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# SMARTER IDEAS FOR A BETTER ENVIRONMENT

ERDF funding and eco-innovation in Germany  
Executive Summary

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## CONCLUSION

**Innovation targeted towards climate and environmental protection opens up export markets and creates new jobs.**

The European Regional Development Fund (ERDF) allocates nearly 16.1 billion euros to Germany between 2007-2013, and is thus a key element of the country's regional, economic and technology policy. Currently only a small portion of ERDF financial resources are used for national and European sustainability and climate protection strategies, especially when compared with the numerous opportunities that exist. Thus, the share of funding which is directly allocated to increasingly important areas – like environmentally friendly transport, energy, climate protection and climate change adaptation, as well as to production-related environmental protection – at present only accounts for about 10 % of the total ERDF budget.

However, the ERDF's focus on innovation means that there are many more attractive approaches by which a bigger share of the budget could be invested in energy and resource saving solutions; through an eco-innovation policy a much greater contribution to climate and environmental protection is possible. At the same time, the strong competitiveness of German industry in environmental technologies could be expanded, new export markets explored and new jobs created by an eco-innovation policy.

The central importance of innovation policy to the ERDF is highlighted by the fact that it accounts for more than 48 % (€7.8 billion) of the budget, thus its potential to encourage vital climate and eco-innovation activities is high. Strategic impulses for ERDF support of eco-innovation include various recycling based concepts (e.g. cradle-to-cradle, sustainable production and consumption) as well as the development of appropriate technologies (green technologies, low-carbon technologies, cleaner technologies) or other measures to promote good environmental performance (e.g. EMAS). Lastly, the efforts to set green public procurement as a standard within ERDF should be strengthened because a high percentage of infrastructure investment is contracted by public authorities.

Such a reorientation of ERDF innovation funding would be a small but strategically important step towards a decarbonised economy and society, en route to a 95 % reduction in greenhouse gas emissions by 2050.<sup>1</sup>

However, current approaches supporting eco-innovation focus exclusively on efficiency improvements, whereas most strategies often completely lack absolute reduction goals for CO<sub>2</sub> emissions and resource consumption (sufficiency).

With regard to the preparation of an action plan for renewable sources of energy at the EU level and the planned update of the ETAP (Environmental Technologies Action Plan) in an "Eco-Innovation Action Plan", there are numerous concrete possibilities for future ERDF funding, including support of co-generation of heat and power, improvement of energy efficiency not only in the manufacturing industry but also in commercial buildings, and readying infrastructure for the expected impacts of climate change.

<sup>1</sup> Prognos AG, Öko-Institut & Dr. Hans-Joachim Ziesing, 2009. *Modell Deutschland. Klimaschutz bis 2050. Vom Ziel her denken. Langfassung WWF Deutschland, hrsg. (Blueprint Germany. A strategy for a climate safe 2050. WWF Germany 2009)*

**The further development of innovation policy towards eco-innovation can be strengthened by devoting a higher budget share to environmentally relevant lead markets and technologies of the future.**



The prevailing funding philosophy behind innovation policy needs to evolve a stronger environmental orientation and specifically support eco-innovation in lead markets and future technology areas. Special attention should be given to: energy technologies and energy infrastructure; sustainable mobility technologies; energy efficiency as well as resource and material efficiency; and eco-friendly life sciences, including industrial (white) biotechnologies. The funding instruments should be improved to prioritise support for “radical” eco-innovation. In this context all phases of the innovation cycle should be considered, especially the market launch and diffusion of eco-innovative products.

The support of “radical” eco-innovation is focused on new products and technologies which can achieve “radical” environmental improvements (e.g. a shift from non-renewable to renewable sources of energy). The success of such innovation requires a broad impact as only then can the necessary quantitative effects be achieved. “Weak” eco-innovation is that which can only achieve incremental improvement (e.g. an efficiency increase in conventional power plants) or which do not have the potential to deliver great quantitative effects on a large scale.

The further development of innovation policy to eco-innovation policy can be strengthened by using a higher budget share for environmentally relevant lead markets and technologies of the future. Due to the coding of expenditure categories, an instrument to manage budgets in line with strategy, monitoring and evaluation is already available in the ERDF instrument.

