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Part II

COMMISSION STAFF WORKING PAPER

IMPACT ASSESSMENT - Part II: Annexes

Accompanying the document

**Proposal for a
REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
on specific provisions concerning the European Regional Development Fund and the
Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006**

and

**Proposal for a
REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
on the Cohesion Fund and repealing Council Regulation (EC) No 1084/2006**

and

**Proposal for a
REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
on specific provisions for the support from the European Regional Development Fund to
the European territorial cooperation goal**

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ANNEX 1 - List of Abbreviations

CF – Cohesion fund
CGE - Computable General Equilibrium [model]
CIP - Competitiveness and Innovation Framework Programme
CSF - Cohesion and Structural Funds
EAFRD - European Agricultural Fund for Rural Development
EFF - European Fisheries Fund
EIB – European Investment Bank
ENP - European Neighbourhood Policy
ENPI - European Neighbourhood and Partnership Instrument
ERDF - European Regional Development Fund
ERTMS - European Rail Traffic Management System
ESF - European Social Fund
ETC - European Territorial Cooperation
ETS - European Trading Scheme
EU – European Union
EU-10 – The ten Member States that joined the European Union on 1st May 2004
EU-12 – Members States of the European Union that have joined the EU since 1st May 2004
EU-15 – Member States of the European Union before 1st May 2004
EU-27 - Members States of the European Union that have joined the EU since 1st January 2007
GDP – Gross Domestic Product
GMR - Geographic macro and regional modeling
GTAP - Global Trade Analysis Project
IA – Impact Assessment
IAB - Impact Assessment Board
IASG - Impact Assessment Steering Group
ICT - Information and Communication Technologies
INTERREG - Interregional Co-operation Programme
IPA - Instrument for Pre-Accession Assistance
MFF – Multiannual Financial Framework
MS – Member State
OECD - Organisation for Economic Co-operation and Development
R&D – Research and Development
RCE - Regional Competitiveness and Employment Objective

RTD - Research and Technological Development

RTDI - Research, Technological Development and Innovation

SMEs – Small and Medium Enterprises

TEN-E - Trans-European Energy Network

TEN-T - Trans-European Transport Network

TFEU - Treaty on the Functioning of the European Union

ANNEX 2 - Summary of evaluations, reports, studies and policy documents

1. EVALUATIONS

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3. POLICY DOCUMENTS

Results of the public consultation on the conclusions of the fifth report on economic, social and territorial cohesion Brussels, Commission Staff Working Paper, SEC(2011) 590 final, 13.5.2011

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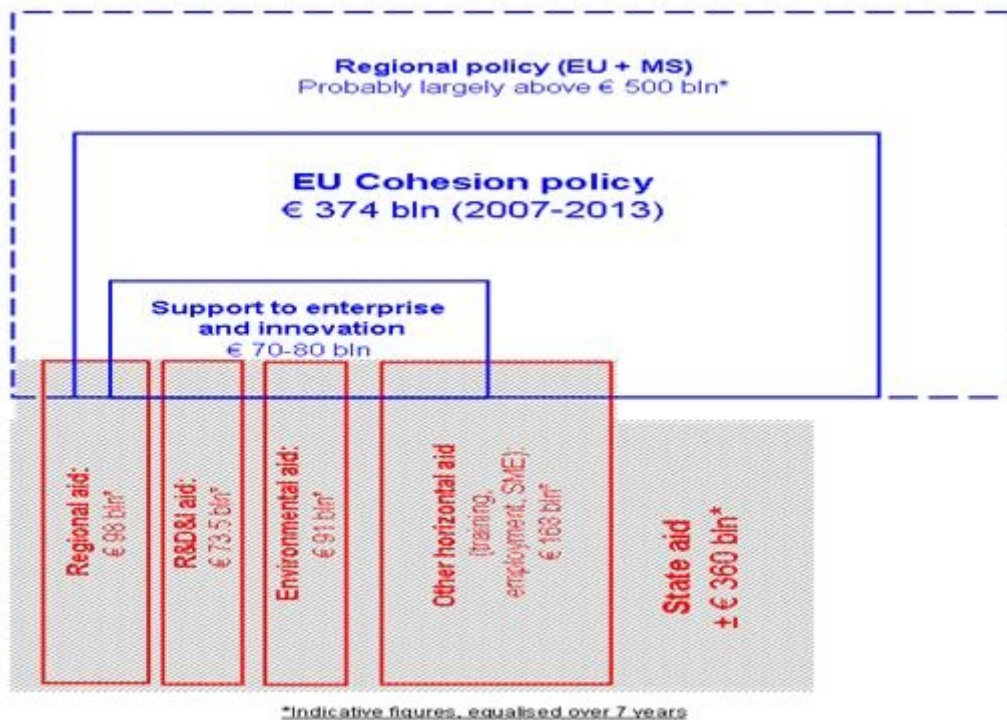
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ANNEX 3 – Regional state aid

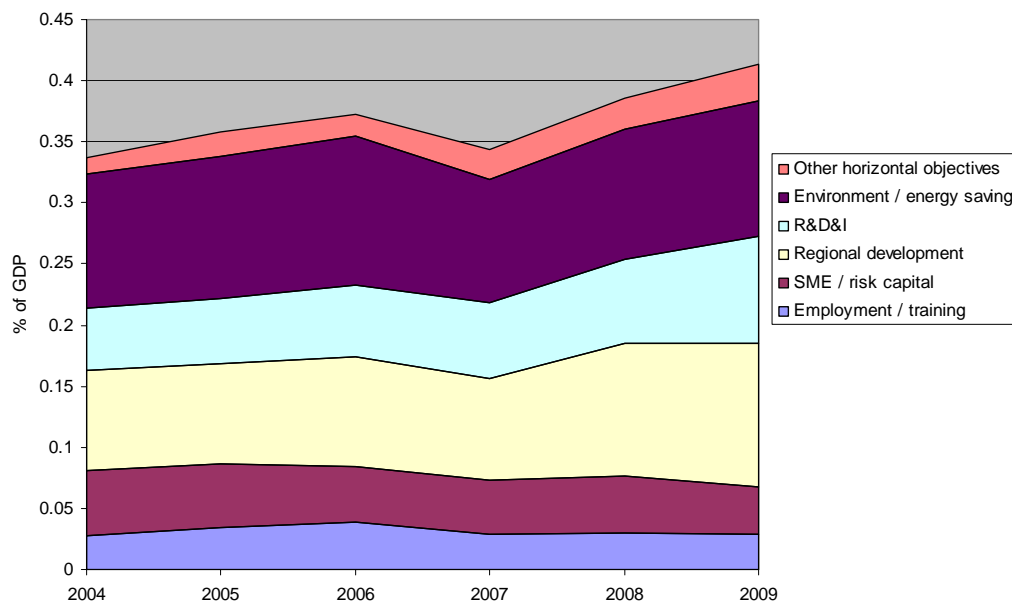


Scoreboard on Regional aid

Between 2007 and 2009, €7.5 billion has been disbursed in regional aid. Of this amount:

- 90 measures represent 90% of regional aid granted over the period 2007-2009 (€33.5 billion)
- 95,1% is granted under multi-sectorial schemes.
- 33% granted to outermost regions (€1.5 bn)

State aid for horizontal objectives as % of GDP, EU-27, 2004-2009 (crisis measures excluded), Source: DG COMP



ANNEX 4 - Transport and Cohesion Policy

As shown by several studies¹, the provision of *public infrastructure* has a potentially positive impact on productivity and growth.² The positive impact of infrastructure on economic growth is due to lower costs of transport and thus lower costs of intermediate goods, but also due to efficiency-promoting positive externalities, which are particularly strong in countries where infrastructure endowment is poor. Due to market failure, investment in infrastructure is below optimal levels without public involvement. An additional rationale for public investment in infrastructure, in particular into environmental infrastructure for water, waste water and waste, is the need to comply with EU directives.

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Cohesion Policy has already significantly contributed to investment in infrastructure. However, assessments of transport infrastructure endowment of Member States and regions show that large variations within the EU persist, with low endowments which can act as inhibitors of economic growth particularly in some Central and Eastern European regions and Member States.³ In addition, in relation to compliance with EU directives, gaps in particular in the areas of waste management, waste water collection and treatment and water management were very high.⁴ At the same time, some Member States and regions lack the public finding to invest in such infrastructure, and private financing is not able to raise the necessary funds. This constitutes the need for further intervention at EU level.

Trans-European transport network (TEN-T) policy aims at providing the infrastructure needed for the internal market to function smoothly and for the objectives of the Lisbon Agenda on growth and jobs to be achieved. It sets out to help ensure accessibility and boost economic and social and territorial cohesion. The Trans-European Transport Network policy has undergone several changes over the past decade, including being extended as a result of enlargement.

The €400 billion invested so far in a network that was established by Decision of the European Parliament and the Council in 1996, and last amended in 2004⁵, has helped to complete a large number of projects of common interest, interconnecting national networks and overcoming technological barriers across national borders. Almost a third of the amount invested so far has come from Community sources⁶. Positive changes resulting from the

¹ See for instance Aschauer, 1989, Fernald, 1999, Kamps, 2006.

² Nevertheless it is not always sufficient for enhancing competitiveness sustainable economic development. The return on investment in infrastructure can vary significantly from one region to the other; the outcome of such investment on performance is not trivial and generally depends on capacity to exploit and further develop its own comparative advantage. (see e.g. Egert *et al.* 2009, Crescenzi & Rodriguez-Pose, 2009).

³ 5th Report on Economic, Social and Territorial Cohesion

⁴ DG ENV analysis.

⁵ Decision No 1692/96/EC of the European Parliament and of the Council on Community guidelines for the development of the trans-European Transport Network, as last amended by Decision No 884/2004/EC of 29 April 2004.

⁶ Grants from the TEN-T budget, the Cohesion Fund and the European Regional Development Fund, plus loans from the European Investment Bank.

implementation of TEN-T policy are already visible. National rail and road networks have become interconnected at many points and railways across borders are beginning to become interoperable.

The impact on Transport Policy on cohesion

Transport is a complex system that depends on multiple factors, including the pattern of human settlements and consumption, the organisation of production and businesses. It is a crucial component for accessibility to goods, services and jobs and has an impact on the economic performance of regions, its environment and the well-being and welfare of individuals and regions.

Transport infrastructure is an important driver of regional development. An efficient transport network is essential for sustained economic growth as well as territorial balance. Efficient transport infrastructure is therefore a necessary base condition for linking regions to the single market and achieving economic, environmental and social cohesion.

The problems of economic development faced by lagging regions stem from having inadequate transport systems and poor links with other regions in the countries concerned and in other parts of the EU. It is not a coincidence that most convergence regions in the EU15 are located on the periphery of the EU or at old borders, away from the national and the old as well as the new EU centres of economic activity. The transport problems in the EU10 countries have been even more pressing. They consist of gaps in major infrastructure and in a poor state of existing road and rail infrastructure as well as a lack in multimodal transport. Evaluations show that cross border investments in infrastructure and TEN-T contribute significantly to enhancing growth⁷, which addresses a major bottleneck for growth and a major source of disparities in the EU.

At the same time, there has been a growing concern over the past decade to reduce the pollution and emissions from transport and to save energy. This has led to an increasing need to shift between modes of transport, in particular, from road to rail and, where possible, to shipping or waterways and their intermodal connections.

A high quality transport system affects economic, social and territorial cohesion in various ways. It increases the accessibility of regions and the ability of businesses there to compete effectively in internal and external markets.⁸

⁷ European Commission (2007); Ex ante evaluation of TEN-T multiannual programme. DG MOVE.

⁸ European Commission (2010) "Ex-post evaluation of Cohesion Policy programmes 2000-2006 co-financed by the ERDF (Objective 1&2)" Synthesis report.

Complementarities of Transport Policy to Cohesion Policy

A high quality transport system affects economic, social and territorial cohesion in various ways. It increases the accessibility of regions and the ability of businesses there to compete effectively in internal and external markets.⁹

Large variations in infrastructure within the EU persist, and in some cases particularly low endowments can act as inhibitors of economic growth.¹⁰ European intervention is justified because of a lack of public and private funding capacities, reflecting the wide differences in GNI levels of Member States. Cohesion Policy supports infrastructure investments including TEN-Ts in regions that are lagging behind, especially in the new Member States. In the current period Cohesion Policy supports investments in lagging Member States and regions with 37.7 bn EUR. It is the largest contributor to TEN-T finance among the European policies and contributes to a large part to the public investments in lagging Member States and regions. The Cohesion Policy support adds another crucial element to finance in these Member States and regions by building governance structures, institutions and capacities for planning and managing the highly demanding TEN-T projects.

