renewable energy: wind	**464**	**317**	**82**	**7**
PL	464	317	82	7
Renewable energy: solar	**342**	**46**	**35**	**2**
DE	69	9	7	1

[244] The funding gap is the share of the discounted investment costs not covered by the discounted net revenue.

Category / country	Total investments	Decision Amount	Community Amount	No. projects
IT	272	37	28	1
Renewable energy: biomass	**300**	**138**	**42**	**3**
PL	135	98	20	2
UK	165	40	23	1
Energy efficiency, co-generation, energy management	**158**	**117**	**70**	**3**
EL	5	4	3	1
RO	153	114	67	2
Promotion of clean urban transport	**9,989**	**6,943**	**5,187**	**62**
BG	110	94	80	2
EL	1255	725	663	9
ES	313	194	88	2
FR	1375	707	201	6
IT	259	169	53	2
HU	1967	1272	1081	6
PL	4321	3542	2834	31
PT	336	203	172	3
UK	54	37	14	1
Intelligent transport systems	**59**	**47**	**40**	**1**
BG	59	47	40	1
Protection and development of natural heritage	**287**	**91**	**24**	**2**
FR	287	91	24	2
Total	**11,598**	**7,699**	**5,480**	**80**

Source: DG REGIO

Note: The amount of total investments is presented for completeness, although it was not used in the analysis. The decision amount represents the total eligible costs multiplied by the funding gap[245], while the community amount is given by the multiplication of the decision amount times the co-financing rate of the OP's priority axis which the major project belongs to.

[245] The funding gap is the share of the discounted investment costs not covered by the discounted net revenue.

Appendix F ESF Support for environment

While some data is available for Member States' environmental spending under the European Social Fund (ESF), the estimates do not appear to be at all compatible across the three programming periods.

For the 2000-2006 financing period, environmental activities were not reported separately in ESF data. However, an independent report[246] assessed Member States' actions for sustainable development (SD) and eco-technologies under the ESF. The methodology used in the report to select relevant measures was based on a keyword search at Operational Programme level.[247] According to this report, the EU amount spent on sustainable development and eco-technologies activities under the ESF reached EUR 5.4 billion (i.e. 10% of the ESF Community resources) during the financing period 2000-2006. In addition, a further EUR 14.8 billion, corresponding to 19% of the ESF budget available, was allocated in the 2007-2013 financing period. The spending reported refers to the EU share spent per measure that had explicit SD and eco-technologies activities, among others. Therefore, the spending reported does not include only environmental spending, which is thus substantially overestimated. Moreover, the amounts reported vary greatly between Member States, with Spain and the UK being the largest investors in SD and eco-technologies activities. As a result, this methodology does not appear to be comparable to the ESF environmental reporting for 2007-2013 or 2014-2020; moreover, it does not appear to provide a good estimate of spending for environment.

For the period 2007-2013, an economic activity dimension was introduced and included a code for 'activities linked to the environment'. However, this categorisation was apparently not used consistently by the Member States in their reporting[248], and the data for 'activities linked to the environment' likely underestimates the amount of actual allocations (a total of EUR 64 million, about 0.08% of the total ESF budget). According to the ex-post evaluation of the ESF 2007-2013, the fund contributed to the implementation of environmental policies. Examples cited in the evaluation include the development of municipal territorial plans in Lithuania and the promotion of environmental management systems in British companies. The ex-post evaluation did not, however, estimate the amount of ESF financing for environment.[249]

[246] Bernard Brunhes International (2010), The European Social Fund: Sustainable Development and Eco-technologies

[247] The keywords used to select relevant OPs were the following: 'sustainable development, environment, eco-technologies, ecology, natural resources, energy, waste, water, corporate social responsibility, environmental management, environmental training, environmental awareness, environmental technologies, climate change, eco-innovation, green jobs'. Bernard Brunhes International (2010), The European Social Fund: Sustainable Development and Eco-technologies

[248] Roulette, M. European Commission (DG Employment), personal communication, September 2016.

[249] Panteia, Fondazione Giacomo Brodolini and Metis GmbH (2016), ESF Ex-post Evaluation Synthesis 2007-2013, EU synthesis report – final version, available at http://ec.europa.eu/social/main.jsp?langId=en&catId=89&newsId=2684.

Yet another approach was introduced in the current financing period (2014-2020), when a secondary reporting theme was established for the ESF to better identify the contribution of this fund to cross cutting objectives. This is the case of environmental and climate change initiatives, which can be identified under the secondary theme 'Supporting the shift to a low-carbon, resource efficient economy'. The table below presents data on allocations to this secondary theme by Member State: in total EUR 1.1 billion of ESF resources — representing 1.3% of total ESF allocations for the same period— were allocated for activities related to the environment. This reporting appears to be more comprehensive and accurate than for previous periods.

Appendix Table 7 Allocations (EUR) to secondary theme 'Supporting the shift to a low-carbon, resource efficient economy' under ESF, 2014-2020

Member State	EU amount
IT	277.7
PT	213.7
DE	156.9
FR	131.1
PL	61.6
FI	61.3
RO	54.2
UK	37.1
SK	23.6
ES	20.4
BG	19.5
SI	18.0
BE	14.1
SE	7.8
AT	7.1
HR	4.6
CZ	2.9
LU	2.0
NL	0.4
CY	0.1
Total	1,114.0

Source: InfoRegio, ESIF categorization (2016)

Appendix G Absolute amounts of OP allocations for direct environmental investments per Member State and FOI

Absolute amounts of OP allocations at the beginning of the 2007-2013 period (as recorded in 2008) and at the end of the 2007-2013 period (as recorded in 2016) (EUR million)