Additionally, specific qualitative requirements should be developed to ensure that funding in environmentally relevant lead markets and technology areas is really guaranteeing a focus on eco-innovation.

Our analysis of current ERDF funding in the areas of energy and industrial biotechnologies has shown that criteria and indicators in the programme management which focus on qualitative requirements are both useful and achievable. Thereby, an orientation to federal states and funding procedures outside the ERDF programme which are particularly advanced in this respect is profitable. Furthermore, competition based project selection procedures should be utilised more frequently in the future because of their ability to support eco-innovation in designated areas (e.g. energy technologies, development and use of eco-friendly resources and materials). Competitions can better mobilise creative solutions and also ensure high technical standards in transparent procedures.

**Transport infrastructure will receive about € 3 billion funding. Only one-third of this amount is foreseen for environmentally friendly transport systems.**

Another, more specific criterion for the environmentally-focused alignment of European regional policy within ERDF funding could be eco-efficiency. An analysis of eco-efficiency by manufacturing sector shows huge differences in the pollution and nuisances which arise and in the potential for improvement. Energy supply as well as basic industries like mineral oil processing, production of glass and glassware, ceramics, manufacturing of other non-metallic mineral products, metal production and processing as well as manufacturing of chemical products demonstrate the worst eco-efficiency. Therefore, comparatively large effects can be expected through specific support of eco-innovation in these industries.

In the current funding period the indicative financial allocation for transport infrastructure is about € 3 billion. This is almost one-fifth (18.75 %) of Germany's total ERDF budget.

Because only about one-third of this funding for transport infrastructure is allocated to environmentally friendly transport systems (railways, bicycle lanes, intelligent transport systems and, with some restrictions, regional and local inland waterways), this budget should be increased at the expense of road building promotion (motorways, national roads, regional/local roads).

Specific funding of eco-innovation and a clear allocation and monitoring of the relevant budgets should contribute to an increase in the ERDF budget dedicated to environment, resources and climate protection.

# PROPOSALS FOR AN ECO-INNOVATIVE REGIONAL POLICY

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In Germany 48 % of ERDF funding is allocated to innovation, research and communication technologies. Because of the strong emphasis on innovation and research in ERDF programmes, it makes sense to focus this funding more on the promotion of a sustainable economy and on environmental and climate protection.

To make sure that innovation policy leads to more eco-innovation through the support of research and technology transfer, more incentives should be created

in specific technology sectors as well as for cross-cutting issues.

In the energy sector significantly more funding should be provided to improve energy efficiency and support renewable energy resources. New challenges such as storage technology and grid infrastructure which ensure security of energy supply should be given particular prioritisation.

Environmental-related funding areas (such as resources and materials, and industry and technology-specific areas) need targeted support to allow innovation towards the use of renewable resources and to boost eco-efficiency.

Because of its important role in creating CO<sub>2</sub> emissions and the high amount of ERDF funding earmarked for this sector, the field of transport should focus completely on sustainable mobility.

With regard to the discussion on future cohesion policy after 2013, a number of options for change exist, that should include:

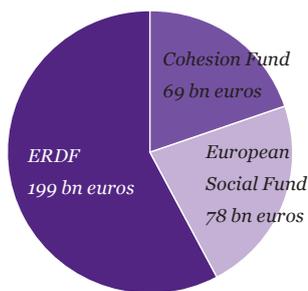
1. A higher commitment to objectives for a sustainable economy, particularly concerning climate protection within the framework of the regulations, guidelines and other regulative conditions at the EU level.
2. Improved coordination between ERDF funding and European and national strategies for sustainable development and climate protection, eco-efficiency, environmental technologies, etc.
3. An upgrade in support of smart eco-innovation concepts, linked to specific requirements of climate and environmental protection.
4. A greater focus of funding on industries with the highest eco-efficiency potential.
5. Increasing the share of and earmarking funding for measures which are directly linked to energy and climate.
6. The development of quality criteria for project selection as well as for monitoring and evaluation of the results which fulfil the new requirements.