The TEN T network provides European connections between the hubs and larger urban areas to strengthen polycentric development. Yet it is also important to secure more fine tuned, secondary networks and linking smaller cities and towns to the TEN T hubs and corridors in order to create functional areas which contribute to the economic, social and environmental development of regions. Typically, infrastructure investments need to be accompanied by investments in regional business environment and human capital in order to enable regions to fully reap its benefits. Cohesion Policy can establish through its programming such an integrated approach in all EU regions.

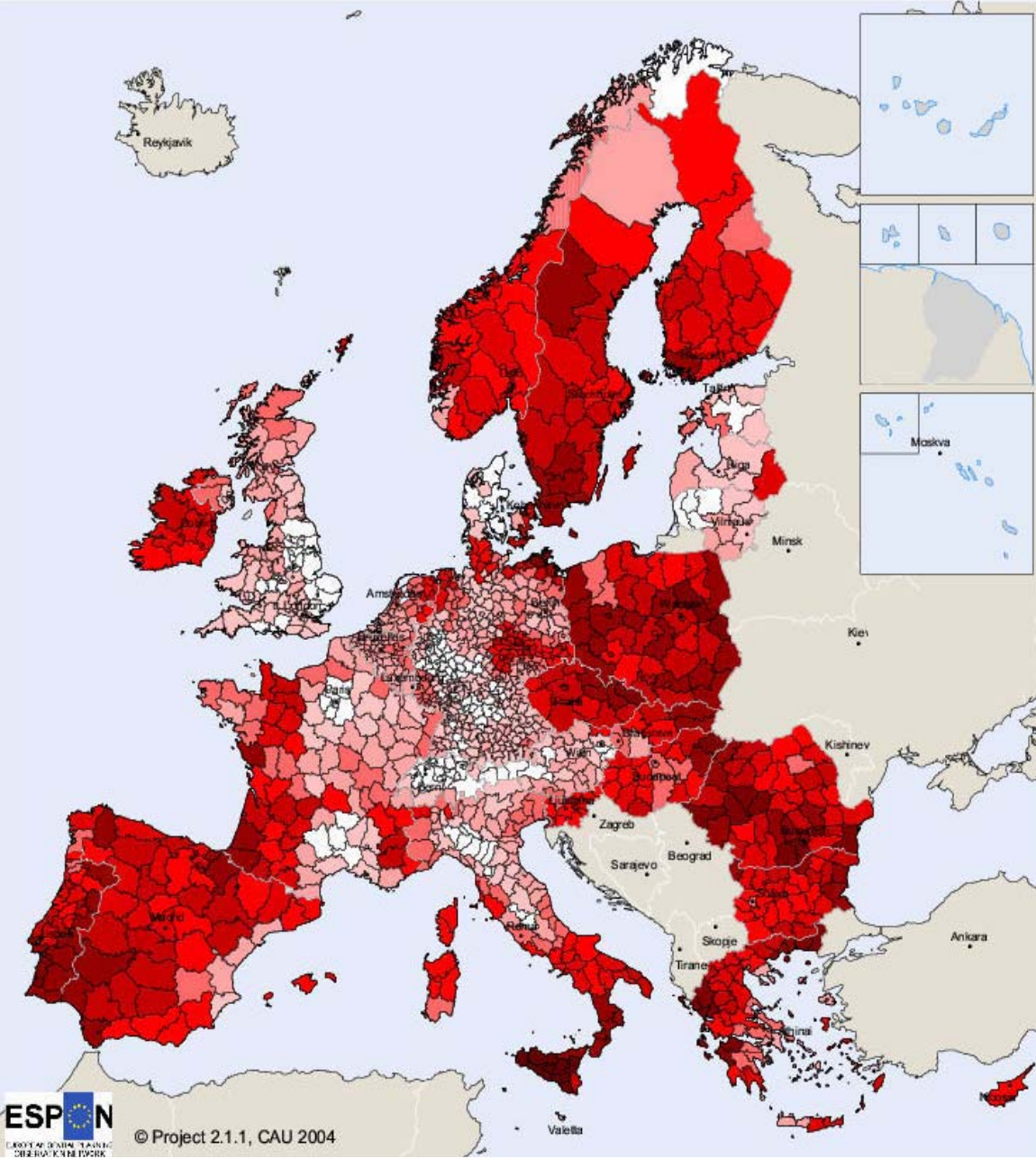
Urbanisation and urban sprawl is a main challenge for transport policy, urban transport accounts for 40% of CO₂ emissions arising from road transport.¹¹ The general congestion problems in urban areas as well as seeking more sustainable forms of transport have given rise to a need in cities to expand the public transport system in order to reduce the traffic on urban roads. Co-modality in urban passenger transport has contributed to sustainable transport pattern and more liveable cities. Developing efficient transport systems in metropolitan areas has become an increasingly complex task which has required better governance, coordination and exchange of good practices.

⁹ European Commission (2010) "Ex-post evaluation of Cohesion Policy programmes 2000-2006 co-financed by the ERDF (Objective 1&2)" Synthesis report.

¹⁰ Chapter 1 of the 5th Cohesion Report.

¹¹ European Commission. COM (2009) 279 Communication on Sustainable future for transport.

**Impact on regional development of Transport policies application
(measured in % change of GDP, 2000)**



(The darker the colour the higher the impact)

ANNEX 5 - Summary of ex-post evaluations on enterprise support and RDI

Summary - Ex post evaluation of Cohesion Policy programmes 2000-2006 financed by the European Regional Development Fund Work Package 6b: Enterprise and innovation¹²

This evaluation reviewed enterprise and innovation support in each EU member country – in both national and cohesion policy.

Main findings:

- SMEs were the main beneficiaries of ERDF support to enterprise, receiving 83% of the funding available for this area of investment. This is in line with national priorities given that enterprise policy focuses on SMEs in almost all EU countries.
- Direct instruments (i.e. financial support, mostly grants but also loans and equity) are still the mainstay of support to enterprise and innovation (69% of total spend).
- Emerging trends towards broader strategies with (i) a greater emphasis on innovation and (ii) a greater palette of instruments, including indirect, non-financial support (such as business services and clusters).

Member State and EU overview

A survey of the most recent activities in 25 of the EU Member States has been undertaken. The survey covers relevant policy developments, incentive schemes and framework improvements over the period 2000-2006, using both national and Structural Fund sources.

Main policy trends - National public support for enterprise and innovation

Productivity, competitiveness, economic growth and employment

The overarching national objective for supporting enterprises has been to increase productivity and competitiveness in order to secure economic growth and ultimately sustained or improved employment and living conditions. This is stated explicitly in all Member State policies. This mirrors the goals of the Lisbon Strategy (European Commission 2000); although the link is not usually made explicit in the text (at least Germany, Poland and Luxembourg do make this link explicitly, however).

Beyond this overarching objective, it is possible to identify a set of recurring priorities that address circumstances specific to particular countries and are perceived to constrain economic growth:

- *Restructuring or diversifying the economy.* Supporting the restructuring or diversification of the economy has been an important part of efforts to secure economic growth in several countries, particularly the EU10 Member States. In these traditional manufacturing economies, large scale modernisation or automation of production – and to some extent also deregulation of market entry and exit – has been viewed as essential to increase productivity and compete internationally. At the same time, rising wages combined with the removal of non-EU-approved trade barriers and

¹² Full report prepared by Mikkel Holm-Pedersen, Jeremy Millard, Kristian Pedersen (Policy and Business Analysis) and available on http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/expost2006/wp6a_report_en.pdf

state subsidies have reduced their competitive edge compared to other low-cost manufacturing countries, leading to efforts to gradually shift production towards higher value-added and/or more knowledge-intensive products and services. For instance, the Czech Republic has increasingly supported investments in ‘new’ creative sectors such as marketing, design and consultancy, whilst Ireland has made conscious efforts to develop capabilities within ICT, biotechnology, pharmaceuticals and health care. Similarly, Malta has targeted ICT and Estonia biomedicine and materials technology. Government interventions are justified by leading and easing structural adjustments that might otherwise be slow and damaging, or may not happen at all because of lack of information or available resources. Other countries with notable policy aims related to economic restructuring or diversification include Cyprus, Greece, Hungary, Latvia, Slovakia, and Slovenia.

- *Encouraging innovation.* Supporting innovation and R&D processes and linkages has also been an important part of efforts to secure economic growth in many countries, especially among the EU15 Member States. Here productivity and labour costs already tend to be high and their catch-up potential is relatively low, so continually introducing new or improved products and processes is viewed as one of only a few means of allowing firms to remain competitive. Innovation allows firms to cover rising costs of production through higher prices or lower production costs through applying cutting-edge processes. While the establishment of basic research infrastructure was often the first priority, increasing emphasis has been placed on applied science and commercialisation potential in order to make more efficient the link between invention and profitable application. This shift in focus, for instance, is evident in Belgium, Finland, France, the Netherlands, Portugal, Sweden and the UK, as well as in Estonia (arguably one of the more advanced EU10 economies scoring high on the Lisbon Scorecard). This shift has coincided with greater focus on innovation and R&D in many other countries, including Austria, Denmark, Germany, Greece, Italy, Latvia, Luxembourg, Malta and Slovenia. It is also reflected in the renewed focus of the Lisbon Strategy following the mid-term review in 2004-2005 (European Council, 2005). The rationale for government intervention in innovation is to support high risk activities that might not otherwise happen because of the uncertain returns to individual firms.
- *Avoiding dual economies.* For a few countries, efforts to secure economic growth have involved not only increasing output in one part of the economy, but ensuring prosperity throughout the economy through effective backward and forward linkages. In Ireland, for instance, a major challenge has been to reap the benefits from supporting high-tech, high value-added industries dominated by foreign ownership, whilst preventing an income gap opening up with the surrounding lowtech, low productivity industries largely in domestic ownership. Likewise, Hungary and Malta have been conscious about embedding as well as strengthening foreign owned companies by developing supplier relations or even demanding partial re-investment of profits within national borders.
- *Achieving balanced growth.* Another economic objective has been to achieve at least some degree of balanced growth across regions in order to reduce regional disparities. This has been particularly prominent in countries with significant inequalities in income across regions, such as the Czech Republic (urban/rural), Finland (urban/rural), Germany (east/west), Greece (urban/rural), Italy (north/south), Poland (urban/rural) and Sweden (urban/rural). However, even relatively balanced countries

such as Denmark have had a regional focus on enterprise and innovation within their national support policies.

SMEs and entrepreneurship

Practically all Member States focus on SMEs in their national support to enterprise and innovation. This reflects the fact that SMEs are widely viewed as the economic bedrock of the national economy in that they constitute the vast majority of enterprises and provide a significant share of jobs. SMEs are also considered to be a key driver of economic growth by leading innovation and the creation of new jobs in emerging sectors. This perception of the importance of SMEs is most apparent among the EU15 Member States, with a particular focus on supporting entrepreneurship and start-ups within the SME group. SMEs and entrepreneurs/start-ups are also viewed as most in need of assistance given their limited internal resources and perceived vulnerability to external competition. Thus, supporting SMEs and start-ups in acquiring vital equipment or knowledge offers a potentially higher return on invested public funds than support for larger enterprises. However, large enterprises also receive support in many Member States, especially in large countries such as France, Germany, Italy, Poland, and the UK, as well as in some of the EU10 Member States more reliant on heavy industry, such as Slovakia.