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	change 2016-2008
AT	53	Risk prevention	9,074,950	12,039,028	33%
AT Total			**9,074,950**	**12,039,028**	33%
BE	44	Waste	2,382,219	4,368,374	83%
	46	Water treatment	1,000,000	1,000,000	0%
	47	Air quality	1,500,000	1,500,000	0%
	49	Climate change	1,500,000	1,500,000	0%
	50	Land rehabilitation	54,048,204	62,048,204	15%
	51	Biodiversity and nature protection	1,054,383	1,054,383	0%
BE Total			**61,484,806**	**71,470,961**	16%
BG	44	Waste	300,521,138	232,958,661	-22%
	45	Drinking water	166,433,336	166,433,336	0%
	46	Water treatment	768,469,973	569,269,973	-26%
	47	Air quality	0	156,800,000	
	50	Land rehabilitation	108,322,014	2,701,932	-98%
	51	Biodiversity and nature protection	80,786,894	71,725,295	-11%
	53	Risk prevention	36,000,660	86,889,620	141%
	54	Other env. risk	0	42,400,000	
BG Total			**1,460,534,015**	**1,329,178,817**	-9%
CY	44	Waste	125,495,000	61,745,000	-51%
	46	Water treatment	8,500,000	79,305,000	833%
	50	Land rehabilitation	16,150,000	15,045,000	-7%
CY Total			**150,145,000**	**156,095,000**	4%
CZ	44	Waste	520,258,572	515,495,562	-1%
	45	Drinking water	400,661,221	171,151,444	-57%
	46	Water treatment	1,344,868,832	1,417,696,949	5%
	47	Air quality	252,317,000	469,892,455	86%
	48	IPPC	160,647,006	78,571,552	-51%
	50	Land rehabilitation	463,170,263	243,211,598	-47%
	51	Biodiversity and nature	605,920,677	485,128,564	-20%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	change 2016-2008
		protection			
	53	Risk prevention	322,957,444	426,157,751	32%
	54	Other env. risk	7,496,852	22,383,676	199%
CZ Total			**4,078,297,867**	**3,829,689,551**	-6%
DE	44	Waste	47,745,110	45,057,770	-6%
	45	Drinking water	32,555,658	26,477,824	-19%
	46	Water treatment	342,418,061	305,469,171	-11%
	47	Air quality	17,997,227	15,085,814	-16%
	48	IPPC	15,946,702	6,757,000	-58%
	49	Climate change	12,282,000	11,912,412	-3%
	50	Land rehabilitation	318,318,228	309,946,370	-3%
	51	Biodiversity and nature protection	50,619,560	55,929,324	10%
	53	Risk prevention	526,609,018	400,038,719	-24%
	54	Other env. risk	53,058,721	121,750,227	129%
DE Total			**1,417,550,285**	**1,298,424,631**	-8%
EE	44	Waste	70,302,813	70,302,813	0%
	45	Drinking water	203,878,160	203,878,160	0%
	46	Water treatment	203,878,160	203,878,160	0%
	47	Air quality	13,600,398	20,000,000	47%
	50	Land rehabilitation	138,045,325	118,045,325	-14%
	51	Biodiversity and nature protection	21,729,961	21,729,961	0%
	53	Risk prevention	38,346,989	38,346,989	0%
	54	Other env. risk	67,107,231	67,107,231	0%
EE Total			**756,889,037**	**743,288,639**	-2%
ES	44	Waste	462,015,554	419,648,249	-9%
	45	Drinking water	1,986,670,620	1,816,116,616	-9%
	46	Water treatment	2,032,831,664	1,975,769,507	-3%
	47	Air quality	20,435,417	23,120,973	13%
	48	IPPC	59,771,629	31,330,699	-48%
	49	Climate change	6,857,923	11,217,969	64%
	50	Land rehabilitation	185,541,996	43,388,434	-77%
	51	Biodiversity and nature protection	681,821,904	725,641,618	6%
	53	Risk prevention	715,036,203	423,308,069	-41%
	54	Other env. risk	37,012,835	40,245,666	9%
ES Total			**6,187,995,745**	**5,509,787,800**	-11%
FI	45	Drinking water	3,290,079	3,290,079	0%
	46	Water treatment	6,214,593	6,214,593	0%
	49	Climate change	796,879	796,879	0%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	change 2016-2008
	50	Land rehabilitation	2,071,886	2,071,886	0%
	51	Biodiversity and nature protection	1,932,884	552,252	-71%
	53	Risk prevention	3,558,141	3,558,141	0%
	54	Other env. risk	13,828,737	13,828,737	0%
FI Total			**31,693,199**	**30,312,567**	-4%
FR	44	Waste	134,470,000	152,650,294	14%
	45	Drinking water	152,934,104	152,752,879	0%
	46	Water treatment	126,513,889	178,629,778	41%
	47	Air quality	8,183,333	4,176,333	-49%
	48	IPPC	11,833,333	11,733,333	-1%
	49	Climate change	18,883,473	16,396,726	-13%
	50	Land rehabilitation	86,493,437	69,150,915	-20%
	51	Biodiversity and nature protection	175,187,846	177,036,853	1%
	53	Risk prevention	198,426,894	156,699,780	-21%
	54	Other env. risk	109,632,132	89,026,858	-19%
FR Total			**1,022,558,441**	**1,008,253,749**	-1%
GR	44	Waste	432,176,450	259,825,920	-40%
	45	Drinking water	455,820,000	432,634,426	-5%
	46	Water treatment	942,346,550	774,384,155	-18%
	47	Air quality	23,870,000	27,807,597	16%
	48	IPPC	4,085,000	0	-100%
	49	Climate change	4,915,000	0	-100%
	50	Land rehabilitation	26,295,000	21,951,000	-17%
	51	Biodiversity and nature protection	179,763,000	111,489,177	-38%
	53	Risk prevention	479,120,000	310,582,113	-35%
	54	Other env. risk	114,201,000	109,612,777	-4%
GR Total			**2,662,592,000**	**2,048,287,165**	-23%
HR	44	Waste	61,784,906	61,784,906	0%
	45	Drinking water	15,927,588	15,927,588	0%
	46	Water treatment	183,167,265	183,167,265	0%
	50	Land rehabilitation	12,160,000	12,160,000	0%
HR Total			**273,039,759**	**273,039,759**	0%
HU	44	Waste	366,500,000	320,553,167	-13%
	45	Drinking water	601,500,000	436,788,881	-27%
	46	Water treatment	1,357,137,850	1,252,113,231	-8%
	48	IPPC	31,900,000	31,900,000	0%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	change 2016-2008
	50	Land rehabilitation	475,191,832	465,017,890	-2%
	51	Biodiversity and nature protection	125,800,000	125,800,000	0%
	53	Risk prevention	969,776,802	968,348,297	0%
	54	Other env. risk	362,778,268	314,207,112	-13%
HU Total			**4,290,584,752**	**3,914,728,578**	-9%
IE	44	Waste	0	2,000,000	
	45	Drinking water	4,000,000	15,000,000	275%
	46	Water treatment	4,000,000	0	-100%
IE Total			**8,000,000**	**17,000,000**	113%
IT	44	Waste	338,072,531	200,513,648	-41%
	45	Drinking water	347,074,346	405,419,502	17%
	46	Water treatment	227,862,362	363,213,422	59%
	47	Air quality	55,369,757	14,071,738	-75%
	48	IPPC	102,089,577	49,693,529	-51%
	49	Climate change	96,774,051	114,587,989	18%
	50	Land rehabilitation	298,355,961	183,330,318	-39%
	51	Biodiversity and nature protection	57,132,769	53,172,433	-7%
	53	Risk prevention	396,135,708	614,904,574	55%
	54	Other env. risk	126,871,300	108,395,200	-15%
IT Total			**2,045,738,362**	**2,107,302,353**	3%
LT	44	Waste	278,995,046	235,552,043	-16%
	45	Drinking water	137,444,500	153,417,945	12%
	46	Water treatment	206,166,750	361,674,768	75%
	47	Air quality	171,481,463	0	-100%
	50	Land rehabilitation	14,501,892	14,501,892	0%
	51	Biodiversity and nature protection	87,011,351	71,849,743	-17%
	54	Other env. risk	0	91,483,448	
LT Total			**895,601,002**	**928,479,839**	4%
LU	50	Land rehabilitation	3,786,550	3,786,550	0%
LU Total			**3,786,550**	**3,786,550**	0%
LV	44	Waste	129,500,000	129,500,000	0%
	45	Drinking water	562,993,781	562,993,781	0%
	50	Land rehabilitation	49,000,000	49,000,000	0%
	51	Biodiversity and nature protection	26,000,000	26,000,000	0%
	53	Risk prevention	25,200,000	25,200,000	0%
LV Total			**792,693,781**	**792,693,781**	0%
MT	44	Waste	55,250,000	36,515,709	-34%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	change 2016-2008
	45	Drinking water	4,250,000	6,015,006	42%
	46	Water treatment	42,500,000	76,252,069	79%
	47	Air quality	21,250,000	0	-100%
	48	IPPC	430,000	0	-100%
	50	Land rehabilitation	48,280,000	23,551,604	-51%
	51	Biodiversity and nature protection	1,700,000	0	-100%
	53	Risk prevention	59,500,000	36,418,167	-39%
	54	Other env. risk	1,900,000	3,672,186	93%
MT Total			**235,060,000**	**182,424,741**	-22%
NL	44	Waste	2,667,500	1,989,900	-25%
	46	Water treatment	2,244,000	1,989,900	-11%
	47	Air quality	3,173,500	2,919,400	-8%
	48	IPPC	0	0	
	49	Climate change	1,000,000	1,000,000	0%
	50	Land rehabilitation	31,340,000	28,799,000	-8%
	51	Biodiversity and nature protection	5,720,000	4,195,400	-27%
	54	Other env. risk	4,976,000	3,451,400	-31%
NL Total			**51,121,000**	**44,345,000**	-13%
PL	44	Waste	1,311,253,636	1,256,093,736	-4%
	45	Drinking water	498,870,300	476,493,703	-4%
	46	Water treatment	3,164,883,744	3,423,723,556	8%
	47	Air quality	117,770,012	205,514,839	75%
	48	IPPC	77,597,745	45,743,248	-41%
	50	Land rehabilitation	278,413,953	199,344,246	-28%
	51	Biodiversity and nature protection	135,077,500	114,559,606	-15%
	53	Risk prevention	823,344,535	851,277,041	3%
	54	Other env. risk	72,301,252	55,915,544	-23%
PL Total			**6,479,512,677**	**6,628,665,519**	2%
PT	44	Waste	224,088,076	279,762,594	25%
	45	Drinking water	659,216,332	515,077,275	-22%
	46	Water treatment	780,153,337	655,007,950	-16%
	47	Air quality	7,795,091	1,509,164	-81%
	48	IPPC	24,512,468	8,892,962	-64%
	49	Climate change	3,574,570	280,245	-92%
	50	Land rehabilitation	191,960,262	72,659,938	-62%
	51	Biodiversity and	46,972,811	58,793,636	25%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	change 2016-2008
		nature protection			
	53	Risk prevention	513,684,600	587,677,685	14%
	54	Other env. risk	134,516,376	69,642,246	-48%
PT Total			**2,586,473,923**	**2,249,303,695**	-13%
RO	44	Waste	792,840,872	592,840,872	-25%
	45	Drinking water	1,388,266,080	1,388,266,080	0%
	46	Water treatment	1,388,266,080	1,388,266,080	0%
	47	Air quality	137,561,186	137,561,186	0%
	48	IPPC	126,418,123	0	-100%
	50	Land rehabilitation	316,430,710	163,121,080	-48%
	51	Biodiversity and nature protection	171,988,693	171,988,693	0%
	53	Risk prevention	240,691,445	238,195,065	-1%
	54	Other env. risk	127,655,219	134,601,619	5%
RO Total			**4,690,118,408**	**4,214,840,675**	-10%
SI	44	Waste	205,568,426	105,568,426	-49%
	45	Drinking water	225,896,414	245,896,414	9%
	46	Water treatment	156,985,442	274,425,269	75%
	51	Biodiversity and nature protection	49,555,411	49,555,411	0%
	53	Risk prevention	97,462,141	97,462,141	0%
SI Total			**735,467,834**	**772,907,661**	5%
SK	44	Waste	368,600,000	294,030,100	-20%
	45	Drinking water	198,932,689	85,950,545	-57%
	46	Water treatment	691,710,376	796,181,500	15%
	47	Air quality	127,800,000	107,800,000	-16%
	49	Climate change	19,800,000	39,800,000	101%
	50	Land rehabilitation	130,400,000	72,329,900	-45%
	51	Biodiversity and nature protection	30,454,161	37,125,099	22%
	53	Risk prevention	120,000,000	280,770,100	134%
	54	Other env. risk	136,002,774	105,715,191	-22%
SK Total			**1,823,700,000**	**1,819,702,435**	0%
UK	44	Waste	20,230,668	32,783,570	62%
	49	Climate change	55,506,454	64,829,584	17%
	50	Land rehabilitation	166,957,047	177,552,119	6%
	51	Biodiversity and nature protection	69,608	69,608	0%
	53	Risk prevention	69,608	69,608	0%
	54	Other env. risk	18,436,546	4,771,347	-74%
UK Total			**261,269,931**	**280,075,836**	7%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	change 2016-2008
TC	44	Waste	45,378,270	50,921,091	12%
	45	Drinking water	57,027,575	58,217,419	2%
	46	Water treatment	114,293,062	114,499,651	0%
	47	Air quality	42,137,802	38,421,400	-9%
	48	IPPC	125,577,693	132,154,489	5%
	49	Climate change	82,837,046	87,506,231	6%
	50	Land rehabilitation	47,535,091	33,352,187	-30%
	51	Biodiversity and nature protection	173,092,636	188,227,689	9%
	53	Risk prevention	258,207,434	291,795,911	13%
	54	Other env. risk	290,628,550	314,982,706	8%
Territorial Cooperation Total			**1,236,715,159**	**1,310,078,774**	6%
Grand Total			**44,247,698,483**	**41,576,203,104**	**-6%**

Appendix H Absolute amounts of OP allocations for indirect environmental investments per Member State and FOI

Absolute amounts of OP allocations at the beginning of the period 2007-2013 (as recorded in 2008) and at the end of the period 2007-2013 (as recorded in 2016) (EUR million)