# RELEVANCE OF EUROPEAN REGIONAL POLICY FOR ECO-INNOVATION AND RESOURCE PROTECTION

The present study addresses the question of how ERDF (European Regional Development Fund) funding in Germany can be used more effectively to contribute to the objectives of sustainable development, in particular on environmental, resource and climate protection. With around one-third of the total EU budget (€346 billion), cohesion policy is one of the key policy areas of the European Union. About €199 billion of this is set aside for the ERDF, €69 billion for the Cohesion Fund and €78 billion is allocated to the European Social Fund (ESF). Hence, cohesion policy is the second biggest budget item within the total EU budget for

2007-2013, only second to the Common Agricultural Policy (CAP). In the 2007-2013 financial framework, ERDF funding for Germany accounts for more than €16 billion – a significant budget contribution that could substantially support environmental, resource and climate protection.

As an organisation representing civil society, WWF has long been involved in the political discussion regarding European cohesion policy. This study intends to contribute innovative ideas and suggestions on how to strengthen the focus of the German ERDF programmes on the goals of environmental, resource and climate protection. WWF conducted this study in order to analyse the ongoing ERDF programmes in Germany. The study firstly evaluates all innovation-related funding measures (which are potentially linked to the environment<sup>2</sup>) and secondly all environment-related funding measures (which are primarily linked to the environment).



In thematic terms the research is focused on innovation policy: the innovation policies (or “funding philosophy”), the funding areas and tools of the German ERDF programmes are examined so as to ascertain to what extent they are specifically oriented to environmentally relevant technologies, industries and lead markets of the future. The basis for this is the fact that, in contrast to expenditures which are primarily linked to the environment (ca. 19 % of funding), the field of innovation funding consumes around 48 % of the ERDF’s means. In view of the challenges in creating a carbon-neutral and resource-saving sustainable economy, this funding area has untapped potential which could support much needed eco-innovation.

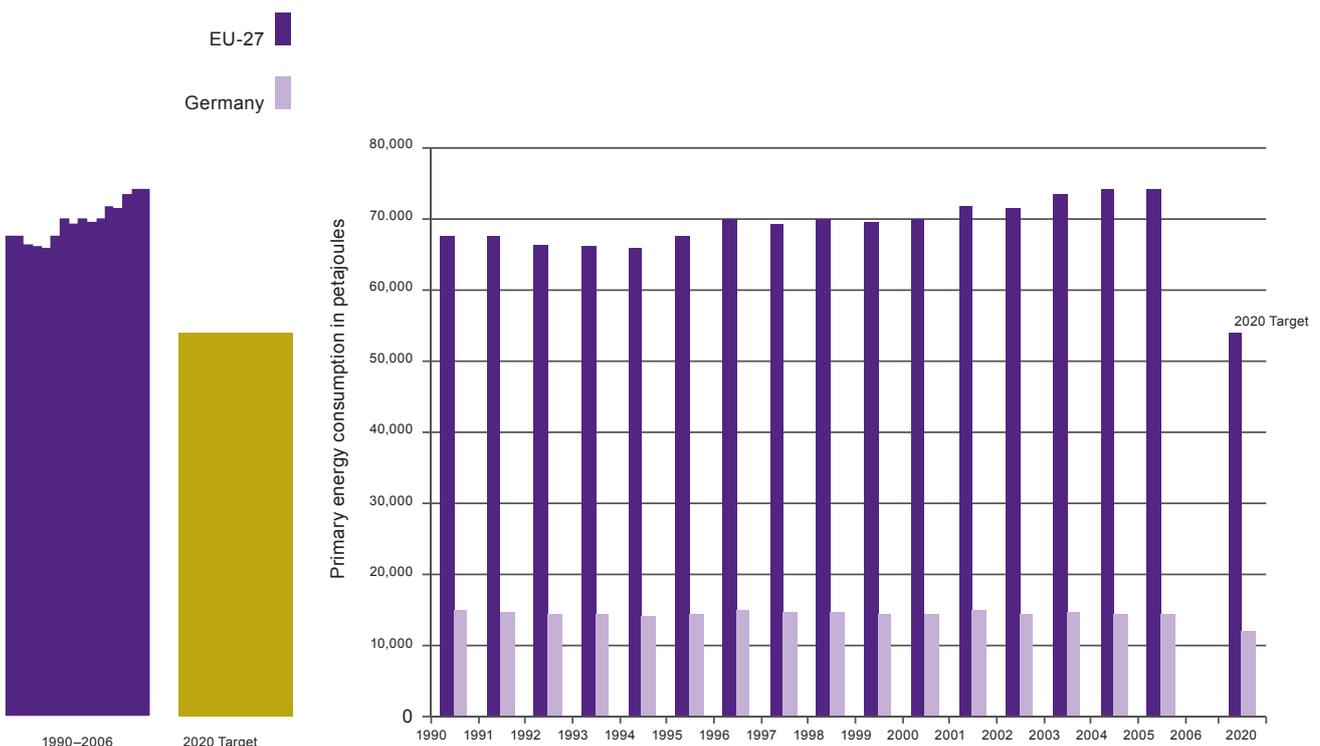
<sup>2</sup> Concerning financial data these sectors can be differentiated into the categories of expenditure in the programme reporting (see details in annex, tables 8-10 in the long version of this study).