Sector-neutral support

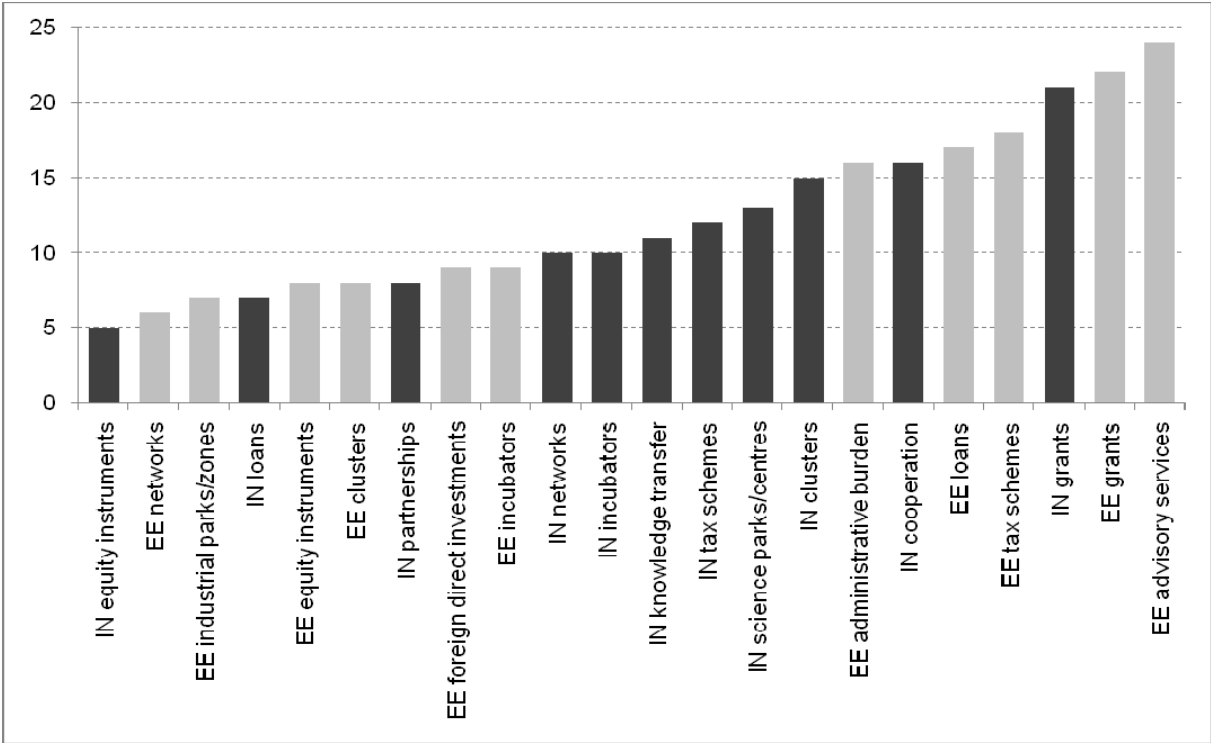
In terms of targeting particular economic sectors for support, *most Member States have a neutral, i.e. non-sectoral approach*. As mentioned above, however, some Member States have set aside specific funds to encourage activities within selected high value-added and/or knowledge-intensive sectors, such as ICT, biomedicine, and design. In addition, several Member States (as described in the following section) have promoted cluster formation and development within particular sectors. These sectors have not been entirely predefined by national policy, but also in accordance with regional strengths and/or enterprise feedback during implementation. Otherwise, the trend is for only very broad sectoral distinctions to be made, such as special support for R&D-intensive sectors in Estonia, Finland, France, Ireland and Latvia or for export-oriented sectors in Finland, Germany and Malta.

Main instruments used

The EU10 and EU15 Member States

A wide variety of instruments have been employed to meet national policy objectives. The use of investment grants and advisory services (either through subsidising private agencies or providing public services) have been pervasive. In addition, support for enterprise has ranged from tax incentives and loan funds to networks centred on shared business interests. Support for innovation has ranged from promoting cooperation between research institutions and businesses to providing equity capital for the development of profitable ideas. Administrative burden reductions, cluster initiatives, science parks and research centres to foster innovation are also popular.

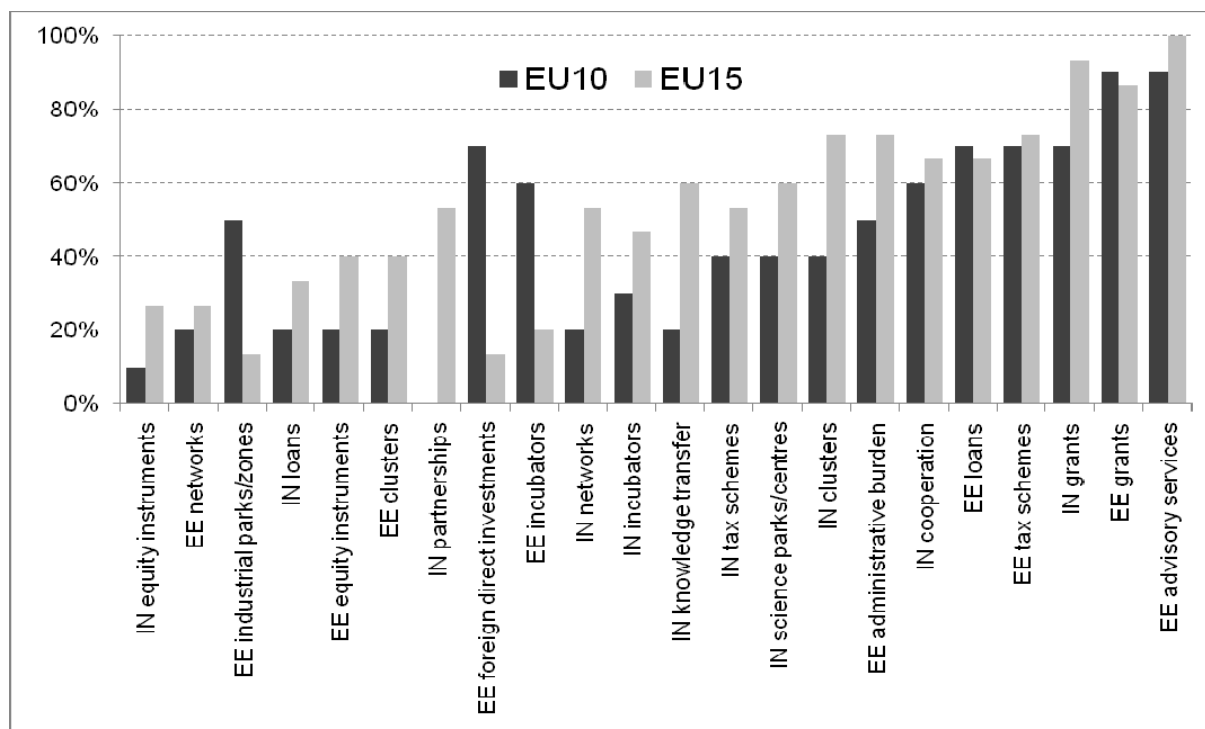
Frequency of support instruments across surveyed Member States



The figure masks some unevenness in the use of different instruments between the EU10 and EU15 Member States. Beyond similar use of the most common types of support, the EU15 seem to be rather more active overall, especially on innovation. However, the EU10 are considerably more active on three policy instruments: foreign direct investment (FDI), industrial parks/zones and enterprise incubators.

Thus, the use of instruments mirrors the general difference between Member States described above when considering the policy priorities for promoting economic growth. That is, the tendency towards a greater focus on encouraging innovation within the EU15 compared to a greater focus on restructuring and diversifying the economy within the EU10 (both of which may be assisted through the attraction of FDI).

Country use of support instruments within EU10 and EU15 Member States



Cluster analysis cuts across the simple EU15 – EU10 dichotomy

Dividing the surveyed Member States into EU15 and EU10 is instructive, but does not capture the diversity of approaches for supporting the enterprise and innovation themes, and whether particular instruments tend to go together. For example, Figure 2 says nothing about how attracting FDI relates to other instruments such as industrial parks/zones and cluster initiatives. Using cluster analysis suggests that it is possible to distinguish three relatively stable groups of countries which exhibit more similarities than dissimilarities in their use of different instruments:

- Cluster 1 - restructuring and/or diversifying countries: characterised by the combination of FDI, industrial parks/zones and incubators on the enterprise side, and cluster initiatives on the innovation side together with little emphasis on networks and knowledge transfer.
 - At its core this cluster consists of the Czech Republic, Greece, Hungary, Malta, Slovakia and Slovenia, all of which have a priority to restructure and/or diversify the economy. These countries have consciously used FDI to offset weak industrial bases and limited national financial resources in efforts to accomplish rapid economic transformations. Further, the establishment of industrial parks/zones with modern business facilities and services can be seen, at least in part, as a continuation of this policy by catering specifically to international firms looking for places to locate production facilities (besides providing a natural set-up for enterprise incubators). In addition, the relative prevalence of cluster initiatives within this grouping can in large part be seen as a reflection of the previously described priorities to lead production towards higher value-added and/or more knowledge-intensive sectors.
 - Cluster 1 also includes sub-cluster 1.2 covering Estonia, Italy, Luxembourg and Latvia. It is similar to sub-cluster 1.1 but tends to have slightly more emphasis

on innovation and R&D – in particular on partnerships, science parks and research centres – and is less focused on the attraction of FDI. Compared to sub-cluster 1.1, these countries have less in common and shift towards the middle cluster (cluster 3 below) when certain cluster sortings and algorithms are used (this is particularly the case for Italy). They cohere as a sub-cluster partly because of their non-use of particular instruments, especially knowledge transfer. This can be explained to some extent by the small number of instruments used within these four countries. It is noteworthy that two of these countries, Estonia and Latvia, also have explicit policy priorities related to the restructuring and/or diversification of the economy, and that Italy arguably faces similar issues in its Southern regions.

- Cluster 2 - innovation and R&D-intensive countries: characterised both by administrative burden reductions and cluster promotion initiatives on the enterprise side, and a broad palette of instruments featuring networks and knowledge transfer on the innovation side.
 - At the core of Cluster 2 are Finland, France, the Netherlands and Sweden (sub-cluster 2.1), all with strong encouragement of innovation, particularly within sectors of economic strength such as flowers and high-tech systems and materials in the Netherlands. These countries have funnelled vast resources into building integrated business networks and partnerships around internationally competitive research centres, whilst also ensuring incubator spaces and seed capital for potential spin-offs at the lower end of the eco-system. Known in France as ‘poles of excellence’, such networks and partnerships form the spearhead of innovation clusters, extending to the build-up of supplier linkages on the enterprise side as well.
 - Austria, Germany and Ireland form sub-cluster 2.2. They have adopted a very similar approach revolving around the initiation of networks and knowledge transfer, but are less focused on the identification of competitive research centres. Like sub-cluster 1.2, these countries and in particular Ireland will shift towards Cluster 3 under certain cluster sortings and algorithms. The apparent differences with sub-cluster 2.1 may just be a matter of time, as all three countries have taken steps to further the formation of innovation clusters.
- Cluster 3 - intermediate countries: intermediate position between the restructuring/diversifying approaches of Cluster 1 and the innovation/R&D approaches of Cluster 2, albeit with more affinities to the latter than to the former. Characterised by the combination of access to loans (in addition to grants rather than instead of grants as has sometimes been the case within Cluster 1), tax incentives, and reductions of administrative burdens on the enterprise side, and a somewhat narrower range of instruments featuring the availability of loans and tax incentives and the promotion of cooperation on the innovation side.
 - It is difficult to distinguish a core of countries exemplifying the approach of Cluster 3. Denmark, Spain, Lithuania and Portugal (sub-cluster 3.1) have relied most on tax incentives and rule simplifications to support enterprise and innovation.
 - Belgium, Cyprus, Poland and the UK (sub-cluster 3.2) have supplemented this with more formalised structures for innovative start-ups through science parks and research centres providing incubator services, and for knowledge transfer by creating networks.

The differences between Clusters 1, 2 and 3 may reflect separate stages in the changing focus of countries over time, moving from a strongly enterprise environment-oriented approach in Cluster 1 to a more innovation and R&D-intensive approach in Cluster 2 involving increasingly targeted and more integrated knowledge transfer and entrepreneurship support channels. Cluster 3 may be along the continuum from Cluster 1 to Cluster 2, depending on national economic circumstances and traditions for enterprise support.

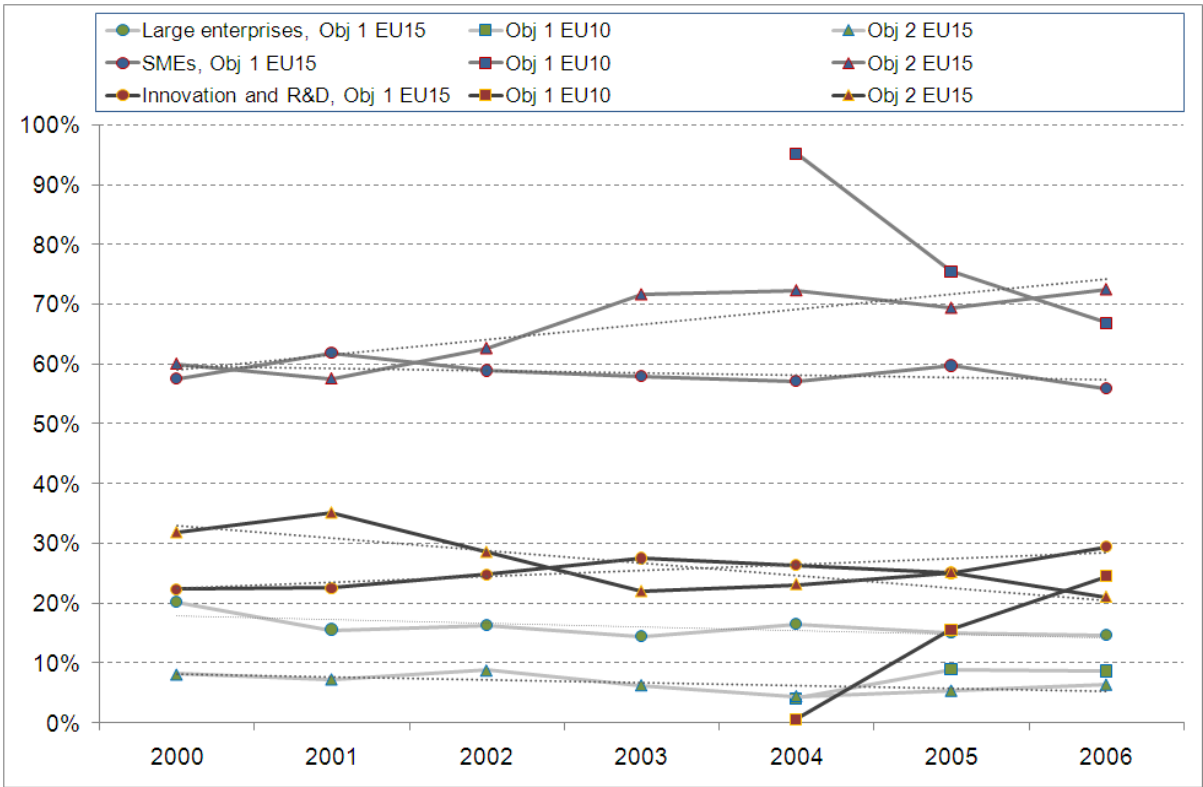
ERDF support to enterprise and innovation

Turning now to ERDF support for the enterprise and innovation themes, this section starts by considering the main policy trends in using ERDF funds, before proceeding to characterise the types of instruments used as evidenced by available expenditure data.