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	Change 2008-2016
AT	6	SMEs env. friendly products	31,209,693	31,377,577	1%
	28	Intelligent transport	1,458,808	1,458,808	0%
	39	RE: wind	65,000	65,000	0%
	40	RE: solar	6,638,629	5,903,555	-11%
	41	RE: biomass	17,208,779	20,098,037	17%
	42	RE: hydro and other	325,000	568,164	75%
	43	Energy efficiency	5,956,013	6,055,512	2%
	55	Natural assets (tourism)	175,000	175,000	0%
	56	Natural heritage (tourism)	2,000,000	2,000,000	0%
AT Total			**65,036,922**	**67,701,653**	**4%**
BE	6	SMEs env. friendly products	2,000,000	5,000,000	150%
	28	Intelligent transport	2,000,000	2,000,000	0%
	40	RE: solar	11,851,495	11,851,495	0%
	43	Energy efficiency	13,976,147	16,035,343	15%
	52	Clean urban transport	4,018,925	4,018,925	0%
	55	Natural assets (tourism)	15,427,183	15,427,183	0%
	56	Natural heritage (tourism)	8,713,592	8,713,592	0%
BE Total			**57,987,342**	**63,046,538**	**9%**
BG	6	SMEs env. friendly products	23,233,333	9,647,500	-58%
	24	Cycle tracks	5,104,063	16,956,755	232%
	28	Intelligent transport	43,244,171	62,666,857	45%
	39	RE: wind	27,760,748	0	-100%
	40	RE: solar	35,641,422	12,196,736	-66%
	42	RE: hydro and other	3,089,660	0	-100%
	43	Energy efficiency	125,619,935	241,144,931	92%
	52	Clean urban transport	68,054,177	86,740,914	27%
	55	Natural assets (tourism)	18,074,389	9,067,483	-50%
	56	Natural heritage (tourism)	60,247,963	36,878,780	-39%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	Change 2008-2016
BG Total			**410,069,861**	**475,299,956**	**16%**
CY	40	RE: solar	5,950,000	9,520,000	60%
	52	Clean urban transport	29,720,000	29,720,000	0%
CY Total			**35,670,000**	**39,240,000**	**10%**
CZ	6	SMEs env. friendly products	292,558,512	285,170,878	-3%
	24	Cycle tracks	117,541,391	124,192,666	6%
	28	Intelligent transport	171,043,703	179,768,449	5%
	39	RE: wind	68,340,963	1,960,376	-97%
	40	RE: solar	109,099,733	18,901,934	-83%
	41	RE: biomass	285,893,854	97,758,119	-66%
	42	RE: hydro and other	104,599,733	67,216,611	-36%
	43	Energy efficiency	622,097,020	1,130,657,910	82%
	52	Clean urban transport	200,960,223	184,530,882	-8%
	55	Natural assets (tourism)	66,971,972	51,586,578	-23%
	56	Natural heritage (tourism)	65,002,327	44,673,151	-31%
CZ Total			**2,104,109,431**	**2,186,417,554**	**4%**
DE	6	SMEs env. friendly products	123,861,432	72,837,129	-41%
	24	Cycle tracks	99,655,994	98,137,097	-2%
	28	Intelligent transport	4,965,965	4,215,965	-15%
	39	RE: wind	25,658,723	35,266,669	37%
	40	RE: solar	47,598,792	46,604,610	-2%
	41	RE: biomass	80,660,261	82,923,588	3%
	42	RE: hydro and other	72,192,486	66,101,421	-8%
	43	Energy efficiency	252,119,003	391,264,444	55%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	Change 2008-2016
	52	Clean urban transport	43,885,020	29,441,893	-33%
	55	Natural assets (tourism)	56,637,975	44,721,146	-21%
	56	Natural heritage (tourism)	85,970,068	51,389,271	-40%
DE Total			**893,205,719**	**922,903,233**	**3%**
DK	6	SMEs env. friendly products	25,980,691	25,980,691	0%
	55	Natural assets (tourism)	6,127,108	6,127,108	0%
	56	Natural heritage (tourism)	6,127,108	6,127,108	0%
DK Total			**38,234,907**	**38,234,907**	**0%**
EE	6	SMEs env. friendly products	8,793,732	9,345,427	6%
	28	Intelligent transport	3,195,582	3,195,582	0%
	39	RE: wind	6,800,199	0	-100%
	41	RE: biomass	3,400,100	0	-100%
	43	Energy efficiency	63,374,791	28,760,241	-55%
	55	Natural assets (tourism)	12,213,516	12,213,516	0%
	56	Natural heritage (tourism)	12,213,516	12,213,516	0%
EE Total			**109,991,436**	**65,728,282**	**-40%**
ES	6	SMEs env. friendly products	245,755,147	71,475,288	-71%
	24	Cycle tracks	472,622	353,002	-25%
	28	Intelligent transport	39,446,605	29,280,443	-26%
	39	RE: wind	3,436,208	397,593	-88%
	40	RE: solar	107,449,030	78,444,024	-27%
	41	RE: biomass	46,881,203	40,994,018	-13%
	42	RE: hydro and other	10,026,805	2,196,290	-78%
	43	Energy efficiency	147,617,671	259,517,168	76%
	52	Clean urban transport	138,677,144	153,013,770	10%
	55	Natural assets (tourism)	68,056,378	71,483,022	5%
	56	Natural heritage (tourism)	63,484,373	36,993,275	-42%
ES Total			**871,303,186**	**744,147,893**	**-15%**
FI	6	SMEs env. friendly products	38,572,460	38,572,460	0%
	24	Cycle tracks	0	690,316	
	39	RE: wind	796,879	796,879	0%
	40	RE: solar	787,530	787,530	0%
	41	RE: biomass	13,210,281	13,210,281	0%
	42	RE: hydro and other	5,887,557	5,887,557	0%
	43	Energy	24,243,917	24,243,917	0%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	Change 2008-2016
		efficiency			
	52	Clean urban transport	1,932,884	1,932,884	0%
	55	Natural assets (tourism)	2,868,765	2,868,765	0%
	56	Natural heritage (tourism)	12,104,438	12,104,438	0%
FI Total			**100,404,711**	**101,095,027**	**1%**
FR	6	SMEs env. friendly products	148,852,300	144,410,427	-3%
	24	Cycle tracks	3,000,000	6,825,000	128%
	28	Intelligent transport	15,800,000	12,300,000	-22%
	39	RE: wind	37,460,284	29,251,319	-22%
	40	RE: solar	107,077,604	126,799,246	18%
	41	RE: biomass	162,231,884	152,442,924	-6%
	42	RE: hydro and other	58,665,285	65,317,114	11%
	43	Energy efficiency	192,106,190	296,006,074	54%
	52	Clean urban transport	179,400,928	210,192,676	17%
	55	Natural assets (tourism)	48,880,964	39,937,004	-18%
	56	Natural heritage (tourism)	103,442,222	92,630,329	-10%
FR Total			**1,056,917,661**	**1,176,112,113**	**11%**
EL	6	SMEs env. friendly products	41,225,000	12,357,141	-70%
	24	Cycle tracks	1,620,000	1,000	-100%
	28	Intelligent transport	700,000	0	-100%
	39	RE: wind	81,840,000	91,258,200	12%
	40	RE: solar	35,260,000	94,153,000	167%
	41	RE: biomass	27,310,000	1,391,000	-95%
	42	RE: hydro and other	148,430,000	17,474,500	-88%
	43	Energy efficiency	71,170,000	520,469,991	631%
	52	Clean urban transport	873,870,000	688,692,028	-21%
	55	Natural assets (tourism)	21,704,000	479,000	-98%
	56	Natural heritage (tourism)	31,790,000	8,280,000	-74%
EL Total			**1,334,919,000**	**1,434,555,860**	**7%**
HR	6	SMEs env. friendly products	12,374,703	12,374,703	0%
HR Total			**12,374,703**	**12,374,703**	**0%**
HU	6	SMEs env. friendly products	51,934,567	15,663,315	-70%
	24	Cycle tracks	152,753,701	136,575,130	-11%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	Change 2008-2016
	28	Intelligent transport	16,366,790	16,366,790	0%
	39	RE: wind	25,000,000	24,073	-100%
	40	RE: solar	28,690,037	70,991,610	147%
	41	RE: biomass	113,690,037	205,594,756	81%
	42	RE: hydro and other	35,511,930	72,700,338	105%
	43	Energy efficiency	156,200,000	692,935,733	344%
	52	Clean urban transport	1,703,305,238	1,518,733,810	-11%
	55	Natural assets (tourism)	163,166,605	163,166,605	0%
	56	Natural heritage (tourism)	113,891,226	113,891,226	0%
HU Total			**2,560,510,131**	**3,006,643,386**	**17%**
IE	43	Energy efficiency	38,000,000	15,500,000	-59%
	52	Clean urban transport	16,400,000	3,600,000	-78%
	56	Natural heritage (tourism)	0	3,500,000	
IE Total			**54,400,000**	**22,600,000**	**-58%**
IT	6	SMEs env. friendly products	524,507,449	452,924,582	-14%
	24	Cycle tracks	23,288,940	21,814,360	-6%
	28	Intelligent transport	91,841,659	131,455,303	43%
	39	RE: wind	75,418,154	21,030,891	-72%
	40	RE: solar	331,657,675	226,383,442	-32%
	41	RE: biomass	385,867,225	53,797,479	-86%
	42	RE: hydro and other	256,185,950	232,529,858	-9%
	43	Energy efficiency	793,795,597	1,110,433,127	40%
	52	Clean urban transport	260,121,797	296,294,628	14%
	55	Natural assets (tourism)	97,621,926	57,236,393	-41%
	56	Natural heritage (tourism)	238,087,169	106,438,678	-55%
IT Total			**3,078,393,541**	**2,710,338,741**	**-12%**
LT	41	RE: biomass	36,763,789	58,485,290	59%
	43	Energy efficiency	329,961,346	373,769,270	13%
	52	Clean urban transport	40,652,957	21,827,656	-46%
	55	Natural assets (tourism)	78,551,914	42,736,547	-46%
	56	Natural heritage (tourism)	79,228,669	0	-100%
LT Total			**565,158,675**	**496,818,763**	**-12%**
LU	6	SMEs env. friendly products	757,310	757,310	0%
	39	RE: wind	252,437	252,437	0%
	40	RE: solar	504,873	504,873	0%
	41	RE: biomass	504,873	504,873	0%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	Change 2008-2016
	42	RE: hydro and other	504,873	504,873	0%
	43	Energy efficiency	504,873	504,873	0%
LU Total			**3,029,239**	**3,029,239**	**0%**
LV	28	Intelligent transport	1,000,000	1,000,000	0%
	39	RE: wind	10,000,000	10,000,000	0%
	41	RE: biomass	24,680,000	24,680,000	0%
	42	RE: hydro and other	32,500,000	32,500,000	0%
	43	Energy efficiency	60,220,000	70,180,102	17%
LV Total			**128,400,000**	**138,360,102**	**8%**
MT	6	SMEs env. friendly products	6,000,000	1,466,834	-76%
	24	Cycle tracks	0	2,160,579	
	28	Intelligent transport	3,500,000	5,746,222	64%
	39	RE: wind	8,350,000	87,130	-99%
	40	RE: solar	8,350,000	42,658,238	411%
	41	RE: biomass	1,700,000	0	-100%
	43	Energy efficiency	15,590,000	32,710,033	110%
	52	Clean urban transport	4,000,000	0	-100%
	55	Natural assets (tourism)	19,130,000	313,151	-98%
	56	Natural heritage (tourism)	4,250,000	1,731,093	-59%
MT Total			**70,870,000**	**86,873,280**	**23%**
NL	6	SMEs env. friendly products	17,747,000	16,053,000	-10%
	24	Cycle tracks	4,514,500	3,244,000	-28%
	28	Intelligent transport	8,170,000	6,476,000	-21%
	39	RE: wind	5,048,600	4,540,400	-10%
	40	RE: solar	3,748,600	3,240,400	-14%
	41	RE: biomass	7,029,600	6,521,400	-7%
	42	RE: hydro and other	5,388,600	4,880,400	-9%
	43	Energy efficiency	28,177,600	34,250,000	22%
	52	Clean urban transport	16,424,000	15,018,918	-9%
	55	Natural assets (tourism)	1,694,000	1,694,000	0%
	56	Natural heritage (tourism)	15,529,000	15,529,000	0%
NL Total			**113,471,500**	**111,447,518**	**-2%**
PL	6	SMEs env. friendly products	182,663,850	85,938,708	-53%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	Change 2008-2016
	24	Cycle tracks	101,785,123	108,967,421	7%
	28	Intelligent transport	357,713,787	305,136,081	-15%
	39	RE: wind	227,709,750	222,625,526	-2%
	40	RE: solar	59,316,996	122,031,190	106%
	41	RE: biomass	339,340,833	282,018,688	-17%
	42	RE: hydro and other	149,427,638	134,274,763	-10%
	43	Energy efficiency	409,233,887	582,289,902	42%
	52	Clean urban transport	2,329,261,318	2,334,732,860	0%
	55	Natural assets (tourism)	72,694,634	34,832,505	-52%
	56	Natural heritage (tourism)	98,646,828	61,178,095	-38%
PL Total			**4,327,794,644**	**4,274,025,739**	**-1%**
PT	6	SMEs env. friendly products	138,179,793	17,236,032	-88%
	24	Cycle tracks	18,750,231	13,522,310	-28%
	28	Intelligent transport	21,646,867	1,512,372	-93%
	39	RE: wind	33,503,226	1,201,000	-96%
	40	RE: solar	19,963,753	23,871,388	20%
	41	RE: biomass	23,697,759	3,046,659	-87%
	42	RE: hydro and other	27,485,461	1,800,996	-93%
	43	Energy efficiency	146,638,870	75,705,458	-48%
	52	Clean urban transport	28,757,404	191,273,331	565%
	55	Natural assets (tourism)	119,536,754	102,650,883	-14%
	56	Natural heritage (tourism)	48,343,697	61,606,667	27%
PT Total			**626,503,815**	**493,427,096**	**-21%**
RO	6	SMEs env. friendly products	125,747,737	112,747,737	-10%
	28	Intelligent transport	126,935,939	38,388,388	-70%
	39	RE: wind	57,462,783	87,462,783	52%
	40	RE: solar	19,154,261	69,154,261	261%
	41	RE: biomass	47,885,653	95,370,442	99%
	42	RE: hydro and other	67,039,914	76,039,914	13%
	43	Energy efficiency	253,241,727	198,057,771	-22%
	55	Natural assets (tourism)	63,901,273	63,901,273	0%
	56	Natural heritage (tourism)	115,506,675	143,416,449	24%
RO Total			**876,875,962**	**884,539,018**	**1%**
SE	6	SMEs env. friendly products	33,130,626	33,130,626	0%
	24	Cycle tracks	475,000	475,000	0%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	Change 2008-2016
	28	Intelligent transport	14,272,602	14,272,602	0%
	39	RE: wind	12,351,349	12,351,349	0%
	40	RE: solar	10,835,795	10,835,795	0%
	41	RE: biomass	17,706,773	17,706,773	0%
	42	RE: hydro and other	11,449,032	11,449,032	0%
	43	Energy efficiency	9,173,788	9,173,788	0%
	52	Clean urban transport	13,741,278	13,741,278	0%
	55	Natural assets (tourism)	8,569,467	8,569,467	0%
	56	Natural heritage (tourism)	7,299,413	7,299,413	0%
SE Total			**139,005,123**	**139,005,123**	**0%**
SI	6	SMEs env. friendly products	55,634,088	55,634,088	0%
	24	Cycle tracks	5,660,000	8,933,491	58%
	28	Intelligent transport	21,680,492	21,680,492	0%
	40	RE: solar	27,086,553	0	-100%
	41	RE: biomass	21,300,000	25,300,000	19%
	42	RE: hydro and other	5,800,000	0	-100%
	43	Energy efficiency	105,700,000	144,586,553	37%
	52	Clean urban transport	34,069,345	24,069,345	-29%
	55	Natural assets (tourism)	39,947,329	39,947,329	0%
	56	Natural heritage (tourism)	7,743,033	7,743,033	0%
SI Total			**324,620,840**	**327,894,331**	**1%**
SK	6	SMEs env. friendly products	54,794,398	84,376,477	54%
	24	Cycle tracks	5,000,000	5,188,109	4%
	28	Intelligent transport	9,500,000	2,135,842	-78%
	40	RE: solar	24,457,405	25,457,405	4%
	41	RE: biomass	24,547,405	24,547,405	0%
	42	RE: hydro and other	41,247,406	17,547,405	-57%
	43	Energy efficiency	78,584,184	124,244,186	58%
	52	Clean urban transport	41,600,000	36,565,779	-12%
	56	Natural heritage (tourism)	46,307,740	5,291,617	-89%
SK Total			**326,038,538**	**325,354,225**	**0%**
UK	6	SMEs env. friendly products	272,522,371	215,097,601	-21%
	24	Cycle tracks	6,308,238	7,526,527	19%

Member State	FOI	FOI title (abbreviation)	OP allocation 2008	OP allocation 2016	Change 2008-2016
	28	Intelligent transport	3,000,000	3,000,000	0%
	39	RE: wind	33,438,257	14,770,470	-56%
	40	RE: solar	21,003,048	12,845,340	-39%
	41	RE: biomass	36,586,945	52,801,465	44%
	42	RE: hydro and other	45,748,663	40,992,551	-10%
	43	Energy efficiency	141,507,204	209,437,945	48%
	52	Clean urban transport	95,076,029	77,132,087	-19%
	55	Natural assets (tourism)	28,981,758	67,250,614	132%
	56	Natural heritage (tourism)	59,955,837	58,073,355	-3%
UK Total			**744,128,350**	**758,927,955**	**2%**
TC	6	SMEs env. friendly products	60,758,325	66,742,262	10%
	24	Cycle tracks	103,814,698	111,007,744	7%
	28	Intelligent transport	132,297,133	106,841,377	-19%
	39	RE: wind	48,740,493	36,923,027	-24%
	40	RE: solar	51,322,160	40,289,614	-21%
	41	RE: biomass	78,753,215	83,353,109	6%
	42	RE: hydro and other	51,139,184	42,703,805	-16%
	43	Energy efficiency	109,971,249	127,030,914	16%
	52	Clean urban transport	42,777,085	30,419,608	-29%
	55	Natural assets (tourism)	131,854,459	128,066,068	-3%
	56	Natural heritage (tourism)	145,066,746	170,921,028	18%
Territorial Cooperation Total			**956,494,747**	**944,298,556**	**-1%**
Grand Total			**21,985,919,984**	**22,050,440,791**	**0.3%**

Appendix I Comparison of Cohesion Policy support for direct environmental investments with other financing sources

This Appendix presents estimates of the share of Cohesion Policy in total direct environmental investments. More precisely, allocations under the CF and ERDF are compared to other five categories of financing: general government, business sector, specialised producers (such as water and waste companies), the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD).