## Strategies for sustainable economic activities

The objectives of environmental, resource and climate protection can only be achieved in the framework of an integrated concept of sustainable development. Only the restructuring of economic activities in line with sustainability requirements and the orientation of the related economic policies will allow an adequate response to the major global environmental challenges in the fields of water, climate, habitats, species and soils. For this reason three strategies should be pursued simultaneously and in a way that maximises synergy:

- **Consistency:** there needs to be compatibility between anthropogenic substances and natural processes and the materials cycle; economic activities need to be based on renewable resources and mainly on closed cycles.
- **Eco-efficiency:** minimising the environmental impacts of economic activities, e.g. by minimising the consumption of materials and energy during manufacturing of products and services.
- **Sufficiency:** self-limitation (e.g. of the total CO<sub>2</sub> emissions) and restraint (e.g. during consumption).

Figure 1: Growth in primary energy consumption in Germany and the EU-27 (Source: graphics based on data from the German Federal Environment Agency and European Environment Agency)



In addition to the widest possible replacement of non-renewable raw materials and sources of energy with renewables in the context of recycling concepts (such as cradle-to-cradle), there is a need to further increase eco-efficient use of resources as well as to apply (social) self-limitation, where critical limits could be achieved. The goal of a sustainable economic strategy should be to control the consumption of natural resources and emissions in a way that enables prosperity without destroying the natural capital.

## Failing to achieve the objectives of sustainable development and climate protection

Not only do major studies about the global state of the environment and especially of the climate show how necessary and urgent it is to increase efforts to reduce energy and resource consumption. The development of key environmental indicators, e.g. for CO<sub>2</sub> emissions and energy consumption within Germany and the EU, shows that the goals in the field of climate protection and sustainability cannot be achieved without stronger commitment.

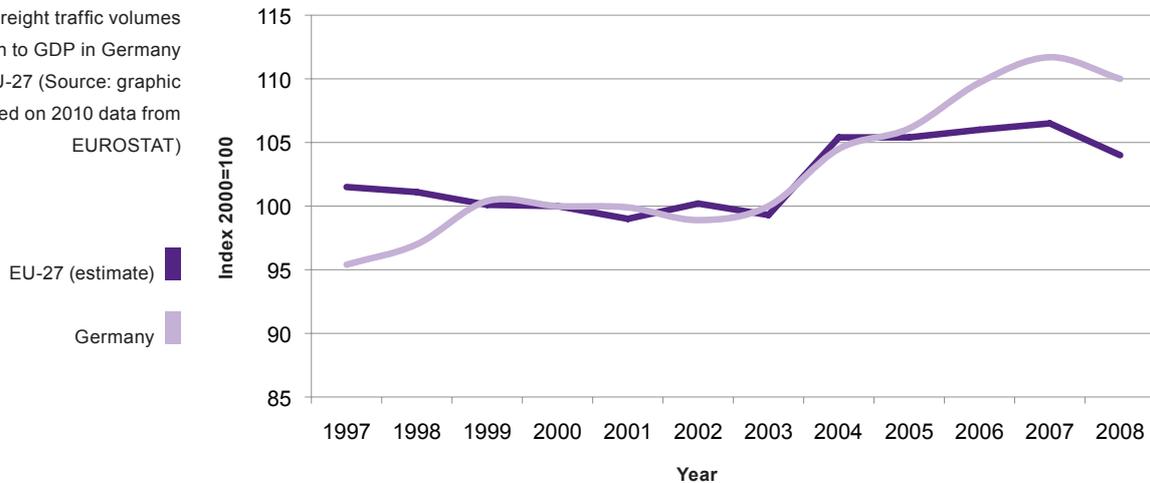
The consideration of the following environmental indicators shows in detail the extent to which the sustainability and climate change policy goals in Germany and the European Union are not yet reached.