Supporting large enterprises, SMEs and innovation and R&D

In line with the focus of national policies on supporting SMEs, ERDF support has also been predominantly directed at SMEs. They received 62% of all funding during the period 2000 to 2006 and as much as 73% of allocated funds in Objective 2 regions within the EU15 Member States by the end of period. Of the remaining funds, 13% have been provided to large enterprises and 25% have been assigned to innovation and R&D without a clear demarcation of end recipients. The shares vary significantly by region and over time.

Distribution of ERDF support for large enterprises, SMEs and innovation and R&D

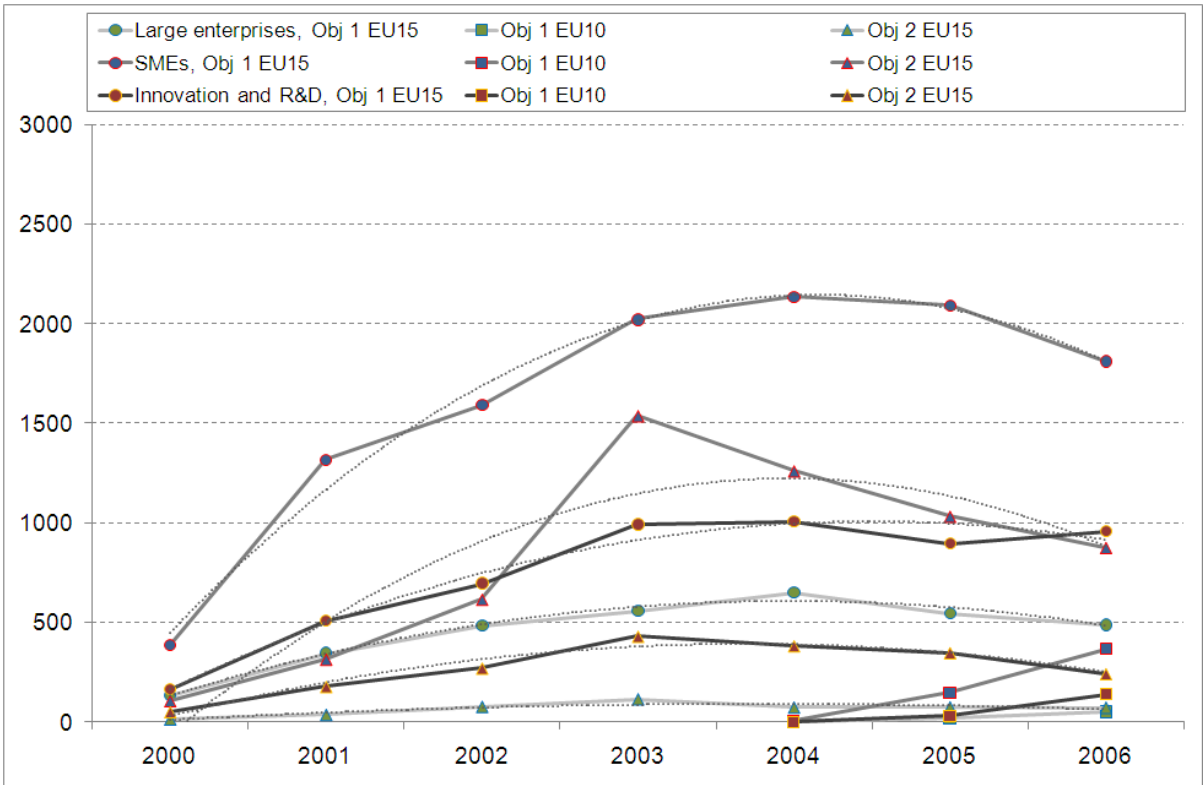


Large enterprises have received approximately 10% more ERDF support within EU15 Objective 1 regions than within EU15 Objective 2 regions. While the overall shares of support for innovation and R&D are relatively equal, they have been increasing slightly over the period within EU15 Objective 1 regions, but decreasing significantly within the EU15 Objective 2 regions, concomitant with more support allocated to SMEs. Following a brief

start-up phase, the distribution of ERDF support within EU10 Objective 1 regions has moved into line with EU15 expenditure patterns.

The reasons for the differences between EU15 Objective 1 and 2 regions are not clear. The declining support for innovation within Objective 2 regions is surprising considering the increased national and European emphasis on innovation as a route to prosperity. The declining shares are not simply an artefact of more rapidly increasing expenditures on SMEs or large enterprises as evidenced by the expenditure series in Figure 4, which shows generally decreasing funding from 2003-2004 onwards within the EU15. Note too the relatively small amounts of support for EU10 Objective 1 regions, which themselves dwarf support for EU10 Objective 2 regions amounting to approximately €6m altogether between 2004 and 2006.

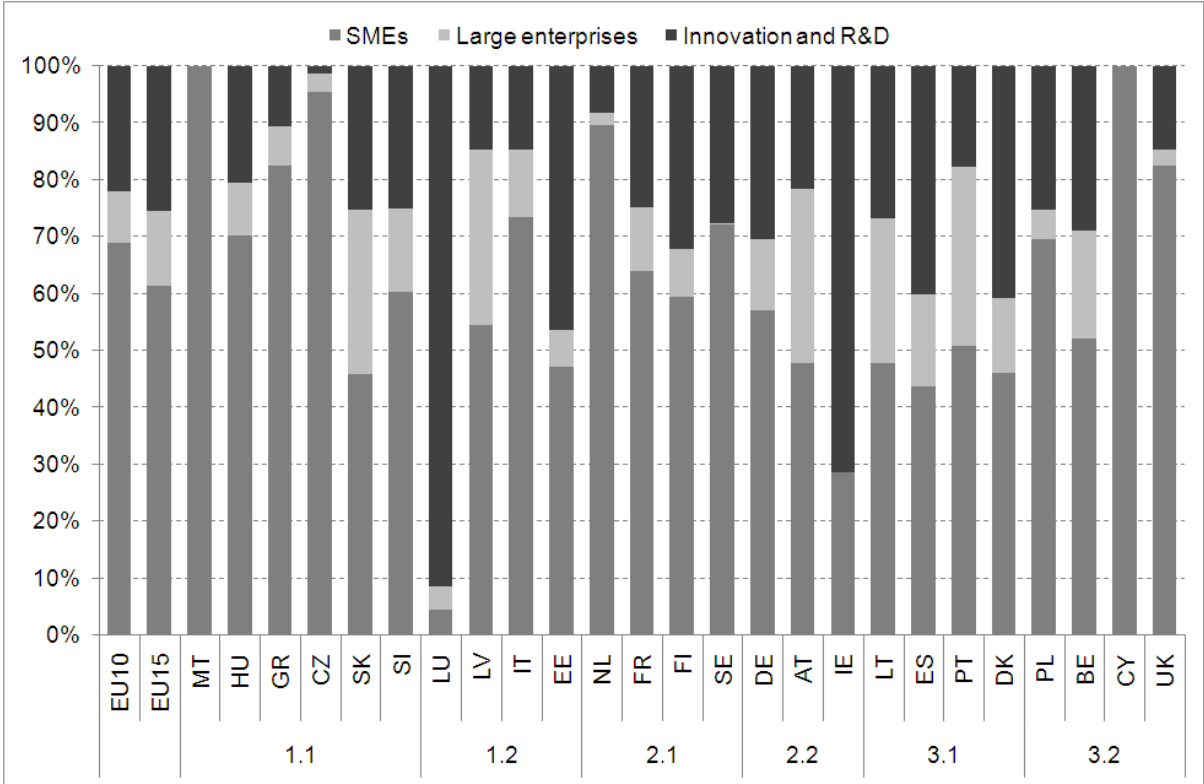
ERDF support for large enterprises, SMEs and innovation and R&D in €m



At the country level, ERDF support for SMEs is also dominant. Only two countries spent less than 40% of their European funding on SMEs. Figure 5 shows that SMEs received more support than anything else in all countries except Ireland and Luxembourg. Here innovation was the priority for ERDF funds (allocated 71% and 92% of total expenditures respectively).

No apparent patterns exist with regard to Member State status or association with the different clusters identified above. This may be because Member States have considerable discretion in allocating the funds, and some of them deliberately concentrate ERDF funds on a limited number of themes, and use their own resources for other policy priorities.

Distribution of ERDF support for large enterprises, SMEs and innovation and R&D



2.2.1 Main instruments used

Support for enterprise

By far the largest share of ERDF support for enterprise has been used for investment in physical capital such as acquisition of plant and equipment. 80% of all support for SMEs and large enterprises in Objective 1 regions within the EU15, and 50% of all support in Objective 2 regions, went for this purpose in the first year, probably due in part to the relatively quick set-up of financial support schemes. The shares stabilised by the middle of the period at around 60% and 30-40% respectively. These levels have been matched in Objective 1 regions within the EU10 since 2004. The level of support for advisory services and shared business services has been lower, receiving about 10% each within EU15 Objective 1 regions, and 20-25% each within EU15 Objective 2 regions. These differences between Objective 1 and 2 regions in their allocation of ERDF support are indicative of the persistent need for modernization of production facilities, especially within Objective 1 regions. It seems to replicate at the regional level the same divergence in focus noted above at the national level between restructuring and diversifying and encouraging innovation.

Support for innovation and R&D

ERDF funds for innovation and R&D have been equally split between (i) research projects based in universities and research institutes, (ii) innovation measures such as knowledge and technology transfer, and (iii) RTDI (Research, Technological Development, and Innovation) infrastructure such as buildings, labs and incubators. Figure 7 shows that the balance has shifted over time, however, from research projects to innovation measures. Thus, by 2006 less

than 25% was spend on research projects within either type of region in the EU15. Comparing EU15 Objective 1 and 2 regions meanwhile, a somewhat lower share was allocated to innovation measures and a slightly higher share was allocated to RTDI infrastructure within Objective 1 regions than within Objective 2 regions. Notably, this pattern is even more pronounced within the Objective 1 regions of the EU10, spending more than 60% alone on RTDI infrastructure in 2006, once expenditures started flowing (the initial distribution in 2004 should be disregarded due to the negligible amount of expenditure involved).

The declining shares allocated to research projects might at least in part reflect the relatively quick set-up of financial support schemes compared to the longer processes involved in planning and implementing networking initiatives or large-scale infrastructure projects. In this regard, the developments are similar to the initially declining shares in investment in physical capital evidenced above. However, it is notable here too that the change in funding patterns would seem to fit convincingly with the increased focus on knowledge transfer as well – especially considering that most lagging regions in the EU10's have continued to emphasize basic infrastructure over innovation measures.

Indirect versus direct support

An important overall trend in ERDF support for enterprise and innovation is the increasing use of indirect instruments. Sorting the expenditure categories according to whether they mainly involve financial mechanisms or non-pecuniary benefits,⁸ it is evident that the relative size of the latter has been growing throughout the period in both EU15 Objective 1 and Objective 2 regions (Figure 8). The figure also shows how funding for indirect instruments generally is more common within EU15 Objective 2 regions than within EU15 Objective 1 regions. The shares for indirect instruments are lowest within the EU10 Objective 1 regions, reflecting their need for investment in modern production facilities and infrastructure.