The data are not fully compatible (as noted in section 2.3.3): comparable data on Cohesion Policy across the two most recent financing periods – 2000-2006 and 2007-2013 – are available in terms of allocations for the periods as a whole, while investments by government, business sector and specialised producers are available on a yearly expenditure basis. Categories of spending are broadly similar, but definitions vary. The comparison shows overall total direct environmental investments and investments in three categories: water, waste and biodiversity. (The methodological note in the box at the end of this section provides further information on data sources and estimation methods.)

Appendix Table 8 and Appendix Table 9 below show the comparison of Cohesion Policy funds to other sources of financing for direct environmental investments during the financing period 2000-2006 and 2007-2013 respectively. The yearly average is presented for all sources of financing.

Generally, the largest sources of financing for direct environmental investments are the national governments, followed by specialised producers, such as water and waste companies, which play a major role in the EU-15. In particular, specialised producers provide a significant amount of financing for the waste sector.

Appendix Table 8 Comparison of Cohesion Policy allocations with other sources of financing for direct environmental investments, 2000-2006 financing period, yearly average (EUR million)

Category	MS groups	Cohesion Policy	General govern-ment	Business sector	Spec. producers	EIB	EBRD	Total	CP as share of total
Total direct environment	EU-28	5,464	20,638	11,580	17,053	1,910	-	56,645	10%
	EU-15	3,926	17,806	9,468	16,363	1,649	-	49,211	8%
	EU-13	1,128	2,832	2,112	691	261	47	7,071	16%
Water	EU-28	2,954	11,713	2,760	10,614	1,600	-	29,641	10%
	EU-15	2,041	9,385	2,167	10,258	1,365	-	25,216	8%
	EU-13	895	2,328	592	356	235	45	4,451	20%
Waste	EU-28	652	3,175	1,222	6,273	212	-	11,534	6%

Category	MS groups	Cohesion Policy	General govern-ment	Business sector	Spec. producers	EIB	EBRD	Total	CP as share of total
	EU-15	506	2,901	992	5,948	191	-	10,539	5%
	EU-13	136	273	230	325	22	2	987	14%
Biodiversity	EU-28	441	3,454	515	n.a.	-	-	4,410	10%
	EU-15	392	3,323	471	n.a.	-	-	4,185	9%
	EU-13	31	132	44	n.a.	-	-	207	15%

Sources: DG REGIO, (2016) for Cohesion Policy; Eurostat, General government expenditure by function (COFOG) for general government; Eurostat, Environmental protection expenditure in Europe - detailed data (NACE Rev. 2) for business sector and specialised producers; EIB website; EBRD website.

Note: This table does not include other EU funding sources for biodiversity, such as the European Agricultural Fund for Rural Development (EAFRD) and the LIFE Programme. .

During the two financing periods considered, Cohesion Policy funds provided about 10% of the overall financing to direct environmental investments. The results indicate that Cohesion Policy funds represented a larger share of environmental financing for EU-13 countries than for EU-15 countries, both in the 2000-2006 programming period (16%) and the 2007-2013 programming period (27%). (The ten first EU-13 become Member States in 2004, mid-way through the earlier period.) The contribution of Cohesion Policy funding has been particularly important in both periods in the water sector and for biodiversity investments[250].

Appendix Table 9 Comparison of Cohesion Policy allocations with other sources of financing for direct environmental investments, 2007-2013 financing period, yearly average (EUR million)

Category	MS groups	Cohesion Policy	General govern-ment	Business sector	Spec. producers	EIB	EBRD	Total	CP as share of total
Total direct environment	EU-28	5,939	30,559	11,605	15,713	3,582	-	67,399	9%
	EU-15	2,097	25,438	8,795	14,556	3,017	-	53,903	4%
	EU-13	3,655	5,121	2,810	1,157	566	-	13,310	27%
Water	EU-28	3,106	16,246	2,666	9,475	3,052	-	34,545	9%
	EU-15	1,090	12,526	1,756	8,826	2,545	-	26,743	4%
	EU-13	1,991	3,720	910	649	507	84	7,862	25%

[250] Data for biodiversity financing is incomplete, in particular for specialised producers, though this is not believed to represent a major gap.

Category	MS groups	Cohesion Policy	General govern-ment	Business sector	Spec. producers	EIB	EBRD	Total	CP as share of total
Waste	EU-28	766	6,612	1,099	6,017	306	-	14,799	5%
	EU-15	200	6,082	840	5,528	269	-	12,919	2%
	EU-13	559	530	259	489	37	-	1,873	30%
Biodiversity	EU-28	365	3,590	566	n.a.	-	-	4,520	8%
	EU-15	170	3,330	528	n.a.	-	-	4,028	4%
	EU-13	168	260	37	n.a.	-	-	465	36%

Sources: see Appendix Table 8.

A final remark concerns the increasing importance of EIB lending to both EU-15 and EU-13 countries in the period 2007-2013. For instance, in the water sector EIB lending increased from EUR 1.4 billion (2000-2006) to EUR 2.5 billion in (2007-2013) in EU-15 countries and from EUR 235 million to EUR 507 million for EU-13 countries. Most EIB lending for water projects occurred in EU-15 Member States.

Box. Methodological note: data sources and calculation methods

Data for investments by government, the business sector and specialised producers was taken from the Eurostat database on environmental expenditures. Data on EIB and EBRD loans was gathered from the publicly available lists of projects of the respective banks[251].

Data for general government is comprised of gross fixed capital formation plus capital transfers, while data for business sector and specialized producers presents investment expenditures. Specialised producers are both public and private companies that have as main activity the production of environmental protection services. Specialised producers work mainly in sewerage, waste collection, waste treatment and remediation activities.

Total direct environment investments by general government are based on the COFOG classification include the following categories: waste management, waste water management, pollution abatement and protection of biodiversity and landscape. Total direct environment investments by business sector and specialised producers are based on the CEPA classification and include the following categories: protection of ambient air and climate, wastewater management, waste management, protection and remediation of soil, groundwater and surface water, noise and vibration abatement (excluding workplace protection) and protection of biodiversity and landscapes.

[251] The selection of projects that contribute directly to environmental protection financed through loans by the EIB and EBRD has been made looking at environmental infrastructure projects and running a keyword search on "environment". The list obtained was then analysed and only projects considered relevant in the context of direct environmental investments were included in the comparison. The amounts recorded are those specifically of the EIB or EBRD loans and do not include other project costs.

Cohesion Policy expenditure is usually low in the initial years of each programming period[252]; moreover, as explained in section 2.3.3, expenditure can continue under the n+2 rule until up to two years after each financing perspective comes to an end. To provide a better comparison between each Cohesion Policy programming period and spending for the other categories, average investment data from general government, business sector and specialized producers is considered for the years 2002-2008 (in comparison with the 2000-6 programming period) and 2009-2014 (in comparison with the 2007-13 programming period)[253]. EIB and EBRD loans are counted by the year of signature of the financial agreement, though most disbursement likely occurs in subsequent years. No time shift is applied to data for the loans.

[252] See Martens B., et al (2016), Ex post evaluation of Cohesion Policy Programmes 2007-2013 – Work Package 6 – Environment (study by COWI and partners for the European Commission, DG Regional and Urban Policy), available at:
http://ec.europa.eu/regional_policy/en/policy/evaluations/ec/2007-2013/#7

[253] Investment data for general government is available until 2014, while data for business sector and specialized producers is available until 2013, with a lot of missing data for the year 2013. Therefore, the average for general government investments is calculated from 2009 until 2014, while the average for business sector and specialized producers is calculated from 2009 until 2012.

Appendix J OP review of horizontal principles

	MS	Title / CCI	Fund	Approach to SD as horizontal principle (chapter 11)
1	BE	OP Brussels Capital Region 2014BE16RFOP001	ERDF	• Reference to SEA findings as evidence of environmental integration: the OP focuses on the development of 5 sectors, 3 of which are expected to bring about positive environmental impacts according to SEA • Requirement that funded infrastructure meet display energy exemplarity (linked to EPBD requirements); Possible consideration of environmental exemplarity in terms of water and waste management, choice of materials etc • Stresses role of MA throughout programme life cycle in maximizing environmental benefits and minimizing harmful effects through for example focusing investment on the most resource efficient options, making greater use of green public procurement • OP will be in line with commitments under the regional Pact of Sustainable Urban Growth
2	BG	Operational Programme Good Governance 2014BG05SFOP001	ESF	• General mention to CPR article 8 elements and that environmental integration will be part of all program activities • Reference to OP actions supporting environmental protection: Upgrade of information systems for Natura 2000; Training of state officials to assess green infrastructure and climate change policy; Support for tracking spending on biodiversity [Note: ESF secondary theme selected]
3	BG	Operational programme "Transport and transport infrastructure" 2014BG16M1OP001	ERDF+CF	• General mention to CPR article 8 elements and overview of how programme activities might be expected to contribute to resource efficiency, climate change and disaster resilience • SD principle to be implemented through EIA of investment plans and evaluation of compatibility with Natura 2000 • Mention of use of GPP for all purchased goods and services
4	BG	Operational programme "Environment" 2014BG16M1OP002	ERDF+CF	• Reference to priority axes that encompass environmental investments and how they are linked to environmental benefits • Reference to guidelines under preparation by the Environment Ministry with recommendations for Managing Authorities on how to integrate the principle of sustainable development in the selection and implementation of operations
5	CZ	Transport 2014CZ16M1OP001	ERDF+CF	• Elaboration of the SD principles included in CZ Strategic Framework for Sustainable Development, including GPP and the polluter pays principle • Stresses environmental aspects in project selection and the role of MA throughout programme life cycle in ensuring SD requirements are observed for all projects • Specific SD requirements to be specified in manuals for applicants within calls; applicants required to describe impact of project on and contribution to SD • All investments to respect EIA and Habitats Directives • Priority for projects entailing sustainable energy and resource use • Programme level monitoring according to SEA requirements and to include indicators concerning air quality (PM emissions reduction etc) • Project level monitoring
6	CZ	Environment 2014CZ16M1OP002	ERDF+CF	• Reference to several principles, including the principle of prevention, the precautionary principle, the polluters-pay principle, the partnership principle
7	CZ	OP Prague – Growth Pole 2014CZ16M2OP001	ERDF+ESF	• During project selection, applicants have to describe how the project contributes to fulfillment of the principle of sustainable development. The principle will be respected at all stages of the project cycle, and projects can be rejected if they are found inconsistent with the principle. • Description of how planned activities in the various PAs contribute to SD (PA1, 2 and 4)
8	DE	OP Niedersachsen ERDF/ESF 2014-2020	ERDF+ESF	• All Specific Objectives will contribute to sustainable development • Specific selection criteria will be developed • Project sponsors will receive information on sustainability, with recommendations to apply e.g. the German sustainability code and