Indeed, there has been progress within Germany and the EU in producing energy from renewable sources and in decreasing CO<sub>2</sub> emissions as well as other air pollutants. As evidenced by increasing productivity levels, there is also a more efficient use of energy and material resources. But at the same time the goal of reducing energy consumption by 20 % has been completely missed so far. In Europe, consumption increased from 1990 to 2006 by 10 %; in Germany it has only decreased slightly. Also in terms of doubling energy productivity, Germany lags behind the objectives.

Within the European Union, the pace of improvement in the fields of energy efficiency, renewable energy, energy savings and CO<sub>2</sub> reduction has to be significantly increased to reach the set goals of the European policy on climate change. In Germany, progress on the national policy on climate change is significantly better. However, in view of recent studies, much higher goals need to be set in order to achieve the objective of limiting global warming to 2 degrees Celsius by 2050. Against this backdrop, increasing climate protection efforts are also needed in Germany.

The objective of decoupling traffic volume and economic development and its expected positive environmental effects have been missed completely, so far. Freight traffic volumes in Germany have increased in proportion to GDP by about 10 %; developments in Europe are similarly unfavourable, although since 2005 less pronounced – between 2000 and 2008 an increase of about 4 % was witnessed. So, instead of the desired decoupling of freight traffic from economic development, the opposite has occurred, meaning that traffic has increased. The intensity of passenger transport decreased in Germany by 4.2 % (and in Europe by 6.9 %) from 2000 to 2007. But the pace is too low to achieve the policy objective for sustainability as set by the federal government. Because this trend can be seen as a result of the further increasing division of labour within and between economies, which is difficult to affect, the increased use of green transport and eco-efficient organisation in combined modes of transport becomes all the more important.

Figure 2: Freight traffic volumes in relation to GDP in Germany and the EU-27 (Source: graphic based on 2010 data from EUROSTAT)



On the one hand, the analysis of the European and national policies on sustainability and climate change shows that many crucial challenges are aptly identified. But on the other hand, in general only a small number of concrete goals are quantified in the end and thus verifiable. Only in the field of climate protection are there clear aims which take into account the level and thus the strategy of sufficiency of sustainable development through limitation of CO<sub>2</sub> emissions. Apart from that, the majority of quantified targets in the sector of energy and climate protection are limited to the strategy of eco-efficiency. In the fields of materials and resource policy, there are no concrete objectives, except for the goal of decreasing the intensity of resource use in Germany. Here it is also important to deal with the ecological quality of materials, including their eco-toxicity and their impact on public health, as well as to promote and require conversion to renewable resources. Overall it can be noted that – with few exceptions – German and European policies overemphasise eco-efficiency and neglect sufficiency and consistency. This overemphasis on boosting efficiency and efficiency-related indicators risks losing sight of the critical level of energy and material consumption, as well as of total emissions.