Here again, it is possible to observe the change in focus along the continuum from restructuring and diversifying to encouraging innovation, as these differences in the use of indirect and direct instruments also emerge across countries associated with the previously defined country clusters. Figure 9 shows that the countries within sub-clusters 1.1 and 1.2 respectively have applied 24% and 22% of ERDF funds to indirect instruments; sub-clusters 2.1 and 2.2 have applied 31% and 39%, and sub-clusters 3.1 and 3.2 around 30% and 48% of ERDF funds through such channels. These data show a close relationship between expenditures through indirect measures and a focus on innovation, even before adjusting any averages inflated by the very high shares in Slovakia, Estonia and Portugal.

Overview of instruments used

Moving a step beyond expenditure categories, Table 4 presents an overview of the types of instrument actually implemented within each Member State using ERDF funds. This has been generated by scanning all Member State notes for the use of different instruments and consulting the individual country experts for potential additional instruments. The resulting table comprises six types of instrument that use ERDF funds – evenly split between direct and indirect support. The table does not include tax incentives, which are not supported by ERDF.

1. Direct support – financial support to the firm, i.e. individual firms receive support in the form of some kind of financial contribution:
 - 1.1. *non-repayable grants* (one-off payments with no further financial obligations)
 - 1.2. *repayable loans* (including ‘financial engineering’ for additional loan resources)

- 1.3. *equity-based instruments* (i.e. acquiring a share in the capital value of the enterprise in return for an injection of investment).
2. Indirect support – non-financial support to firms, i.e. access to collective or third party facilities which are provided for several firms:
 - 2.1. *services* providing information, management advice, consultancy, business, financial advice
 - 2.2. *intangible mechanisms* such as technology transfer, knowledge transfer, collaboration, participation in partnerships and networks (sometimes made available through regional innovation systems, clusters or poles of excellence)
 - 2.3. *tangible ‘public goods’*, such as shared infrastructure and buildings, including business incubators (also sometimes made available through regional innovation systems, clusters or poles of excellence).

The use of grants and advisory services is almost ubiquitous, whereas the other four types of instrument are less widespread. Regarding direct support, five Member States (Hungary, Ireland, Luxembourg, Portugal and Slovakia) have relied exclusively on grants, whilst seven Member States (Belgium, Finland, Germany, Italy, the Netherlands, Poland and the UK) have used all three types of direct instruments. The use of multiple instruments is much more common in relation to indirect support, where all but three Member States (Belgium, Luxembourg, and Portugal) have implemented more than one instrument, and 13 Member States (Denmark, Estonia, Finland, Germany, Greece, Italy, the Netherlands, Poland, Slovakia, Spain, Sweden and the UK) have been relying on a combination of all three types.

At this level of detail it is more difficult to see country patterns. Yet it is notable that the prevalence of equity-based instruments and intangible mechanisms including networks and knowledge transfer are more prevalent among the EU15 (67% and 87% respectively of the EU15 have implemented these) than among the EU10 (where the corresponding figures are 33% and 56%). In contrast, the use of tangible ‘public goods’ is most prevalent among the EU10 (89% of these countries have implemented this type of instrument compared to 60% of the EU15). Moreover, all countries in sub-cluster 2.1 have used equity-based instruments and all countries in sub-clusters 2.1 and 2.2 have used intangible mechanisms as the only clusters to be so characterised. The frequency with which each type of instrument is used across the two Member State groups and three cluster families.

2.3 Typology of ERDF funded support instruments for enterprise and innovation

ERDF expenditures allocated on FOI codes (figures 8, 9 and 10) provides a concrete quantitative indication of what substantial uses ERDF funding has been applied to. Further analysis of these figures shows that almost 90% of this expenditure can be allocated to a two-by-two matrix distinguishing spending on enterprise from spending on innovation, and spending on direct instruments from spending on indirect instruments. Table 7 provides an overview of this four cell matrix, with the addition of relevant component details where these are available. Note that while the Structural Fund FOI codes may not be the way all Member States classify their own or even Structural Fund interventions in relation to enterprise and innovation, all Member States nevertheless are required to either use these categories or show how their own categories link to them when reporting, making the FOI codes a consistent basis for comparisons.¹⁰ Consequently, this typology is not an artificial construction imposed on projects, but rather reflects a classification that Member States have applied themselves.

Referring to Table 7, it can be seen that:

- almost three quarters of all expenditure was aimed at enterprise.
- almost 70% took the form of direct support.
- within the enterprise expenditure, only 16% was specifically aimed at large firms, almost all of which was support for investment in physical capital (plant, equipment, premises, etc.), with negligible amounts used for financial engineering and indirect support on services and networks. These are areas where large companies do not seem to need support. In contrast, the data for SMEs shows that almost one third was used for indirect support on services and networks. About half the SME funding for enterprise was devoted to direct physical capital investment, with 10% used for financial engineering and 5% for ICT services and applications.
- within the innovation category it is not possible to distinguish large and small firms. Here, almost two thirds was used for direct support, split

Typology of ERDF instruments

	DIRECT SUPPORT		INDIRECT SUPPORT		Total
ENTERPRISE ENVIRONMENT	<i>1) Large firms investment in physical capital</i> <u>Level 1:</u> <ul style="list-style-type: none"> • physical capital (FOI 151): 10% • financial engineering for additional loan resources (FOI 155): 1% <u>Level 2:</u> 1. a) grants, b) loans c) equity	52%	<i>4) Large firms access to services</i> <u>Level 1:</u> <ul style="list-style-type: none"> • business services (FOI 153): 1% <u>Level 2:</u> d) services, e) intangible mechanisms, f) tangible public goods	21%	73%
	<i>2) SMEs investment in physical capital</i> <u>Level 1:</u> <ul style="list-style-type: none"> • physical capital (FOI 161): 32% • financial engineering for additional loan resources (FOI 165): 6% <u>Level 2:</u> a) grants, b) loans, c) equity		<i>5) SMEs access to services</i> <u>Level 1:</u> <ul style="list-style-type: none"> • business services (FOI 163): 9% • shared business services (FOI 164): 11% <u>Level 2:</u> d) services, e) intangible mechanisms, f) tangible public goods		
	<i>3) SMEs investment in ICT</i> <u>Level 1:</u> <ul style="list-style-type: none"> • ICT services & applications (FOI 324): 3% <u>Level 2:</u> a) grants, b) loans, c) equity				
INNOVATION AND R&D	<i>6) Investment in research projects</i> <u>Level 1:</u> <ul style="list-style-type: none"> • Research projects (FOI 181): 8% <u>Level 2:</u> a) grants, b) loans, c) equity	17%	<i>8) Technology transfer and use of public goods</i> <u>Level 1:</u> <ul style="list-style-type: none"> • Innovation & tech transfers, networks, partnerships, etc. (FOI 182): 10% <u>Level 2:</u> d) services, e) intangible mechanisms, f) tangible public goods	10%	27%
	<i>7) Investment in RTDI infrastructures</i> <u>Level 1:</u> <ul style="list-style-type: none"> • RTDI infrastructure (FOI 183): 9% <u>Level 2:</u> a) grants, b) loans, c) equity				
Total	69%		31%		100% (€25,801m)

Expenditure not allocated to 3-digit FOI codes are excluded as these cannot be differentiated between direct and indirect instruments. Total expenditure not so allocated was €2,594m. (9% of total)

The value of the typology in Table 7 is that it:

- has been derived inductively and thus directly reflects the application of ERDF funds over the period 2000 to 2006
- can be quantified at the first level, whilst second level types have been widely used by Member States
- directly reflects many of the evaluation questions in the study, including:
 - the distinctions between direct versus indirect support, grants versus other direct support, SMEs versus large firms, long-term research (e.g. building research infrastructure) versus shorter-term technology transfer,
 - building poles of excellence and clusters.

2.4 Conclusion

This chapter has shown the wide range of policy instruments used to encourage the growth of enterprise and innovation across the EU25. Grants, loans and business advice are the most common tools and SMEs are the main targets of support. A broad distinction is apparent between:

- i. (regions and nations that are mainly seeking to catch up more advanced economies with an emphasis on the fundamentals (business infrastructure, advisory services and general financial support) without discriminating much between sectors, and
- ii. regions and nations that aim to be more innovative and closer to the leading-edge, using a wider range of policy instruments, including equity finance and various methods of producing and sharing new knowledge and information.

The theme of innovation has grown in importance over time, along with indirect (nonfinancial) forms of business support.

Summary - Ex post evaluation of Cohesion Policy programmes 2000-2006 financed by the European Regional Development Fund Work Package 6b: Enterprise Support¹³

This evaluation set out to measure the achievements of the programmes and assess the effectiveness of the different instruments.

Main findings:

- Support for enterprise contributed to the creation of a significant number of new jobs, increased production, and improved productivity. The 30 programmes assisted 800,000 enterprises, mainly SMEs, leading to 625,000 gross new jobs. An estimated 1 million gross jobs were created by cohesion policy enterprise measures in total.
- Monitoring needs to be improved. For example, the main intended effect of many instruments is greater productivity, but only 7 out of the 30 programmes collected data on this. Even for jobs created – an indicator planned by all the programmes – in 6 out of 30 cases figures were missing or judged unreliable. Programmes should determine which indicators most closely measure what they are trying to achieve and be consistent in collecting data.
- From the palette of instruments available (e.g. grants, venture capital, loans, business services), one size does not fit all. Some regions showed an over-reliance on grants, where other instruments would have been more appropriate. Conversely, some investments (e.g. start-ups or early R&D) are too risky for financial engineering.
- Policy makers should take a more proactive approach to implementation delays. This means enhancing administrative capacity to reduce unnecessary delay, but also accepting that some delay is inevitable and finding ways to manage this (eg getting an early start when setting up venture capital funds).

Outputs and beneficiaries – enterprises supported

The number of beneficiaries is generally measured as the number of enterprises benefiting from enterprise support. Most of the beneficiaries received indirect support, in particular support of low intensity. One example of such low intensity support is information to businesses (advice and support), where each recipient of information was counted as a beneficiary. Recipients of direct support were less numerous, but the financial support received by them can be expected to have larger impacts on their development, as they generally received support of higher intensity than beneficiaries of indirect support. It should however be noted that many beneficiaries receiving support from mixed measures may have benefited from the same support as the enterprises supported by direct instrument-only measures.

¹³ Full report prepared by Annegret Bötzel, Benita Kidmose Rytz, Xavier le Den, Johan Harvard and Thomas Westergaard-Kabelmann (Ramboll) and available on http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/expost2006/wp6b_final_report_en.pdf

Number of beneficiaries per instrument and instrument type

Instrument type	Instrument	No. of enterprises supported (number of measures)	% of total
Direct	a) Non-repayable grants	54,862 (30)	7%
	b) Repayable loans	10,928 (7)	1%
	c) Equity-based instruments	114 (2)	0%
	Mixed instruments	74,693 (15)	9%
Direct Total		140,597 (54)	17%
Indirect	d) Advice and support	255,090 (15)	32%
	e) Networking and clustering	4,491 (4)	1%
	f) Infrastructure, especially business incubators	2,609 (6)	0%
	Mixed instruments	133,898 (12)	17%
Indirect Total		396,088 (37)	49%
Mixed	Mixed instruments	267,112 (46)	33%
Mixed Total		267,112 (46)	33%
Grand Total		803,797 (137)	100%

Source: Annual Implementation Reports for 2008 or 2007 of the respective programmes

Note: The figures in parentheses indicate the number of measures which have reported on beneficiaries. The total number of measures studied in this review is 262, which means many measures did not present data or number of beneficiaries.

Detailed monitoring information on the beneficiaries is limited. However, it can be seen that:

- Out of the 137 measures that have reported on the number of beneficiaries (262 measures analysed in total), only 54 measures offered indicators distinguishing SMEs from the total number of beneficiaries. Based on these 54 measures, 98% (500,203 out of 512,242) of the beneficiaries were SMEs.
- Based on the area of intervention codes, measures targeting SMEs supported 81% of the beneficiaries (639,651), measures targeting both SMEs and large businesses supported 9% of the beneficiaries (66,710), and measures targeting large enterprises only supported 10% of the beneficiaries (79,883). According to this data, this means that SMEs accounted for 81% to 90% of the total beneficiaries.

Based on this information, it can be concluded that SMEs constituted the vast majority of the beneficiaries of enterprise support within the 30 studied programmes. The finding that the majority of beneficiaries were SMEs is in line with the share of expenditures that was provided to this business size group.

Results and impact

Results and impacts were analysed in order to determine the programmes' achievements in terms of increased production, productivity and employment, as well as how these achievements compared with what they set out to achieve.

The review of achievements shows that the programmes have contributed to a significant number of new jobs, increased production and improved productivity. In total, the enterprise support measures within the studied programmes reportedly created more than 625,000 gross new jobs by spending close to €46 billion on the support of more than 800,000 enterprises, of which at least an estimated 80-90% were SMEs. In addition to the new jobs created, the seven UK programmes reporting on results in terms of increased production report having created about €15 billion in gross new turnover (£9,689 million) by spending only €7.5 billion.