	MS	Title / CCI	Fund	Approach to SD as horizontal principle (chapter 11)
		2014DE16M2OP001		GPP. • The monitoring of environmental developments and impacts will occur under the framework of environmental monitoring, as recommended during the SEA process. Suitable environmental indicators have been proposed for the individual measures. The contribution towards these indicators by submitted project applications will be evaluated. Further, context indicators have been defined to detect negative environmental developments through projects. • The Environmental Ministry of Niedersachsen will appoint an environmental commissioner to serve as expert advisor on sustainable development. • The Land Niedersachsen will continue its participation in the working group "Umwelt"
9	DE	OP Nordrhein-Westfalen ERDF 2014-2020 2014DE16RFOP009	ERDF	• Representation of regional conservation associations in the monitoring committee • Specifically designed selection criteria for sustainable development • Development of monitoring indicators that appropriately measure the sustainable development • The implementation of sustainable development will be reported in the Implementation Reports • Sustainable Development will be considered during the programme's evaluation • Particularly the climate adaptation potential of the investments will be considered during project planning and execution.
10	ES	Sustainable growth ERDF 2014-20 OP 2014ES16RFOP002	ERDF	• General reference to the process of SEA as the means through which sustainability is guaranteed. • Based on SEA report, ten environmental criteria are established for the selection of the operations of the Program, to which are added three criteria for projects located in the Natura 2000 Network.
11	ES	Andalucía ERDF 2014-20 OP 2014ES16RFOP003	ERDF	• Reference to priority axes that encompass environmental investments and how they are linked to environmental benefits • Reference to SEA process as the means through which horizontal environmental integration is ensured • Reference to green public procurement and the polluter-pays principle in connection to selection criteria
12	ES	País Vasco ERDF 2014-20 OP 2014ES16RFOP021	ERDF	In line with the recommendation of the ex-ante evaluation, the horizontal principle of sustainable development has been addressed under a twofold approach: • Specific actions: promoting, as far as possible, the presence of environmental measures in the operations • Transversal approach guaranteed by the SEA process of the OP (sustainability principle has been addressed in all SEA phases: diagnostic and intervention needs identification, planning, implementation, monitoring and evaluation)
13	EL	TRANSPORT INFRASTRUCTURE, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT OP 2014GR16M1OP001	ERDF+CF	• Reference to SEA process and Europe 2020 Strategy. • Reference to the national provisions for the application of ELD and *the polluter pays principle* in Greece. • Reference to all transport operations being subject to EIA (as foreseen by national law regarding Environmental licensing of projects and activities) as well as to a Decision on the Approval of Environmental Terms. • Detail list of principles and requirement for compliance of transport operation with sustainable development (transport safety, noise reduction, waste management plans as part of project planning, principles for transport operations planning, emphasis on biodiversity)
14	EL	ATTICA OP 2014GR16M2OP012	ERDF+ESF	• General reference to the parallel process of SEA as the means through which sustainability is taken into account: 1. in the run up to the final submission and approval of the OP; 2. through the involvement of environmental authorities in ensuring compliance with SEA; 3. through the specification of project selection criteria for each priority axis in conformity with the OP SEA, which will be included in the Management and Control System and approved by the Monitoring Committee of each OP. • Specific reference to the Greek regulatory framework for environmental licensing of projects and activities taking into account 'appropriate assessment' in accordance with the Habitats and Birds Directive.
15	IE	Southern & Eastern Regional	ERDF	The following arrangements will be made to ensure the integration of the sustainable development principle in the OP:

	MS	Title / CCI	Fund	Approach to SD as horizontal principle (chapter 11)
		Operational Programme 2014IE16RFOP002		• Involve bodies working in the fields of sustainable development at all stages (preparation, implementation, monitoring, evaluation) • Comply with the EIA and SEA Directives, where appropriate • Incorporate the principle of sustainable development in the design of measures and operations; • Ensure that project selection criteria will assess projects on the basis of environmental protection requirements, resource efficiency, climate change mitigation and adaptation, disaster resilience and risk prevention; • Monitor and evaluate the application of the principle and have regard to the results of such monitoring and evaluation actions; and • Comply with the polluter pays principle. In addition, chapter 11 makes reference to the Irish Government's renewed sustainable development framework ('Our Sustainable Future – A Framework for Sustainable Development for Ireland'), which sets out a medium to long-term plan to guide the essential work needed to progress the sustainable development agenda and more fully exploit opportunities in the green economy in Ireland, with priority actions including among other the development of a set of indicator to measure progress.
16	IT	ROP Campania ESF 2014IT05SFOP020	ESF	• Chapter 11 recognises the role of ESF OPs and this OP in particular in reflecting Sustainable Development through actions such as: sustainable development promotion and education actions, information and dissemination on environmental issues within wider training actions, and equipping the workforce with skills to operate safely and in compliance with environmental protection standards, and to identify and prevent situations of environmental risks. • The OP takes into account project selection criteria that contribute to the pursuit of the principle of environmental sustainability. In this context, the Regional Operational Programme, to the extent possible, will pursue the green public procurement and strengthen the system of green procurement. • The OP provides appropriate monitoring and evaluation tools that make it possible to check the qualitative and quantitative results that the implementation of the Operational Programme produces on environmental aspects.
17	IT	National Operational Programme on Infrastructures and Networks 2014IT16RFOP002	ERDF	• The OP emphasises the key role of SEA in the elaboration of OP, and also as an instrument of decision support in all phases of definition of the program and the selection of operations. • Selection criteria will be established coherently with SEA indications especially with respect to the preservation of biodiversity/Natura 2000 sites • Green public procurement will be encouraged throughout the programme • Emphasis on the role of MA during implementation in ensuring full integration of environmental protection requirements and sustainable development, and in encouraging the adoption of GPP practices. • A report on the monitoring and management of the environmental aspects of the OP will be prepared on an annual basis. The report will take into account the trend of environmental indicators linked to the implementation of the program (ref. Tab. 8.1 of ER non-technical summary) and the action taken to detect potential adverse environmental effects associated with the implementation of OP and introduce appropriate corrective measures where necessary
18	IT	National Operational Programme on Enterprises and Competitiveness 2014IT16RFOP003	ERDF	• Mention that the OP is not expected to have negative environmental impacts, rather to generate positive effects • From an operational point of view the MA will provide in the implementation phase the development of appropriate selection criteria relating to environmental issues and risk management with reference where relevant to existing initiatives/requirements • MA in accordance with instructions contained in the Partnership Agreement, will ensure that all the contracts in the implementation process of the program contain provisions that incentivise protection of the environment • The concept of "green public procurement" is taken as the guiding principle of the program • The Technical Assistance component foresees capacity building activities and special technical assistance related to the planning, design, implementation, monitoring and reporting of specific actions

	MS	Title / CCI	Fund	Approach to SD as horizontal principle (chapter 11)
				with particular reference to those relating to the efficient use of resources and the reduction of greenhouse gas emissions.
19	IT	ROP Lazio ERDF 2014IT16RFOP010	ERDF	• SD ensured through the application of the indications contained in the SEA environment report. • Description of how planned activities in the various PAs contribute to SD • The OP will contribute to the spread of the practices of GPP through the use of Minimum Environmental Criteria (CAM) identified by the National Action Plan on GPP, as revised by MoE Decree of 04.10.2013. CAM will be identified where possible, as a criterion for rewarding. • More generally, criteria for selecting the operations will give priority to sustainability goals. From an operational point of view, the assessment of operations will be based on the specific definition of objectives and measurable indicators to ensure an effective implementation of a sustainable development model. In particular it will give priority to those projects that will contribute to the prevention and reduction of harmful effects on human health and the environment as a whole, to reducing ghg emissions, PM10 and NOx, while also increasing the R&D activities for the use of renewable sources and promoting the use of transport systems with low environmental impact. • The OP does not foresee specific actions for Natura 2000 sites, however it notes that due diligence needs to be conducted in the event that planned interventions prove to be located in Natura 2000 sites.
20	IT	ROP Veneto ERDF 2014IT16RFOP021	ERDF	• Stresses the role of SEA in strengthening sustainability of funded activities • Role/responsibility of Environment Authority in ensuring sustainable development through working closely with the Managing Authority and its involvement in PMC • Incentivising green public procurement where relevant • Reference to financed actions directly addressing environmental concerns, and reference to relevant regional plans (e.g. on air pollution and energy)
21	LT	Operational Programme for EU Structural Funds Investments for 2014-2020 2014LT16MAOP001	ERDF+CF+ ESF+YEI	• Chapter 11 emphasizes the need to combine social, environmental and economic aspects of sustainable development. • Compliance monitoring with respect to the principle of sustainable development will be integrated into the overall project monitoring system. The OP will focus on improving information and data collection and reporting system, access to shared information resources and better information at national, regional and local levels. • Priority will be given to the projects carried out under the harmonized and (or) green procurement procedures. • A higher rating will be given to the projects that reduce CO2 annual emissions, projects designed to replace the use of fossil fuels with biofuels for additional bioenergy production and use of sustainability principles and criteria covering biodiversity conservation, energy efficiency, resource efficiency, social and economic aspects. • The selection of projects will take into account the strategic planning documents, risk reduction plans, solutions, goals and guided by law to ensure sustainable development of the principles and objectives of the provisions. • Furthermore, the OP supports actions development and implementation of products and technologies that reduce environmental impact.
22	MT	Fostering a competitive and sustainable economy to meet our challenges 2014MT16M1OP001	ERDF+CF	• Continuation of approach adopted under the 2007-2013 programme(s) whereby applicants are required to demonstrate that they have considered sustainable development issues at all stages during the design of the project • Applicants must also demonstrate how the project has been structured to ensure that sustainable development issues will be mainstreamed throughout the project's aims and operation.
23	MT	Stimulating private sector investment for economic growth 2014MT16RFSM001	ERDF	• The overall scope of the OP is to stimulate private sector investment for development, growth and diversification of SMEs, through a financial instrument providing guarantees to cover new loans for new investments implemented by beneficiary SMEs. The OP will cover various sectors of the Maltese economic landscape, including the tourism sector and is expected to contribute particularly to Smart Growth through TO3. However, given the flexibility in terms of the sectors supported, it is envisaged that the Programme will also contribute towards TO1, 2 and 4.

	MS	Title / CCI	Fund	Approach to SD as horizontal principle (chapter 11)
24	PL	OP Inf rastructure and Environment 2014PL16M1OP001	ERDF+CF	• Sustainable development taken into account when defining strategic objectives (presumably also through SEA) • Sustainable development to be considered at individual project level, e.g. through taking into account the polluter-pays principle • PMC to develop selection criteria for sustainable development
25	PL	Regional Operational Programme for Łódzkie Voivodeship 2014-2020 2014PL16M2OP005	ERDF+ESF	• A practical and measurable way of introducing the principles of sustainable development in the OP will be to establish minimum requirements for projects with respect to rational management of resources; reducing pressure on the environment; consideration of the effects of environmental management; raising environmental awareness. These criteria will be applied in the selection of projects in the area of the environment, and energy efficiency and energy savings, especially infrastructure projects targeting construction or modernisation of buildings. • Rewarding projects that take into account the application of: green public procurement; the "polluter pays" and "user pays" principles for the financing of infrastructure through the introduction of the obligation to comply with the relevant EU regulations and national legislation; Corporate Social Responsibility; eco-innovation; green jobs; Investment projects that reuse land and buildings rather than expansion into undeveloped areas; etc • The OP assumes compliance with the principle of sustainable development by strengthening resilience to hazards, disaster risk prevention and management, in particular by ensuring that the infrastructure created under the OP will be adapted to climate change.
26	PL	OP Digital Poland 2014PL16RFOP002	ERDF	• The OP will be carried out on accordance with the principle of sustainable development within the meaning of Community and national law, at all stages of its preparation and implementation. • During the project selection phase, projects will be assessed for all elements of environmental governance (the environmental dimension of sustainable development) and social order in the context of health and protection of culture. • The OP will contribute to resource efficiency (e.g. by restricting the circulation of traditional letters and documents), or reducing pressure on the environment (e.g. limiting use of transport by visitors) • The analysis carried out shows that activities supported under the OP will not directly affect the environment (limited focus on environment)
27	PL	ROP Malopolskie	ERDF+ESF	• Reference that particular emphasis on sustainable development is given in PA4: development of low-carbon economy, energy consumption in buildings; PA5: natural disaster and risk management, water and waste management; PA6: biodiversity conservation; and PA11: revitalization of regional space. • In addition, the principle will be taken into account in all PAs and actions under the Programme and it will be a formal requirement in the selection and implementation of projects, and in particular infrastructural projects. • Mentions that the principle will be implemented by taking into account adaptation to climate change in the region.
28	TC	(Interreg V-A) IT-SI - Italy-Slovenia 2014TC16RFCB036	ERDF	• Mention that sustainable development and safeguard and protection of the environment is considered a horizontal approach throughout the OP. • Description of how priority axes have a direct or indirect impact on sustainable development • Reference to significant allocation TO6 “Protecting the environment and promoting resource efficiency”. • Special attention to sectors highly affecting environment such as tourism and transport, requiring environmental mitigation strategies and more efficient use of natural resources.
29	TC	(Interreg V-A) SI-HU - Slovenia-Hungary 2014TC16RFCB053	ERDF	• General reference to the process of SEA and the ex-ante evaluation as the means through which sustainability is taken into account • Projects will be encouraged to apply GPP