## Promote eco-innovation in future lead markets and fields of technology

The active promotion of eco-innovation in the context of specific branches, technologies and clusters can be regarded as a key strategic point in becoming sustainable. As innovation policy is central to its funding, the ERDF could contribute considerably to the implementation of this strategic approach. Specific support for eco-innovation could help to direct the innovation process, the pace of technological progress as well as growth in key economic sectors in a specific direction. In addition to the promotion of environmental technologies in the narrow sense, it is necessary to consider eco-efficiency in all fields of technology. Environmental and resource-saving eco-efficient technologies have the potential to take the role of a leading industry. Industrial transformation has happened in the past around industrial clusters and the associated leading technologies. As current research findings show, forcing eco-efficient innovation and diffusion onto lead markets of pioneer countries such as Germany is possible. The key lead markets of the future – not only in environmental terms – are, amongst others:

Energy technologies, especially renewable energy sources such as hydropower, solar thermal energy, photovoltaic, wind energy, geothermic, biogas and biomass power plants and energy-storing technologies. To harness these technology-based potentials fully, a corresponding expansion of energy grids is needed, especially in the power transmission sector, meaning smart-grids, which allow the load-dependent control of electricity consumption.

Sustainable mobility technologies, especially alternative propulsion systems such as fuels from biomass (second generation), electric and hybrid drive systems, building and extension of efficient logistic systems for freight transport and the development of green transport infrastructure.

Energy efficiency as well as resource and material efficiency, especially energy-efficient cross-cutting technologies such as measurement, control and regulating systems, systems of plant automation and more efficient electric motors, HVAC, low-energy houses/passive houses, energy-efficient products like electrical appliances (“white goods”), material efficient construction (“green design”) and the extension of product lifetimes as well as use of alternative, renewable materials and natural products.

Life science and biotechnologies, especially in the field of industrial biotechnology and the use of renewable resources in chemistry, even though this field also takes risks through the use of genetic engineering.

With investment instruments (such as grants, loans, guarantees, etc.) and direct project funding, the ERDF can be used specifically to support “radical” eco-innovations:

- which initiate basic improvements, e.g. a switch to renewable energy sources and renewable raw materials; and
- which develop a widespread impact and thus cause great quantitative improvements, e.g. through the introduction and diffusion of new technologies to the market.

# ERDF FUNDING IN GERMANY 2007-2013

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How can current ERDF funding practices be evaluated as an instrument for environmental, resource and climate protection? To answer this question, we first consider indicative financial allocations, and then analyse innovation policy within the “funding philosophy“, as well as focus on environmentally relevant lead markets and technologies of the future.

In addition, industry eco-efficiency is discussed, and, finally, selected funding in the energy, biotechnology and transport sectors are presented in short case studies.

## Financial resources and use of funds

The evaluation of cash distribution (based on the data from the programme planning) takes place from the perspective of: (1) what budget share is used for funding measures primarily linked to the environment<sup>3</sup> (i.e. is there a clear focus on environmental goals in these measures) and (2) what share is used for measures potentially linked to the environment. The latter category consists of innovation-related measures which pursue other goals primarily, but which can also have positive effects on the environment in terms of a coupling product.

The first category of funding measures includes five main groups:

- Environmental protection linked to production
- Energy
- Climate
- Transport and
- Environmental protection and risk prevention

The second funding category consists of the groups:

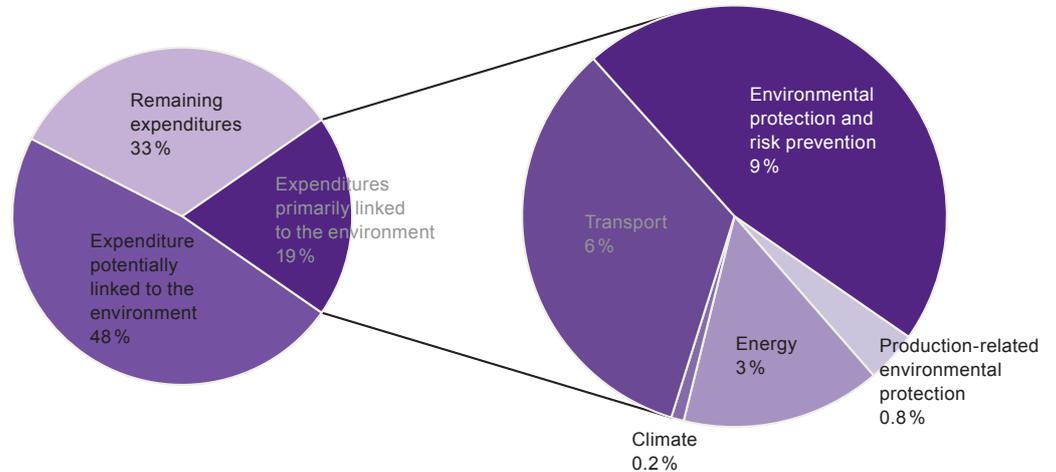
- Research and technological development (RTD), innovation and entrepreneurship
- Information society