Strategy

Although support activities varied within the programmes, enterprise support aimed first and foremost at helping to improve business activity (production) and enterprise competitiveness. This was seen as the basis for employment creation, which should ultimately lead to the overarching goals of improved competitiveness and social cohesion in the programme regions. Two main strands of activities were observed:

- Modernising and diversifying the existing enterprise structure. Many Objective 1 and Objective 2 programmes addressed the need to develop the sector structure from low value-added to high value-added sectors, and to support individual businesses in their attempts to become internationally competitive. Attempts at economic cluster development were mainly found in Objective 2 programmes.
- Fill the enterprise gap. Support in some cases was aimed at the development of microenterprises and at enhancing entrepreneurship. It was also crucial in some regions to integrate foreign companies into the domestic value chain, as well as to keep large enterprises in the regions. Support to investments by large enterprises was mostly found in Objective 1 programmes.

Employment

Out of the 30 programmes studied, quantitative data on job creation could be aggregated and further analysed from 24 programmes. In these programmes at least one of the studied measures reported on job creation in their monitoring systems. The relative importance of different types of support instruments in the created jobs reflects their different goals and foci. For instance, practically all jobs created by the German programmes were reported to have been created by direct support instruments (often grants), whereas in the UK programmes the indirect instruments played an important role in creating jobs, reflecting the focus of these programmes on indirect support.

Number of gross jobs created per instrument and instrument type

Instrument type	Instrument	No. of jobs created (number of measures)	% of total
Direct	a) Non-repayable grants	176,890 (22)	28%
	b) Repayable loans	16,201 (3)	3%
	c) Equity-based instruments	987 (2)	0%
	Mixed instruments	60,835 (14)	10%
Direct Total		254,913 (41)	41%
Indirect	d) Advice and support	59,110 (9)	9%
	e) Networking and clustering	2,609 (2)	0%
	f) Infrastructure, especially business incubators	32,616 (21)	5%
	Mixed instruments	75,254 (14)	12%
Indirect Total		169,589 (46)	27%
Mixed	Mixed instruments	200,482 (42)	32%
Mixed Total		200,482 (42)	32%
Grand Total		624,984 (129)	100%

Source: Annual Implementation Reports for 2008 or 2007 of the respective programmes

Note: The figures in parentheses indicate the number of measures which have reported on this indicator

Considering the relatively few beneficiaries of direct support, the number of jobs created by the direct instruments is considerable. Loans and equity-based instruments were to a high degree used together with other instruments, and it is therefore not possible to determine how many jobs these instruments specifically helped to create. In addition, it should be taken into consideration that loans and equity instruments may have been better at producing quality jobs rather than a high number of jobs.

With direct instruments supporting close to 141,000 enterprises and creating more than 255,000 gross jobs, close to two jobs per enterprise supported were created. Of the direct instruments, especially the results for grants were striking. Through the support of almost 55,000 enterprises, grants created more than three jobs per supported enterprise. The indirect support instruments contributed to job creation primarily in the UK programmes.

The few available figures on net effects indicate that the gross effects reported by the programmes overestimate the true impact of the programmes, with net additionality ratios for job creation ranging from 20% to 70%. However, even when taking the lowest calculated net additionality ratios into consideration, the total aggregated effects on employment and turnover are substantial. As the available net figures are derived from a small subset of programmes with specific characteristics, further studies will have to be carried out before any attempts of generalisation of net additionality rates can be made.

Tentative attempts at extrapolating total ERDF programmes job creation produce a figure of at least 1 million jobs created. The extrapolated estimates for all programmes are only rough indications of the actual values, but can serve as food for thought.

Production

Since activities to support businesses do not (and should not) always lead to an increase in employment, another important indicator is turnover (or sales), i.e. the sum of the value of all sales of services or goods. While an increase in turnover does not automatically mean an increase in employment, there are other positive regional effects to be gained from an increase in businesses' sales, such as strengthened local and regional supply chains.

Of the 262 measures studied, 53 had targets for increased production measured in absolute increase in turnover (sales). The same 53 measures reported actual achieved increases. Only seven programmes in the UK used this indicator. Below, the gross turnover created for these programmes is presented, together with the number of beneficiaries and total expenditures.

Gross turnover created (in million GBP)

No.	Programme	Gross turnover created (M GBP)
22	Herseyside (O1)	845
23	South Yorkshire (O1)	2,311
24	West Wales and the Valleys (O1)	151
25	West Midlands (O2)	936
28	North East of England (O2)	1,755
29	North West England (O2)	3,240
30	Western Scotland (O2)	451
Grand Total		9,689

Source: Annual Implementation Reports for 2008 or 2007 of the respective programmes

None of the abovementioned programmes reported large gross increases in turnover from measures using only direct instruments. Out of the total £9,583 million in new turnover

created, only £646 million GBP were created from direct instrument-measures. The achievements per instrument type reflect the focus of these programmes, and cannot be directly interpreted as an indication of direct support not being able to create increases in sales in supported enterprises.

Productivity

Productivity is an important indicator of success for the enterprise support activities supported by the Structural Funds, since many activities aim at increasing the competitiveness of enterprises. An increase in competitiveness in this case implies an increase in sales while maintaining the same number of employees, or a reduction in employees while maintaining sales.

Only a handful of programmes used any form of indicator to measure changes in productivity and none of the programmes attempting to measure results in terms of increased productivity consider themselves successful in capturing this change. The indicators were valid, but methodological difficulties and problems on the project level arose in obtaining the data from enterprises. The Hungarian programme made a good attempt at measuring the effects of the enterprise support on business productivity, using increase in Gross Value Added (GVA) per employee (in %). Unfortunately, they were not very successful as the projects did not report back on this in a uniform manner.

Other effects

It is important to acknowledge other effects of the programmes that are not visible in the effect indicators of employment creation, turnover creation or increase in productivity. For instance, the many hectares of land developed, and the many square meters of office space developed may be of use to numerous businesses for years to come. It is interesting to note that the achievements presented do not strongly correlate with the programme expenditures on enterprise support. The programmes reporting the highest achievements in terms of jobs created were West Wales and the Valleys, North West England and the Spanish competitiveness programmes, but they had very different expenditure levels. The Spanish expenditures were quite high while the UK programme expenditures were lower. The achievements also do not strongly correlate with the type of support on which the programmes focus. All this variation points to the importance of the programme context: differences in demography, economy and business demography; labour market; fiscal conditions and social policy all affect the effectiveness of the enterprise support instruments.

Summary - Ex post evaluation of Cohesion Policy programmes 2000-2006 financed by the European Regional Development Fund Work Package 6c: Enterprise Support - an exploratory study using counterfactual methods on available data from Germany¹⁴

This study compared enterprises in Eastern Germany which benefited from investment or research grants with similar, but unsupported, enterprises. There were two specific samples: the IAB Betriebspanel for enterprise support and Gefra's survey of enterprise R&D in Thuringia. To ensure robust results, various comparison methods were used (including propensity score matching, controlled difference in difference and instrumental variables).

Main findings:

- Investment grants induced strong investment effects. Average public support of €8,000 per employee led to €1,000-12,000 of extra investment. This implies a leverage effect, where every euro of public money generates up to €1.5 of total investment.
- R&D grants of €8,000 led to an additional €8,000 of investment. Although this 1-to-1 ratio is a little smaller than that for investment grants, it has an additional "spillover" benefit in terms of increased long term regional economic growth.
- A rough calculation of the direct employment effect from investment grants was some 27,000 extra jobs. While positive, this is lower than figures derived from monitoring data, suggesting that the main impact of such support is increased investment and productivity, with job creation a secondary impact.

¹⁴ Full report prepared by GEFRA – Gesellschaft für Finanz- und Regionalanalysen GbR and IAB – Institut für Arbeitsmarkt- und Berufsforschung, Forschungseinrichtung der Bundesagentur für Arbeit, and available on http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/expost2006/wp6c_final_report_en.pdf

ANNEX 6 – Environment and climate change

1. ENVIRONMENT

1.1 Rationale

The European Union Sustainable Development Strategy (EU SDS) states that "the main challenge is to change (...) the non-integrated approach to policy-making."¹⁵ Among the guiding principles of the EU SDS are policy integration, i.e. the "integration of economic, social and environmental considerations so that they are coherent and mutually reinforce each other by making full use of instruments for better regulation." Article 11 of the Treaty on the Functioning of the European Union (Treaty) states that "environmental protection requirements must be integrated into the definition and implementation of the Union policies and activities, in particular with a view to promoting sustainable development."

There are several reasons for cohesion policy investment in environment:

- to help poor MS comply with "investment heavy" EU environmental *acquis*,
- potential contribution to eco-innovation and green growth,
- addressing negative externalities which can serve as an obstacle to local and regional development.

1.1.1 Supporting heavy investments in environmental infrastructure in Cohesion countries

Main focus of investments by the Cohesion Fund in environmental infrastructure is in the area of waste-water and waste infrastructure and management as well as to combat pollution. These investments are indispensable to safeguard future growth and quality of life in Cohesion countries. Investments needed as a result of obligations arising in the next financial period following the expiration of transitional periods in Accession treaties are of considerable scale and arguably impossible to meet without the EU solidarity. A large part of the financing provided by the ERDF goes to environmental infrastructure including waste treatment and waste water processing. Some EUR 50 billion has been allocated to environmental protection and risk prevention over the 2007-2013 period, with a further EUR 0.8 billion going to renewable energy and EUR 2.5 billion to help SMEs adopt environmentally friendly processes and develop environmentally-friendly products.

In fact, the largest programme is the Polish infrastructure and environment OP, with a total of EUR 28 billion coming from the ERDF and the Cohesion Fund. Although it includes infrastructure of various kinds, a majority of the operational priorities (7 out of 13) concern the environment, including energy efficiency, water and waste management, environmentally-friendly transport and habitat protection.

Traditionally the focus of support has very much been on environmental infrastructure (notably clean drinking water supply, waste water treatment and household and industrial waste management), especially in Objective 1, or Convergence, regions. Increasingly

¹⁵ Council of the European Union Brussels, 26 June 2006 10917/06 Renewed EU Sustainable Development Strategy, p. 2.

however the focus is also on renewable energy, green transport, the green economy and a greener governance of Cohesion Policy.

The ex post evaluation¹⁶ found "Tangible results [...] many villages, towns and cities being made more attractive places to live in [...] While the projects undoubtedly improved living standards and the quality of life, as well as territorial balance by encouraging more people to live in the places concerned and more businesses to locate there, unlike in the case of economic growth, there is no accepted set of indicators to quantify these effects.

Moreover, while their immediate impact on economic growth was limited, they almost certainly strengthened the conditions for long-term sustainable development by reducing social disparities between regions and territorial imbalances as well as by protecting the environment."

The following investment needs in Cohesion countries have been estimated:

- Investment in water or waste infrastructure also creates substantial benefits both for the consumers concerned and for society at large. Public intervention is justified by high expenditure needed, only partially recovered from user charges.
- Water. Financing needs to implement the Water Framework Directive and the other water acquis, like the Drinking Water Directive are estimated at some €30 billion per year. While a large part of it can be covered from user charges, substantial EU funding, mainly for infrastructure investment in the new MS, is needed from the Structural/Cohesion Funds and rural development funds.
- Waste-water. According to the recent study for DG ENV on the compliance costs of the Urban Waste Water Directive, the public and private investments for collection and treatment of urban wastewater, until full compliance with the requirements of the Directive is achieved, would amount to €45 billion for the 27 MS. This estimate is based on the status of implementation in 2005/2006, thus could somewhat overestimate needs due to the ongoing projects in this field. In addition to these figures on drinking water and waste water there are Water Framework Directive requirements that, based on the extrapolation of costs reported by Member States in the river basin management plans, are about 16 bn per year for the whole EU. From that, we estimate that about **8-10 bn per year** will be costs related to measures that could be potentially eligible under the cohesion policy. Mainly these refer to physical measures related to river restoration, installation of fish migration devices, etc.
- Waste. A study for DG ENV estimated funding needs for municipal waste in the EU in period 2014 – 2020 at €7-12 billion, of which €2.5-6 billion should be funded from the EU (the rest by users and national budgets). These figures relate to municipal waste only; the other needs in the waste sector, such as for disposal of industrial and construction waste, are being evaluated.
- Natura 2000. Financing for implementation of the Natura 2000 directives, including investment, such as land acquisition or habitat restoration, and the ongoing management costs of sites will be critical to make the network fully operational. The Habitat Directive explicitly requires EU financial support. MS estimates for the costs

¹⁶ Applica (2010) "Ex Post Evaluation of Cohesion Policy Programmes 2000-2006: synthesis report".

amount to €5.8 billion, of which 50 – 75% could come from the EU budget. This figure comes from replies of MS to a detailed questionnaire sent by DG ENV in 2009.