	MS	Title / CCI	Fund	Approach to SD as horizontal principle (chapter 11)
30	TC	Danube 2014TC16M6TN001	ERDF	• Main recommendations of SEA process incorporated in the programme • Selection of investment-related project to maximize resource efficiency and sustainability; prevent investments with significant negative environmental and climate effects • Provides a list of aspects to be considered in project selection by assessors, e.g. contribution to energy efficiency. ghg emissions reduction, application of GPP in a systematic manner • Notes that ghg emissions reduction and increase in energy efficiency and renewable energy production should be monitored at operations level (if applicable) • GPP requirement in relation to energy using products • Building projects going beyond the minimum EPBD requirements to be favoured
31	TC	Alpine Space 2014TC16RFTN001	ERDF	• Reference to priority axes aimed directly at environmental protection • Promotion of life-cycle approaches and integration of protection od biodiversity and ecosystems • Project proposals to be assessed regarding how operations contribute to sustainable development by addressing the "Alpine Space Programme Sustainable Development Principles" (no further info provided on these principles in the text)
32	TC	North West Europe 2014TC16RFTN006	ERDF	• NWE promotes SD directly through supported actions. NWE defines six key challenges including resource efficiency, vulnerability to climate change events and energy security and supply. By including these challenges in the strategy of the new Programme the importance of sustainable development is emphasised. • Project proposals are only eligible if the project objectives and activities do not conflict with the principles of sustainable development. • Projects must comply with all EU and national environmental legislations and standards. • By signing the application form, applicants automatically agree with the principle of sustainable development. • Applicants are obliged to define in their application how their projects contribute to environmental challenges in NWE. • The contribution of the NWE Programme to the promotion of sustainable growth will be part of the NWE Programme evaluation.

Appendix K References to green jobs in the reviewed OPs (2014-2020)

OP	Green jobs references
OP title: OP Brussels Capital Region **CCI: 2014BE16RFOP001** **Country: Belgium** **Fund: ERDF**	Chapter 1: Reference to the Employment-Environment Alliance implemented in the Brussels-Capital Region that is based on the recognition that environmental issues represent an essential source of employment and economic development for businesses in the Region and proposes an innovative governance aimed at mobilizing and coordinating public, private and associated stakeholder around concerted actions. The objective is to work together to develop economic sectors linked to the environment and the creation of quality jobs.
OP title: OP Environment **CCI: 2014BG16M1OP002** **Country: Bulgaria** **Fund: ERDF/ CF**	Mentioning that the OP, will support interventions allowing to create/fill jobs in sectors with great potential, such as sectors, creating "green" jobs. These are: support for Employers and businesses within Natura 2000 sites; measures training of young entrepreneurs for planning and development green business in areas falling within the Natura 2000 and others.
OP title: Prague – Growth Pole **CCI: 2014CZ16M2OP001** **Country: Czech Republic** **Fund: ERDF/ESF**	No mentioning of green jobs, but according to Chapter 11, PA4 on Training and Education supports environmental education and raising awareness (no mentioning of it in actions supported by IPs).
OP title: Danube Transnational Programme **CCI: 2014TC16M6TN001** **Country: Hungary (lead), Austria, Bulgaria, Croatia, Czech Republic, Germany, Romania, Slovakia, Slovenia + Bosnia and Herzegovina, Moldova, Montenegro, Norway, Russia** **Fund: ERDF(+IPA(e)+ENI)**	a) General sections references: Chapter 1, section 1.1.1.5 Research & innovation: In order to foster the sustainable and inclusive growth of the programme area, other aspects of innovation should be addressed, such as eco-innovation and social innovation. The complexity of the geographical area asks for new approaches in terms of environmental technologies helping to create green jobs and provide sustainable progress for the area. b) ERDF IP references: Start-up support for the creation of new jobs related to green technologies and environmental industry is mentioned as part of the indicative examples of action that may be financed under the IP1b, and more specifically within the context of a specific objective to improve framework conditions for innovation: • "Develop and implement strategies and instruments to provide better access to innovation finance and support for innovative start-ups. Joint efforts may be supported to improve instruments for better financing innovative SMEs, start-up support for creation of new jobs; internationalisation, access to new markets. Consider innovative ways of financing (e.g. better coordination of national, regional and EU funds, crowd funding etc.). A focus may be put on the creative industries, green technologies and environmental industry, and cultural incubators". The same IP also covers an SO to "Increase competences for business and social innovation mentions" and could support for e.g. actions to build up cross-disciplinary networks and joint transnational information and training actions for enhancing future needed job qualifications and competences. **The following indicative examples of action may be financed under the IP6c:** • Improve frameworks and develop joint and integrated solutions for sustainable tourism ("green tourism"), leisure and culture e.g. in the areas of ecotourism (e.g. sustainable tourist activities in national parks and nature reserves, geo-parks), cycle tourism, agro-tourism, development of

OP	Green jobs references
	new and existing Cultural Routes relevant in the Danube Region, theme paths and joint products with a critical mass and embedded in wider development and growth strategies which contribute to sustainable jobs and growth.
OP title: OP Niedersachsen EFRE-ESF 2014-2020 **CCI: 2014DE16M2OP001** **Country: Germany** **Fund: ERDF ESF**	ESF IP references: Under PA 9, IP10iv (p.275), green jobs is mentioned as an example for educational projects on sectors with good future prospects
OP title: ATTICA OP **CCI: 2014GR16M2OP012** **Country: Greece** **Fund: ERDF + ESF**	General sections references: Page 10, Needs analysis for TO8: The adaptation of human resources skills in new areas and economic sectors, such as green economy, as well as professions related to mitigation and adaptation to climate change are among the priorities of the ROP. Page 16, Regional development priority target A includes: the gradual restructuring of the productive base by shifting to high value-added sectors and low environmental impact to create jobs, enhance openness, innovative entrepreneurship and the friendly and intelligent use of ICT. Page 16, Regional development priority target B refers to actions that aim to reap the potential offered by the environment as an emerging economic activity sector.
OP title: (Interreg V-A) IT-SI - Italy-Slovenia **CCI: 2014TC16RFCB036** **Country: Italy-Slovenia** **Fund: ERDF**	General sections references: Chapter 8 Sustainable Development (p.145): the identified cross-cutting issues (ICT, Education, SME, Social Inclusion, Employment) will complete the OPs priorities fostering ICT tools for environmental monitoring and green jobs creation 1.1.1.4 Cooperation Programme Strategy (p.26): find new strategic models and approaches transforming weaknesses into new growth opportunities, investing in green jobs and green economy
OP title: TRANSPORT INFRASTRUCTURE, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT OP **CCI: 2014GR16M1OP001** **Country: Greece** **Fund: ERDF + CF**	• General sections references: Chapter 6 (SPECIFIC NEEDS OF GEOGRAPHICAL AREAS WHICH SUFFER FROM SEVERE AND PERMANENT NATURAL OR DEMOGRAPHIC HANDICAPS) reference to the creation of "green jobs" in individual areas of the environment contributing to the reduction of unemployment and social exclusion, both in urban and suburban areas with high unemployment rates, and in remote mountain areas and small islands. In this context, ch 6 refers to: • PA 14 envisaging actions such as the development green point networks, recycling collection / sorting systems, bio-waste management and processing units of excavation and demolition products, as well as • PA 12 and PA 13 including actions for the conservation, management and restoration of biodiversity, ecosystems and their services and conservation and good management of the Natura 2000 network.
OP title: Southern & Eastern Regional Operational Programme **CCI: 2014IE16RFOP002**	a) General sections references: Chapter 11 (SD) refers to Ireland's Sustainable Development Framework (2012) which identifies the green economy as a central plank to Ireland's economic

OP	Green jobs references
Country: Ireland **Fund: ERDF**	recovery, consistent with the Action Plan for Jobs. It sets out a medium to long term plan to guide the essential work needed to progress the sustainable development agenda and more fully exploit opportunities in the green economy in Ireland. The Irish Government's Action Plan for Jobs (2014) is also referred to in chapter 1 (needs analysis), Section on 'Regional Innovation and Competitiveness and Smart Specialisation': the Green Economy (green jobs and eco-innovation) is among the exporting sectors which have been growing over the last number of years and which offer the potential for significant job creation. b) ERDF IP references: • Investment priority 4(c) will support energy efficiency in the housing sector. The actions to be funded under this priority axis will support the creation of green jobs, for employees working in the labour-intensive retrofitting of existing dwellings. • Investment Priority 3(a), namely to promote entrepreneurship, with a particular emphasis on high-growth and potentially high-growth sectors by facilitating the economic exploitation of new ideas and fostering the creation of new firms. Chapter 11 mentions that support measures included in Priority Axis 3 have the potential to support green jobs and eco innovation.
OP title: ROP Campania ESF **CCI: 2014IT05SFOP020** **Country: Italy** **Fund: ESF**	IPs under TO8, TO9, TO10 encompass support actions related to green jobs: • TO8, will prioritize the high growth potential sectors indicated in the Regional Innovation Strategy (RIS3), such as energy, environment, green chemistry, sustainable constructions. IP8ii in particular will promote: apprenticeships in green areas (eg, technologies for renewable energy, sustainable construction, sustainable transport, waste management, etc.; mobility initiatives for the development of specific skills related to renewable energy production, production of climate-friendly products, waste and water management etc; training of professionals with specific expertise in the management of environmental risks and the green economy; training of professionals with specific expertise in the technologies used in the blue economy; incentives for self-employment in areas such as energy efficiency equipment, low-carbon vehicles, renewable energy, biomass, green chemical industries etc. • TO9: supporting social enterprises to employing people at risk of social exclusion in the green economy field and sustain their competences' enhancement in specific sectors (such as photovoltaic panels installation). • TO10: promotes education and training programmes, addressing the green economy sectors and fostering the development of competences on risk prevention and on the transition towards a low-carbon economy.

OP	Green jobs references
	Moreover indirectly green jobs might be promoted also through: • TO11: the promotion of GPP which will indirectly support jobs in the green economy
OP title: National Operational Programme on Enterprises and Competitiveness **CCI: 2014IT16RFOP003** **Country: Italy** **Fund: ERDF**	IP references: • Energy conservation and greenhouse gas emissions reduction from production processes is integrated through specific interventions in a complementary manner under TO4, TO1 and TO3: TO1 and TO3 support startup or strengthening of productive chains dedicated to the green economy (priority areas may include among other the green economy, eco-innovation, low-carbon economy and promoting the effective use of resources), thus creating green job positions, while TO4 foresees incentive measures to support the implementation of investment programs for energy rationalization in production processes and the construction of high efficiency cogeneration plants and energy production from renewable sources for own consumption, thus creating demand for products offered by green economy companies: • Under IP3b, Action 3.5.1 will 'Support interventions to the birth of new businesses through direct incentives, the provision of services, or through micro-finance. The action will give priority to those new initiatives that have characteristics of innovation in relation to in particular to the introduction of new technology and management solutions. Possibly interventions will cover areas such as the digital economy, the green economy, eco-innovation, new companies operating in the welfare services sector, low-carbon economy and promoting the effective use of resources. • TO4 foresees incentive measures to support the implementation of investment programs for energy rationalization in production processes and the construction of high efficiency cogeneration plants and energy production from renewable sources for own consumption.
OP title: ROP Lazio ERDF **CCI: 2014IT16RFOP010** **Country: Italy** **Fund: ERDF**	Chapter 8 : mentions complementarity scope of actions of this OP to other ESF funded training measures aimed at green jobs that can link up with the APEAs project or the supply of qualified human resources in one of the potential areas for development identified in the context of the S3 (incl green economy).
OP title: Regional OP Veneto **CCI: 2014IT16RFOP021** **Country: Italy** **Fund: ERDF**	Mentioning in Chapter 11of creation of employment in risk prevention and management: strengthening services and employment opportunities in the inland and marginal areas to ensure the presence of the population in those territories whose departure has triggered processes of degradation and instability, exacerbated by climate changes.
OP title: Operational Programme for EU Structural Funds Investments for 2014-2020 **CCI: 2014LT16MAOP001** **Country: Lithuania**	b) ERDF IP references: IP 3d, SO2 '*Increase SME investment in eco-innovation and other resource-efficient technologies*' – investments into eco-innovation and green technologies will contribute to green jobs creation (p.102). c) ESF IP references:

OP	Green jobs references
Fund: ERDF+CF+ESF+YEI	IP 8i, SO3 *'Increase demand for labor by encouraging the population, especially faced with difficulties in the labor market, entrepreneurship'* - when it comes to support for start-ups, the priority will be given to the businesses that support creation of 'green' jobs (p. 249)
OP title: Fostering a competitive and sustainable economy to meet our challenges **CCI: 2014MT16M1OP001** **Country: Malta** **Fund: ERDF+CF**	a) General sections references: Chapter 1/ description of priority axis 5 (Protecting our environment - investing in natural and cultural assets): Investments under this priority axis will be complemented with capacity building interventions financed through the ESF OP with a view to strengthen the knowledge and skills within this sector and to foster the creation of green jobs. Chapter 8 (COORDINATION BETWEEN THE FUNDS): Infrastructural investments and financial support under this programme will also be complemented by measures fostering entrepreneurship at a societal and educational level through the ESF operational programme. Complimentary capacity building interventions to include education, training, knowledge and information are also envisaged to strengthen the understanding and skills in the low carbon economy and to foster the creation of green jobs. b) ERDF IP references: IP6c / SO1 (Improve the urban environment in the Southern Harbour in line with the integrated urban development strategy through the preservation and promotion of cultural/ historical assets in the public domain intended to improve employment opportunities in social deprived areas): "Investment in cultural heritage also aims to focus on the greening of this public infrastructure as a way to interlink historical features with modern technology. Such interventions will not only upgrade the energy performance of buildings and ensure protection of the environment but will also promote the creation of green jobs".
OP title: North West Europe **CCI: 2014TC16RFTN006** **Country: France (lead), Belgium, Germany, Ireland, Luxembourg, Netherlands, United Kingdom, Switzerland** **Fund: ERDF**	The OP includes output indicator 'Number of jobs maintained in all economic sectors' for environment-related investment priorities and SOs: • IP4e - SO: To facilitate the implementation of low-carbon, energy and climate protection strategies to reduce GHG emissions in NWE, • IP4f - SO: To facilitate the uptake of low carbon technologies, products, processes and services in sectors with high energy saving potential, to reduce GHG emissions in NWE • IP6f – SO: To optimise (re)use of material and natural resources in NWE, • P7c – SO: To facilitate the implementation of transnational low-carbon solutions in transport systems to reduce GHG emissions in NWE The source of data for this indicator will be own registration based on information from beneficiaries and will be reported annually.
OP title: Regional OP for Łódzkie Voivodeship 2014-2020	<u>General sections references:</u>

OP	Green jobs references
CCI: 2014PL16M2OP005 **Country: Poland** **Fund: ERDF/ESF**	Chapter 11,p. 566: Strengthening the implementation of the principle of SD by rewarding projects that take into account: - "Green jobs" in the context of, among others, PA 8; ESF IP references: IP 8i (p. 317): In addition, it is assumed the possibility of introducing a preference for projects aimed at creating jobs in the "White sector" and the "silver economy" and "green economy" (in line with the Communication Commission "initiative for green jobs' of 02 July 2014.). The OP's MA will carry out the analysis that aims to identify the need for support for the creation of "white" and "green" jobs. The results of this analysis will be taken into account in the formulation of criteria for project selection.

Appendix L References to circular economy in reviewed OPs (2014-2020)

OP	References to circular economy
OP title: OP Brussels Capital Region **CCI: 2014BE16RFOP001** **Country: Belgium** **Fund: ERDF**	• Priority Axis 3 is dedicated to "Supporting the Development of a circular economy and the sustainable use of resource in the supported sectors" • Priority axis 1 (TO1): Strengthening research and improving the transfer and emergence of innovation, as well as Priority axis 2 (TO3): Strengthening entrepreneurship and improving the development of SMEs in supply chains will both concentrate on the three sectors of: Resources and waste, Sustainable food and Horeca, Sustainable construction and renewable energies.
OP title: Transport and Infrastructure **CCI: 2014BG16M1OP001** **Country: Bulgaria** **Fund: ERDF/CF**	Chapter 11 on the horizontal principle on sustainable development, p. 139: the OP will follow and take into account the general requirements for savings, recycling, replacement by alternatives, reducing the volume of materials and proper assessment of natural resources.
OP title: Environment **CCI: 2014CZ16M1OP002** **Country: Czech Republic** **Fund: ERDF/CF**	OP focus on resource efficiency
OP title: Prague – Growth Pole **CCI: 2014CZ16M2OP001** **Country: Czech Republic** **Fund: ERDF/ESF**	No mentioning of green jobs, but according to Chapter 11, PA4 on Training and Education supports environmental education and raising awareness (no mentioning of it in actions supported by IPs).
OP title: Operational Programme Transport 2014-2020 **CCI: 2014CZ16M1OP001** **Country: Czech Republic** **Fund: ERDF / CF**	SD chapter makes reference to the main principles of sustainable development set out in Czech Republic's Strategic Framework for Sustainable Development that will also be reflected in OPD including […] the efficient management of resources.
OP title: Danube Transnational Programme **CCI: 2014TC16M6TN001** **Country: Hungary (lead), Austria, Bulgaria, Croatia, Czech Republic, Germany, Romania, Slovakia, Slovenia + Bosnia and Herzegovina, Moldova, Montenegro, Norway, Russia** **Fund: ERDF(+IPA(e)+ENI)**	<u>Chapter 8.1 on SD</u> No reference to circular economy, but: • At the operational level the selection of investment-related projects in view of highest resource efficiency and sustainability should be considered during programme implementation (if applicable) • Aspects to be considered in project selection include to efficient water and waste management, energy efficiency. <u>Chapter 2:</u> • IP1b indicative actions to include: Support collaborative research & innovation activities and competent networks between enterprises, R&D centres, technology information centres, education and higher education, the public sector and the users to further develop innovative environmental technologies and common resource efficiency standards and benchmarks including energy efficiency technologies and cross-border water management and to enhance the commercial use of research results. • IP6c indicative actions to include: Strive for the reduction of energy consumption and CO2 emissions and resources

OP	References to circular economy
	consumption (e.g. water) through increased use of renewable energy sources and energy and resource efficiency measures as an integrated aspect of sustainable tourism development.
OP title: OP Nordrhein-Westfalen EFRE 2014-2020 **CCI: 2014DE16RFOP009** **Country: Germany** **Fund: ERDF**	- The promotion of a circular economy and res is a horizontal principle (p.190) - IP3d, ID04, p.59: Under the first measure under this specific objective, improved resource efficiency shall lead to new and improved value creation for SMEs. Therefore SMEs shall receive support for a) counselling on resource efficiency, b) modernising and innovating investments for resource efficiency, and c) network activities for the promotion of resource efficiency
OP title: OP Niedersachsen EFRE-ESF 2014-2020 **CCI: 2014DE16M2OP001** **Country: Germany** **Fund: ERDF ESF**	PA3, IP4b: scientific research on resource and energy efficiency shall develop and implement concepts for recycling and resource efficiency of e-waste. Further, a competence centre shall be developed that demonstrates current practices and provides counselling for enterprises. In addition, a market for second-hand resources shall be developed for small and micro enterprises. PA4, IP6e: the revitalising of used/ polluted/ contaminated sites shall reduce the need for the building of new sites (and thus the use of additional material)
OP title: ATTICA OP **CCI: 2014GR16M2OP012** **Country: Greece** **Fund: ERDF + ESF**	Needs Analysis section 1.6, page 7,: Reference to resource efficiency in needs analysis under TO6 in relation to actions for the promotion of recycling operations and public awareness, sorting at source the biodegradable fraction of waste in order to produce good quality compost for possible energy utilization, and promoting measures for waste prevention and reuse, etc. according to the requirements of Directive 2008/98 / EC. Page 152-153: IP 6a (Investing in the waste sector to meet the requirements of the Union's environmental acquis and to address needs, identified by the Member States, for investment thatgoes beyond those requirements) foresees for example actions for the development of a recycling collection point ("Green Point") network, the promotion of biowaste management units, reuse of treated waste water in new or existing wastewater treatment plants with emphasis on urban and peri-urban use.
OP title: Andalucia **CCI: 2014ES16RFOP003** **Country: Spain** **Fund: ERDF**	OP focus on resource efficiency: waste, water, etc.
OP title: País Vasco ERDF 2014-20 OP **CCI: 2014ES16RFOP021** **Country: Spain** **Fund: ERDF**	IP 6g (p.125): Supporting industrial transition towards a resource-efficient economy, promoting green growth, eco-innovation and environmental performance management in the public and private sector. Actions: development and technological demonstration projects, application of more efficient techniques and processes and management systems IP 4c- Supporting energy efficiency and smart energy management (Improvement of the energy efficiency in building and public services infrastructures)
OP title: Sustainable Growth **CCI: 2014ES16RFOP002** **Country: Spain** **Fund: ERDF**	p.31, TO6: Preserving and protecting the environment and promoting resource efficiency, 31% of financial support (IP 6b water quality).
OP title: Alpine Space **CCI: 2014TC16RFTN001** **Country: Austria, Czech Republic,**	PA3, TO 06 - Preserving and protecting the environment and promoting resource efficiency

OP	References to circular economy
Germany, France, Italy, Liechtenstein, Slovenia **Fund: ERDF**	
OP title: Interreg V-A Slovenia - Hungary **CCI: 2014TC16RFCB053** **Country: Slovenia - Hungary** **Fund: ERDF**	Chapter 8, p. 86: Projects' assessment, selection, implementation, monitoring and evaluation will be guided by the following principle: selection of investment related projects in view of highest resource efficiency and sustainability, and promoting usage of green technologies.
OP title: TRANSPORT INFRASTRUCTURE, ENVIRONMENT AND SUSTAINABLE DEVELOPMENT OP **CCI: 2014GR16M1OP001** **Country: Greece** **Fund: ERDF + CF**	The term "circular economy" is not used. However there are several references to resource efficiency and recycling/reuse: • Chapter 6 (SPECIFIC NEEDS OF GEOGRAPHICAL AREAS WHICH SUFFER FROM SEVERE AND PERMANENT NATURAL OR DEMOGRAPHIC HANDICAPS) underlines that Environmental OP interventions relate to improving the efficiency of limited natural resources of the islands. • PA 14 is dedicated to "Preservation and Protection of the Environment, promotion of resource efficiency". Envisaged actions cover investments in the waste and water sectors and include for example the development of green point networks, recycling collection / sorting systems, bio-waste management and processing units of excavation and demolition products. For example SO26 concerns "Waste prevention, preparation for reuse, waste separation, collection and recycling, including composting" and SO27 concerns "Improving the effectiveness of the integrated waste management". In the water sector SO 30, 31 include as expected results the contribution of operations on water use efficiency. • PA 12 and PA 13 that are both dedicated to Actions for the promotion of integration of European Environmental acquis, cover investments in the water sector, where the project selection criteria will take into account the contribution of operations on water use efficiency
OP title: Southern & Eastern Regional Operational Programme **CCI: 2014IE16RFOP002** **Country: Ireland** **Fund: ERDF**	• Resource efficiency is mentioned in the context of building energy efficiency/retrofit actions under IP 4c, and the discussion on the potential use of financial instruments • Resource efficiency is also mentioned in the context of actions to be supported under IP 6e (e.g. green regeneration, rehabilitation of brownfield sites and rehabilitation/ development of cultural infrastructure/ assets), which can provide new uses for existing vacant buildings and under-utilised open spaces.
OP title: National Operational Programme on Enterprises and Competitiveness **CCI: 2014IT16RFOP003** **Country: Italy** **Fund: ERDF**	Energy conservation and greenhouse gas emissions reduction from production processes is integrated through specific interventions in a complementary manner under TO4, TO1 and TO3: TO1 and TO3 support startup or strengthening of productive chains dedicated to the green economy (priority areas may include among other the green economy, eco-innovation, low-carbon economy and promoting the effective use of resources), while TO4 foresees incentive measures to support the implementation of investment programs for energy rationalization in production processes and the construction of high efficiency cogeneration plants and energy production from renewable sources for own consumption. • Chapter 1.1.1 (programme strategy): the OP aims to contribute to increasing the relative weight of the manufacturing sector in the European GDP from 15.6% in 2011 to 20% in 2020, through supporting a process of competitive repositioning of the production system of the South, reversing downsizing and disinvestment and enhancing at the same time the market opportunities for the related industrial chain through the efficient use of energy resources by strengthening the infrastructure for the transmission and distribution of energy and innovations related to them (smart grids). • Under IP3b, SO 'Birth and consolidation of micro, small and

OP	References to circular economy
	medium enterprises', Action 3.5.1 will 'Support interventions to the birth of new businesses through direct incentives, the provision of services, or through micro-finance'. The action will give priority to those new initiatives that have characteristics of innovation in relation to in particular to the introduction of new technology and management solutions. Possibly interventions will cover areas such as the digital economy, the green economy, eco-innovation, new companies operating in the welfare services sector, low-carbon economy and promoting the effective use of resources. • IP4: in relation to energy resources (smart grids, RES) • Technical assistance: capacity building activities and special technical assistance related to the planning, design, implementation, monitoring and reporting of specific actions with particular reference to those relating to sustainable development, efficient use of resources and the reduction of greenhouse gas emissions.
OP title: ROP Lazio ERDF **CCI: 2014IT16RFOP010** **Country: Italy** **Fund: ERDF**	Chapter 11: In the context of PA4, the expected results are aimed primarily at reducing energy consumption in buildings and public facilities, the reduction of emissions of greenhouse gases from businesses and production systems and the increase in the use of renewable sources, the increase of sustainable mobility in urban areas. PA1 actions will also cover research in materials, mechanical and ICT that will allow to open new production developments with diverse use of raw materials and reuse of waste and waste materials. PA 3 will cover interventions aimed at reducing greenhouse gas emissions, the development of high-efficiency technologies, the affirmation of the principles of circularly economy. Chapter 1 - on PA3 (competitiveness): The Program supports investment in APEAs, with the aim of ensuring that energy production and consumption, consumption of raw materials, production and management of production residue is integrated in an industrial development that uses the waste of an industrial production process as input for other processes. Experts have described the basic concept referring to the so-called "industrial ecosystem", in which "the consumption of energy and materials is optimized, and the effluent of a process can serve as raw materials for another process." It is intended, therefore, to replicate the multiple experiences oriented to an overall view of the flows of energy materials that are potentially tradable under more or less concentrated industrial complexes. It is a particularly useful approach both in the case of restructuring existing industrial sites, often linked to urban areas in decline, as well as a planning tool for new industrial parks. Borrowing and expanding the life cycle assessment methodologies and logical programming of the industrial districts, the planned interventions start from the assumption of extending the concept of supply chain, extending it to the entire life cycle of products as it is not enough to separate and give correctly but you also need to plan and operationalize all subsequent steps leading to the transformation of waste into resource. Very strong implications that this entails rather than expanding advanced capabilities for development of products and services and in terms of efficient use of resources (see correlation with the actions proposed in the TO4 in relation to APEAs). Chapter 1 – PA 4 (sustainable energy and mobility): Decoupling between economic growth on the one hand, and environmental impact and exploitation of resources on the other, through the introduction and dissemination of technologies for energy system decarbonisation; Also aims to encourage energy sustainability of APEAs, activating, within the previously described model (PA3). The achievement of energy efficiency targets is integrated in the development of materials, construction techniques, equipment and sustainable technologies in the various green economy productive sectors. IP3b – PA3 - SO3.1 " Consolidation, modernization and diversification of local productive systems": To increase the sustainability in the production system, the region has sought to focus its efforts in the reconversion of Ecologically Equipped Productive Areas (APEA), to promote investment and introduction of eco-innovations and eco-friendly certified processes (introduction of effective environment managing system, adoption and use of pollution-prevention technologies, integration of clean technologies into production). A definition recently proposed by Lombardi & Layburn identifies the industrial symbiosis as the involvement of traditionally separate industries and other

OP	References to circular economy
	organizations in a network to promote innovative strategies for a more sustainable use of resources (including the effective and efficient management of materials, energy, water, resources, expertise, logistics). APEAs fall within the framework of a regional strategy for the sustainability of productive activities, which is based almost exclusively on the promotion of eco-innovative investments in the best available technologies according to the most recent guidelines of the circular economy.
OP title: Operational Programme for EU Structural Funds Investments for 2014-2020 **CCI: 2014LT16MAOP001** **Country: Lithuania** **Fund: ERDF+CF+ESF+YEI**	Chapter 1, p.4, growth based on resource efficiency/sustainable use of resources. TO6 aims to significantly increase the sorted and recyclable municipal waste fraction, properly clean surface water, as well as to increase the proportion of the population covered by wastewater treatment and publicly supplied drinking water (p.4). IP 3d, (p. 105): investment in cleaner production innovations and eco-innovation PA5 (p. 158) 'Sustainable use of resources and climate change adaptation' Chapter 11 (p. 530), the focus on GPP will promote the sustainable use of natural resources, products, secondary use and recycling, greater use of renewable, environmental technology development in industry, increased environmentally friendly goods and services.
OP title: Fostering a competitive and sustainable economy to meet our challenges **CCI: 2014MT16M1OP001** **Country: Malta** **Fund: ERDF+CF**	Chapter 1 • Chapter 1 description of Priority Axis 1 (Investing in research, technological development and innovation) mentions that "this Axis will be complemented inter-alia with initiatives financed through ESF whereby the training of researchers, the development of post-graduate courses, and scholarships at postgraduate, doctoral and post doctoral level will be supported. […] Such measures will also be contributing towards the Resource Efficient Europe initiative, under Sustainable Growth, through the promotion of technologies that favour the shift to low-carbon and facilities-supporting research related to resource-efficiency and climate change". • Chapter 1 description of Priority Axis 4 'Shifting towards a low-carbon economy' highlights the importance of the need to exploit natural resources in a sustainable manner and notes that Malta will take measures which are in line with the national strategies such as the National Renewable Energy Action Plan and the National Energy Efficiency Action Plan and which aim to address the priorities of the Flagship Initiatives: 'A resource-efficient Europe' and 'An integrated industrial policy for the globalisation era'. Measures under this priority axis will aim to increase the share of renewable energy sources, enhance energy savings and promote energy efficiency systems and buildings, while infrastructural investment undertaken through this Programme will seek to maximise the use of renewable energy and energy efficiency in all interventions co-financed. • Chapter 1 description of Priority Axis 10 'Investing in a more environmentally-friendly society' puts particular emphasis on the need to address significant national challenges such as waste minimisation and disposal, water scarcity and the shift towards a more resource efficient economy… Pursued interventions are aimed to reduce the amount of waste, increase recycling and waste to energy options. Apart from the sustainability of the waste sector, efforts will also be targeted towards enhancing the sustainability of water management (water conservation, efficiency, quality) • Chapter 11: Within the context of sustainable development, the Operational Programme envisages various initiatives in terms of the sustainable use of water including through measures which promote amongst others water conservation, wastewater recycling and, rainwater harvesting. In this regard, at project application stage, prospective applicants are encouraged to include water conservation measures as

OP	References to circular economy
	part of the project proposals. Chapter 2: • PA1 IP1a /SO1 (SO 1 - Stimulating participation in R&D&I through the development of the necessary public infrastructure in line with the Smart Specialisation Strategy.): Government will also support investments in environmentally-friendly showcase infrastructure regarding resource efficient buildings, which will act as a live laboratory for climate change related research and indigenous research in the building environment industry. • PA3 – IP3d: in an effort to enhance the growth and development of SMEs, Government will provide assistance in the form of financial incentives, with the scope of enhancing the operations of SMEs and enable SMEs to invest in areas such as: environment, quality certification, resource efficiency and tourism product development (including niche tourism), amongst others. • PA4: IP4b /SO2 will promote the use of RES and EE within the commercial and industrial sectors through financial incentives and financial instruments. IP4c/ SO3 will promote the use of RES and EE within public property as well as EE in housing through financial incentives. • PA6 (Sustainable Urban Development) – IP9b, foresees as possible interventions the development of public spaces or the regeneration and upgrade of public social housing infrastructure that will seek to maximise resource efficiency, in particular water and energy efficiency measures, as well as energy generation through renewable sources. • PA10 (Investing in a more environmentally-friendly society) IP6i, SO1 The expected results of this investment priority are to increase the amount of recycled waste, to reduce waste going to landfill through waste to energy measures and to rehabilitate contaminated land to be used for non waste related purposes.
OP title: North West Europe **CCI: 2014TC16RFTN006** **Country: France (lead), Belgium, Germany, Ireland, Luxembourg, Netherlands, United Kingdom, Switzerland** **Fund: ERDF**	The OP includes clear references to 'circular economy'. Overview of references: • Challenge 3 of the strategy is on 'Resource and materials efficiency', (chapter 1) • PA3 is dedicated to 'Resource and materials efficiency' (chapter 1) • Under PA3, IP6f/SO5 aims "To optimise (re)use of material and natural resources in NWE". The Programme aims to accelerate the transition of the NWE economy to a circular model (3Rs - Reduce, Reuse, Recycle) by enabling spill-over effects of eco-innovation in resource intensive industrial sectors. (chapter 2) • The result indicator for UP6f/SO5 is "The status of the competences in the resource-intensive sectors in NWE for eco-innovation diffusion".
OP title: Digital Poland **CCI: 2014PL16RFOP002** **Country: Poland** **Fund: ERDF**	Chapter 11, p.135 : resource efficiency (e.g. by restricting the circulation of the traditional letters and documents
OP title: Infrastructure and Environment **CCI: 2014PL16M1OP001** **Country: Poland** **Fund: ERDF/CF**	Focus on resource efficiency u nder TO6
OP title: Regional OP for Łódzkie Voivodeship 2014-2020 **CCI: 2014PL16M2OP005** **Country: Poland**	PA5 'Environmental Protection' (p.200): Increasing the effectiveness of the use of Natural Resources (Priority: the behavior to achieve resource efficiency, reduce the pressure on the Environment), which is consistent with the Priority II Europe 2020 Strategy. Sustainable development: support of resource-efficient, greener and more competitive economy.

OP	References to circular economy
Fund: ERDF/ESF	PA6 'Revitalisation and endogenous potential of the region' (p.237): Measures implemented under the PA will contribute to the achievement of specific objectives to increase resource efficiency (natural and cultural) as well as their behaviour, the more efficient use of resources in the labour market, reducing the risk of social exclusion due to disparities in access to public services, the inclusion of communities living in peripheral areas and degraded.
OP title: ROP Malopolskie **CCI: n.a.** **Country: Poland** **Fund: ERDF/ESF**	PA4 and PA5 are focused on resource efficiency: energy efficiency, water and waste management (p.246).

Appendix M Case fiches

This appendix contains the fiches developed for the 15 selected cases:

1. RENOVATION OF THE WATER SUPPLY SYSTEMS IN KOHTLA-JÄRVE AREA, ESTONIA

2. RENOVATION & CONSTRUCTION OF THE SEWERAGE SYSTEM IN BRNO, CZECH REPUBLIC

3. WASTE-TO-ENERGY PLANT – KRAKÓW, POLAND

4. PLASTICS CLUSTER, LOWER AUSTRIA CLUSTERS PROGRAMME, AUSTRIA

5. ECONNECT - IMPROVING ECOLOGICAL CONNECTIVITY IN THE ALPS. AUSTRIA, GERMANY, FRANCE, ITALY, LIECHTENSTEIN, SWITZERLAND

6. MANAGEMENT OF NATURA 2000 SITES IN ANDALUSIA, SPAIN

7. SUSTAINABLE URBAN FRINGES (SURF) PROJECT (BELGIUM, GERMANY, NETHERLANDS, SWEDEN, UNITED KINGDOM)

8. REMEDIATION OF THE CONTAMINATED SITE OF THE FORMER AB SKAITEKS FACTORY, VILNIUS CITY, LITHUANIA

9. REHABILITATION OF THE FORMER 'GASOMETER' AREA IN THE CITY OF VERONA - PHASE 3 (ITALY)

10. CONSTRUCTION OF MINI ECOLOGICAL SAILING DOCKS - GREAT MASURIAN LAKES, POLAND

11. ENERGY AND INNOVATION TRAINING PROGRAMME IN THE REGION OF SOUTH DENMARK

12. KARWICE WIND FARM CONSTRUCTION - WEST POMERANIAN VOIVODSHIP, POLAND

13. CLYDE GATEWAY SUSTAINABLE TRANSPORT PROJECT, UNITED KINGDOM

14. KINDERGARDEN IN KERATEA THAT INTEGRATES GEOTHERMAL ENERGY- EAST ATTICA, GREECE

15. FLOODCOM - POSITIVE WATER MANAGEMENT IN LOWLAND AREAS FACING CLIMATE CHANGE (BELGIUM, FRANCE, NETHERLANDS, UNITED KINGDOM)

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