Cohesion Policy has a history of financing environmental interventions which are "investment heavy". In the 2007-2013 programming period Cohesion Policy is contributing EUR 28 bn to financing interventions which help MS comply with directives in the field of water supply, wastewater and solid waste. The ERDF and Cohesion Fund have co-financed 14% of total environmental investment in the EU in the period 2000-2006, providing up to 40% of funding in environmental investments in the 4 old Cohesion Countries (Ireland, Greece, Portugal, Spain).¹⁷

The ex-post evaluation of the ERDF 2000-2006 in the field of environment has shown that cohesion policy interventions brought substantial environmental benefits. For instance, 20 million of additional population has been connected to wastewater collection and treatment in the period 2000-2006 thanks to EU funds. Without EU funding, compliance with the *acquis* in waste water, water and waste would have been even more difficult.

1.1.2 Contribution to green growth

Investment in the environment generates demand for eco-industries, thereby promoting further development and innovation in these industries. A 2009 study¹⁸ has shown that "the size of the EU eco-industry has been estimated using methods which rely strongly on environmental protection expenditure data and which are consistent with the ones of previous studies." The same study estimates employment in eco-industries in 2008 to reach approximately 3.4 million. Total turnover is estimated to be more than EUR 300 billion. "While the average growth in nominal terms was about 2% p.a. in previous reports, the current study arrives at a rate of 7% to 8% p.a. In terms of micro-economic productivity the study found for a representative sample of companies, that on average for the period 2004-2006 the productivity of the EU ecoindustry was higher compared to manufacturing and that the growth rates were higher."

1.1.3 Addressing negative externalities which can serve as an obstacle to local and regional development

Economic drivers exist which result in the concentration or dispersion of economic activity. Concentration of economic activity has many potential advantages to economic agents, including decreased transport costs, increased economies of scale and knowledge spill over, labour market pooling and input sharing as well as demand and cost linkages.¹⁹

However, the concentration of economic activities also results in negative externalities such as congestion and pollution, lowering the quality of life in cities, and setting off processes which lead to a concentration of lower income households in some areas, and the formation of pockets of poverty and deprivation, also in Member States and regions with higher than average per capita income. In addition, the concentration of economic activity in larger agglomerations results in increasing differences in the economic performance of rural and urban areas, and increasing differences in the economic performance of large cities and capitals and other regions.²⁰

¹⁷ ADE (2009) p.

¹⁸ Ecorys (2009) Study on the Competitiveness of the EU eco-industry.

http://ec.europa.eu/environment/enveco/eco_industry/pdf/report%202009_competitiveness_part1.pdf

¹⁹ Marshall, 1890 and Krugman, 1991.

²⁰ 5th Cohesion Report.

As these negative impacts result from the functioning of market forces, public policy intervention is needed to address these issues. Potential public interventions includes integrated and cross-sectoral approaches to increase the attractiveness of cities by investing in integrated urban development which addresses the social, economic and environmental dimensions of urban regeneration.

1.2 Cohesion policy performance

Cohesion Policy is contributing heavily to improving the quality of the environment by funding environmental infrastructure and other interventions in the field of environment. Total planned spending in the period 2007-2013 on *environment* is EUR 104,7 bn if *indirect* spending (i.e. on sustainable transport, renewable energy, energy efficiency and other indirect spending) is also included in the figure.

The impact of cohesion policy has a strong environmental dimension. The ex-post evaluations for 2000-2006 reveal that cohesion policy contributed to improve the environment in line with EU Directives, especially in Objective 1 areas, making them more attractive places in which to live and work. In the 2000-2006 period, ERDF co-financed actions which connected 20.5 million additional inhabitants to waste water treatment to EU standards. This represents approximately half of the increase of the additional population connected over the period. An additional 14 million inhabitants were served by improved water supply thanks to ERDF co-financed projects.

In the 2000-2006 period, the European Regional Development Fund spent 21% of its total allocation, €25.5 billion, on environment-related interventions. Over 80% of environmental spending was concentrated in 7 Member States. The main sectors of intervention were rehabilitation and planning (45%) and environmental infrastructure (44%), while environment-friendly technologies (7%) and energy infrastructure (4%) were less important.

Main indicators of the 2000-2006 period:

- Water supply - Number of co-financed projects: 3913 and additional population served: 14.1 million.
- Wastewater - Number of co-financed projects: 6211 and additional population served: 20.4 million
- Solid waste - Number of projects: 2637; New capacity of waste treatment created: 231,649 m³/day; Number of unauthorised landfills closed/rehabilitated: 964

Factors that limited the effectiveness of environmental investments included oversized investments and not ensuring the financial sustainability of investments. The need to comply with European directives was the main driver of investments in environmental infrastructure. Environmental measures were often designed with a sole objective of making progress to meet the requirements of the aquis, without having regard to the development needs of the region.

Although the concept of sustainable development was not prominent in the 2000-2006 regulations and its interpretation varied across Member States, the ex post evaluation confirms that Cohesion policy delivery systems are fit-for-purpose to deliver sustainable development. The evaluation found out that an overall trend evolved from environmental inclusion towards a broader three-dimensional approach. A differentiated progress was made in accommodating sustainable development within delivery systems (e.g., programme design, selection of project, monitoring, evaluation and reporting), representing a significant learning curve for most authorities. There was a general increase in understanding/awareness of the issue;

however, the degree of its operationalisation was limited. Nevertheless, a momentum for integrating sustainable development was initiated in some Member States and good practice examples exist for individual management and implementation processes.

Regarding Sustainable Development in general, there seems to be a political preference for highlighting synergies between economic and environmental considerations, and in the current programming period Operational Programmes were in general more specific about the potential synergies among the pillars of sustainable development, rather than the trade-offs.²¹

An ex-post evaluation study of ERDF interventions in the field of environment and climate change comes to the conclusion that despite the successes potential synergies between the economic and environmental pillars of SD were not always taken advantage of. It concludes that the "main drivers for using the ERDF in environment have been the need to comply with environmental standards established in the relevant Community Directives."²² As a result, "the integration of environmental measures with other parts of the OPs has been generally weak."²³ Overall, "the contribution of ERDF environmental measures to economic development appears to have been rather limited and when observed, affecting mainly local areas without spillover effects into the regional economy."²⁴ The study attributes this to several factors including the guidance at the beginning of the programming period to give priority to compliance with EU directives,²⁵ and "the lack of vision at the EU, national, regional or local level of how environmental and regional development interact", due to the fact that "the integration of environmental investments as a factor of growth was understood neither in theory nor in practice."²⁶ The study concludes that this is due to weak institutional capacities, including lack of capacities for developing a vision, weak sectoral planning capacities, weak capacities for project development, lack of technical know-how, and difficulties in enforcing decisions.²⁷

2. CLIMATE CHANGE

2.1 Rationale

Several reasons can be given to justify cohesion policy investment in climate change:

- Financing win-win interventions with a potential benefit both for Cohesion Policy aims and climate objectives;
- Anticipating and managing structural change resulting from putting economies on a path towards a LCE, and from the impacts of unavoidable climate change on the economies of regions;
- Overcoming financial constraints linked to "investment-heavy" legislation, as a horizontal theme.

2.1.1 Financing win-win interventions

Several studies and policy documents have pointed out that there are potential win-win outcomes of investing in climate change mitigation and adaptation. Investments in the

²¹ Nordregio p. 82

²² ADE (2009) p. 135.

²³ ADE (2009) p. 136.

²⁴ ADE (2009) p. 136.

²⁵ ADE (2009) p. 137.

²⁶ ADE (2009) p. 138.

²⁷ ADE (2009) p. 139.

environment can increase the attractiveness of regions, investments in energy efficiency in housing can decrease energy costs of vulnerable social groups, investments in renewable energy and energy efficiency can positively impact economic growth and jobs, promoting eco-innovation can enhance competitiveness of regions, etc. Although all studies acknowledge the potential for win-win outcomes, there are different views on the size of co-benefits. Sustainable growth is one of the key themes of the Europe 2020 Strategy, which states that "improving resource efficiency would significantly help limit emissions, save money and boost economic growth" and emphasises the potential advantages in terms of job creation and competitiveness of clean energy technologies and combating climate change. The World Development Report 2010 also emphasises the potential for win-win solutions, stating e.g. that in 2006 2.3 million new jobs were created worldwide in the renewable energy industry,²⁸ but provides a more conservative estimate with regard to win-win outcomes, and states that win-win solutions are not enough to stay on a 2°C trajectory²⁹ stating the need not to "overplay" the win-win narrative and acknowledge adjustment costs which are likely to be substantial.³⁰

Article 177 of the Treaty explicitly allows for funding of environmental interventions through the Cohesion Fund. The Treaty does not specify which types of environmental projects could or should be supported. Article 174 of the Treaty sets out the aim of strengthening of economic, social and territorial cohesion as a means to promoting the overall harmonious development of the Community. There are investments which serve the goal of economic, social and territorial cohesion and other goals (e.g. climate change mitigation, energy security, reducing energy poverty, decreasing fuel costs of firms, reducing fuel costs of low income social groups, increasing competitive advantage through eco-innovation, etc.) simultaneously. Win-win³¹ investments can take the form of productive investments, or investments in R&D.

There are several European Studies which have demonstrated the positive impact of climate change interventions on economic variables. A recent study by Fraunhofer Institute has assessed the impact on GDP and employment in the EU of investments undertaken in order to meet the 20% renewable energy target for 2020. The study is based on a detailed macro-economic modelling of economic impacts using 2 models, NEMESIS and ASTRA, and four policy scenarios. The GDP increase by 2030 compared to a policy off scenario is expected to be between 0.36-0.44%, and employment is expected to increase by 60,000-656,000 net jobs.³² Other examples include a study by ETUC which found that extending the scope of the directive on energy performance of buildings would create between 30,000 to 90,000 additional man-years in the EU-15, and 90,000 man-years in the new Member States.³³ The same study also found that policies that restricted transport activity while rebalancing transport modes in favour of rail would lead to an overall average annual growth in employment of around 2% for passenger transport and 1.25% for freight transport.³⁴

²⁸ World Bank (2009) p. 192.

²⁹ World Bank (2009) p. 190.

³⁰ World Bank (2009) p. 236.

³¹ In models used for assessing the impact of climate friendly investments on economic variables, the alternative scenario does not take account of damages of continued climate change to economies. Therefore "win-win" outcomes are evaluated against a hypothetical baseline where there is a lower level of climate friendly investment but damages from climate change do not increase. A case for intervening in climate change can often be made even under these assumptions.

³² The lower estimate is a result of the ASTRA model, and is significantly lower than results for the NEMESIS model, as the ASTRA model takes the conservative view that other sectors are very sensitive to increases in the price of energy, reducing competitiveness and output of these sectors, resulting in reduced employment.

³³ GHK (2009b) p. 28.

³⁴ GHK (2009b) p. 30.

The economic impacts of investment in climate change mitigation are a multitude of first and second order impacts, which depend on the economic situation in a country or region. To illustrate this, the main conclusions of the study by the Fraunhofer Institute on the economic impacts of increasing the share of renewable energy are summarised below. Renewable energy support schemes set off diverse adjustment reactions among companies and households which are felt as structural effects on sectoral and regional level. These are caused by the impacts of investment in renewable energy, O&M, and renewable fuel use. The sum of these adjustment reactions change macroeconomic variables through the following mechanisms:³⁵

- *Price and cost effect*: the impact of increased energy prices on household consumption results in a modification of household consumption; the impact on industry is felt in the form of increased costs and decreased competitiveness (depending on various factors such as energy intensiveness and exposure to international competition); and the impact on the public budget may be felt through the reduction of other expenditure, or increase in taxation which may result in crowding out of investment or consumer spending.
- *Structural demand effects*: direct impacts such as increased demand for the products of different sectors, e.g. additional demand for investment in renewable energy (structural investment impulse) and in the case of biomass for agricultural and forestry products (structural O&M impulse) have a positive impact on GDP. Some indirect effects such as decreased demand for investment in conventional energy (structural investment impulse) and for conventional fuels (fuel demand impulse), and decreased consumer demand because of higher energy prices (structural consumption impulse) seem to offset positive impacts to an extent, but not entirely.
- *Multiplier and accelerator effects*: if conditions for Keynesian unemployment are met, positive employment and growth effects of a renewable energy policy can be felt through multiplier and accelerator effects. The impact on households through the multiplier effect results from higher income for those employed in the renewable sector, resulting in higher demand for consumption goods, higher production of these goods, higher revenues for sectors, and ultimately higher income for those employed in these sectors. The impact on industry results from an accelerator effect: higher demand for investment, O&M or fuels in the renewable energy sector results in higher demand in backward industries, higher production in these industries, and higher demand in their own backward industries.
- *Innovation/productivity effects*: The production possibilities of national economies increase due to growth and renewal of capital stock. Some empirical studies have shown that renewable energy may also contribute to an increase in production possibilities.³⁶ There are also first mover advantages in technology-intensive sectors where international trade success is greatly influenced by quality competitiveness. The size of these advantages depend on e.g. innovation ability, learning effects and early market presence.

The precise impacts which will be felt in a MS or region will depend on several factors, including e.g. the existence of sectors producing RES technologies (i.e. will a country be an importer or producer of the technologies it installs), initial conditions in the labour market (multiplier effects will be felt if Keynesian unemployment exists in an economy), the potential to produce biomass and generate income from the sale of fuels, national

³⁵ For a detailed description see Fraunhofer ISI (2009) pp. 10-24. The results are based on a model with neo-keynesian features.

³⁶ Fraunhofer ISI (2009) p. 21. refers to Walz (1999).

competitiveness to export renewable technology (depending in particular on the competitiveness of the manufacturing sector), inter-industry structure (depending on input-output relations of the energy sector and major sectors producing renewable technologies), etc.³⁷

The study concludes that an increase in renewable energy investment and production has the potential to contribute to growth and employment, but "a thorough analysis of which RES technology best fits each country in terms of the specific production cost is a pre-requisite for a successful renewable policy".³⁸ In addition, there is a need to tailor investment in renewable energy to specific economic goals, as different renewable energy technologies contribute to different economic goals to a different extent: e.g. biomass is a relatively low-tech high employment option, while photovoltaic and wind energy are highly technology intensive, and early investment in these can provide the potential for EU MS to become lead markets in specific renewable energy technologies, but create less jobs.

Other theories of economic growth, e.g. the neoclassical growth model and endogenous growth theory can also be linked to positive economic impacts of climate change interventions. Both theories emphasise the importance of learning and technological change for long-term economic growth. Some renewable and other low carbon energy technologies represent high-tech products which could potentially contribute to competitiveness of EU regions and MS. The market for these technologies is growing - 2008 was the first year when global investment in new power generation in renewable energies was greater than in fossil fuel technologies.³⁹ European MS (in particular higher income MS) have a leading role in innovative renewable energy technologies. The EMEA (Europe, Middle East and North Africa) region was the region with most technology incubators, driven by European governments setting aside funding for this purpose.⁴⁰

There are several considerations when deciding whether an intervention provides a true win-win outcome for a given region, e.g.:

- Contribution to economic priorities such as growth, jobs, competitiveness, etc. as well as other priorities such as energy security;
- Emission reduction potential;
- Timeframe of impacts and the contribution of an intervention to long-term economically, socially and environmentally sustainable development;
- Contribution of the intervention to positive (or negative) technological lock-in effects;
- The regional dimension of impacts and the need to build on regional assets and regional potential and to utilise underutilised resources within the given region;
- Cost-effectiveness in delivering positive impacts.

Taking into account the specific conditions in a country or region, and designing appropriate support schemes which can contribute to local development and fit into an overall national strategy are therefore of high importance.

³⁷ Fraunhofer ISI (2009) p. 146. and p. 168.

³⁸ Fraunhofer ISI (2009) p. 187.

³⁹ UNEP (2009) p. 11. Investment in renewables suffered a decrease due to the economic crisis. The figure for renewables includes large hydro.

⁴⁰ UNEP (2009) p. 26.

2.1.2 Anticipating and managing structural change

The transition to a LCE, and changing climate conditions will require restructuring of economies and not just marginal changes compared with business as usual. This structural change is economically similar to structural changes which have been witnessed previously in the EU, e.g. in the context of a declining coal industry in the UK, or the structural changes that took place in the transition economies of Central and Eastern Europe in the 1990s, but with a different driver. The driver is climate change policy and climate change impacts, which will lead to restructuring by impacting both the supply side and the demand side of businesses⁴¹ resulting in changes in the weights of sectors within total economic output. At a company level restructuring entails "a modification of a company's workforce that affects both the qualitative (skills and qualifications required) and quantitative features (number of jobs),"⁴² and results in changes in company structure, organization, products, production processes and technology. It is a process through which there is simultaneously creation and destruction of company value, with impact on distribution of income and jobs in the economy.

Several studies have shown that the overall net impacts on economic output of the transition to a LCE will be slightly positive at a European level. At the EU level climate change policy will have a modest aggregate economic impact on job growth in the EU. Climate change policies are more likely to lead to a redistribution of jobs within and across sectors than to changes in absolute employment levels.⁴³ The impact on regional employment and GDP will be highly differentiated. Heavy industries are regionally concentrated, and impacts on some industries will be stronger. E.g. "the iron and steel industry (...) could experience job losses of 50 000 of a total of 350 000 for EU-25 as a whole, due to relocating production outside the EU and lack of new investment in Europe."⁴⁴

It has been shown that not only the impacts of climate policy, but also the impacts of climate change will be differentiated across Europe, more highly concentrated in some regions. The Regions 2020 study on climate change has shown that climate change is expected to impact the EU asymmetrically, and the impact shows a core-periphery pattern for the EU. "Regions under highest pressure are generally located in the south and east of Europe, the whole of Spain, Italy, Greece, Bulgaria, Cyprus, Malta and Hungary, as well as most of Romania and southern parts of France. (...) In some cases severe impacts will be felt in regions with low GDP per capita and therefore lower capacity for adaptation to climate change. (...) In regions heavily impacted by climate policy, or climate change a structural adjustment response will be required which the heavily impacted region may not be able to deliver on its own."⁴⁵

In this respect, climate change and in particular climate change mitigation can be considered as drivers of structural change. Preparations have to be made to ensure that the transition to a low carbon, climate-adapted economy is as smooth as possible. Such a role is in line with the purpose of the ERDF, which, according to Article 160 of the Treaty is "intended to help to redress the main regional imbalances in the Community through participation in the

⁴¹ GHK (2009b) Companies have to adapt to regulatory changes (i.e. standards, carbon price, innovation policy, etc.) stemming from climate change policy, which will impact both the supply and demand side of businesses. On the supply side it will result in increased costs, e.g. higher compliance costs, increased costs of energy production, increased price of energy, increased price of transport. In addition, there will be demand-side changes, resulting from e.g. changing customer demands due to changed preferences or a decreased demand for high energy consuming products. Some sectors will be more susceptible to these changes than others, depending on e.g. employment intensity, competition intensity, and ability to respond to challenges.

⁴² DG EMPL (2008) p. 8.

⁴³ GHK (2009b) p. 14. citing studies of ETUC (2008), CERES (2008) and IEEP (2008)

⁴⁴ Cedefop

⁴⁵ Regions 2020 pp. 23-24.

development and structural adjustment of regions whose development is lagging behind and in the conversion of declining industrial regions."

Anticipating and managing the required change is important, as structural adjustments may not happen automatically. Even in cases where the net impacts of structural change are anticipated to be positive, such as in the case of an increase in employment as a result of an increase in production of renewable energy, there may be a role for managing structural change. The labour market recovers slowly when economic changes take place, and there may be a significant role in labour market matching through investing in human resources, so that those losing jobs in one sector are ready to enter the labour market with new skills, to be employed in an emerging sector. Several sectors are already facing skill shortages, and this could hamper the greening of the economy.⁴⁶ The lack of skills required could reduce the capacity of the economy to respond to government and EU incentives, and increase the likelihood of painful transition costs for EU MS.⁴⁷ "ETUC 2008 have suggested that the transition from high to low carbon employment is not without its difficulties. They argue the potential cost of the transition for employees in "losing" sectors is not appreciated, nor is the vulnerability of some categories of workers in relation to the opportunities of re-skilling. Because of this, irreversibility effects are underestimated: the employment of displaced workers could become structural if developments are not correctly anticipated and followed up."⁴⁸

So far most of the available literature on restructuring and climate change focuses on employment, skills and labour markets. However, structural change requires a complex response from actors, as it involves the formation of new companies, new orientations for existing companies, new products, production processes and technologies. There is a need to examine what potential role Cohesion Policy can play to assist the transition process.

2.1.3 Overcoming financial constraints

The polluter pays principle is the basic principle which applies within the European Union with regard to the internalisation of environmental externalities, in accordance with Article 191 of the Treaty. There has been a gradual application of the principle in Member States, with a transition from public support to user fees and charges. However, Article 192 of the Treaty states that "without prejudice to the principle that the polluter should pay, if a measure (...) involves costs deemed disproportionate for the public authorities of a Member State, such measure shall lay down appropriate provisions in the form of (...) financial support from the Cohesion Fund set up pursuant to Article 177."

As mentioned in Section 2.1, climate change is considered by the Stern Review to be a challenge where financial constraints may lead to suboptimal outcomes, which implies the need for intervention by the public sector. The estimate in section 3.2 on the costs of climate change mitigation and adaptation in the EU indicate an annual figure slightly above EUR 100 bn. Another source estimates cumulative capital expenditure in the period 2006-2030 is at EUR 1,535 bn for investment in renewable production of electricity and heat, and renewable transport fuels, in order to attain the 20% renewable energy target by 2020. The investment costs increase with time, from EUR 129.6 bn for first 5-year period and EUR 218.2 for last 5-year period.⁴⁹ Naturally not all of these costs would be borne by EU funds, and it is necessary

⁴⁶ GHK (2009b) p. 36.

⁴⁷ GHK (2009b) p. 37.

⁴⁸ GHK (2009b) p. 38.

⁴⁹ Fraunhofer (2009) p. 106. The figures do not include electricity generation costs.

to determine the amount of public funding, and within this the proportion of EU funding that is required.

The economic crisis, which has resulted in increased public debt, adds to the problem of financing investments in climate change, particularly in some of the poorer regions and MS of the EU. Cohesion Policy could play a role in financing interventions which would otherwise be largely financed by the public sector, e.g. energy efficiency in public buildings, or public transport.

2.2 Cohesion policy performance

Confirmed by ex-post evaluation, Cohesion policy has performed well in the area of investments in environmental infrastructure and in assuring the use of the environmental acquis in Cohesion countries. Planned spending in the current programming period on climate change in the form of direct and indirect spending amounts to 16.1 % of total Community financial contribution under Cohesion Policy, or a total of EUR 56 bn.⁵⁰ Absorption of funds is significantly lower than the average figure of 22.4 % in urban, multimodal and intelligent transport, inland waterways and renewable energy.

⁵⁰ Based on figures contained in the Strategic Report 2010

Table 1: 2007-2013 Cohesion and Structural Fund expenditures on climate change adaptation and mitigation

CSG Theme	Priority theme		EU Investment		
	Code	Title	Planned EU investment (m EUR)	Allocated to projects selected (m EUR) ⁵¹	Allocated compared with planned (%)
Rail	16	Railways	4.133.172	1.063.718	25,70%
	17	Railways (TEN-T)	18.428.295	4.088.511	22,20%
	18	Mobile rail assets	629.394	148.728	23,60%
	19	Mobile rail assets (TEN-T)	665.532	70.622	10,60%
Other Transport	25	Urban transport	1.660.211	229.902	13,80%
	26	Multimodal transport	1.628.786	570.442	35,00%
	27	Multimodal transport (TEN-T)	446.841	42.030	9,40%
	28	Intelligent transport systems	1.085.514	122.532	11,30%
	30	Ports	3.547.314	1.139.572	32,10%
	31	Inland waterways (regional and local)	268.088	44.733	16,70%
	32	Inland waterways (TEN-T)	603.973	83.907	13,90%
	52	Promotion of clean urban transport	6.126.565	1.982.867	32,40%
Energy	39	Renewable energy: wind	785.491	23.069	2,90%
	40	Renewable energy: solar	1.064.250	126.776	11,90%
	41	Renewable energy: biomass	1.786.119	212.912	11,90%
	42	Renewable energy: hydroelectric, geothermal and other	1.123.791	136.016	12,10%
	43	Energy efficiency, co-generation, energy management	4.270.266	894.408	20,90%
Environment	49	Mitigation and adaption to climate change	304.727	224.861	73,80%
	53	Risk prevention (...)	5.801.168	706.753	12,20%
	54	Other measures to preserve the environment and prevent risks	1.675.671	799.896	47,70%
Total Climate Change			56.035.167	12.712.257	22,68%

Source: Commission Staff Working Document accompanying the Strategic Report 2010

With regard to efforts to combat climate change, in the 2000-2006 period, 120 Operational Programmes supported investment in these areas with a total amount of €2.3 billion. These investments mainly targeted enterprises, either to create capacity for renewable energy production or to provide energy savings through new technologies. The results of the ex-post evaluations confirm that the wider economic impacts of these investments are mixed. On the

⁵¹ With the exception of 6 Member States, data was extracted for funds allocated by 30.09.2009.

one hand, they can both lead to increased competitiveness (e.g. improved energy efficiency); on the other, they can lead to decreased employment (especially in energy production, new technologies require less labour).

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