The share of measures primarily linked to the environment is low, with 19 % of the total budget, meaning just over €3 billion. The measures which could be potentially linked to the environment include almost half of the total ERDF budget (about €7.8 billion), as the area of research and technological development has a high priority due to the Lisbon strategy. In the area of measures potentially linked to the environment there could be a significant impact if requirements for environmental innovations are successfully anchored in the programme. This could increase the currently low budget share of 19 % which is invested directly in environmental protection and sustainable development.

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<sup>3</sup>“Linked to environment” means the orientation of funding measures which benefit environmental and climate protection.

Figure 3: Expenditures primarily linked to the environment



The largest financial share of the measures primarily linked to the environment is found in environmental protection and risk prevention. These are policies and actions to prevent and manage natural and technological hazards, sewage treatment and the redevelopment of contaminated industrial sites and areas of particular importance. With almost half the budget of all measures primarily linked to the environment (just under €1.5 billion – about 9% of the total ERDF budget), this sector is significantly ahead of the second ranked sector, transport (which accounts for about one-third of the funding for environmental measures). One criticism is that only 0.2% of the total ERDF budget (about €30 million) is foreseen for further measures to improve air quality, adapt to climate change and mitigate its effects.

The conclusions can be drawn as follows:

In the future, the budget for ERDF funding measures primarily linked to the environment should be raised for the increasingly important areas of transport, energy, climate protection and climate change adaptation as well as for production-related environmental protection (at present covering a total of around 10% of all ERDF funds). Since significant financial resources have been invested in the infrastructure of water supply and wastewater treatment in the previous funding periods in Germany, in the future less funding will be required in this area.

The ERDF contribution to environmental protection and sustainable development could be increased considerably if requirements for eco-innovation were integrated into the various funding measures for the promotion of innovation (measures potentially linked to the environment).

## Orientation of innovation policy under the ERDF

**Support for innovation without an environmental focus fails to achieve ambitious climate and environment goals**

Innovation policy under the ERDF is based on a comprehensive and systematic understanding of innovation with a variety of support measures and instruments (promotion of knowledge and technology transfer of research and development, innovation financing, start-up support). The predominantly supply-oriented policy aims to improve the comparative competitive situation of regions through the improved provisioning of potential economic factors. These include innovation-based corporate development for which investment should be stimulated, and which in turn can lead to better utilisation and realisation of innovation potential.

Yet there is no prominent role for the promotion of eco-innovation. Rather, the focus is on the overall development and implementation of new ideas, knowledge and technologies into marketable products as well as on efficient processes and purposeful solutions that can compete on the world market. This approach may indeed achieve efficiency enhancement. But due to the lack of goal-directedness in environmental terms, innovation policy remains far below its potential. Insufficient consideration of the sufficiency and consistency dimensions is compounding this deficit. Hence, it is likely that ambitious environmental and climate goals can only be partially realised.

Despite the environmentally undirected nature of the funding philosophy of the German ERDF, an analysis of the innovation support provided by individual ERDF programmes shows that eco-relevant technologies, industries and lead markets are taken into account.

Studying the content and conceptual focus of the innovation support reveals that all environmentally relevant industries, lead markets and technologies of the future are addressed in the operational programmes of the ERDF funding. Most frequently these are cross-cutting technologies such as material and resource efficient technology, followed by life science and biotechnology, information and communication technologies and the funding areas of energy, transport and logistics in the scope of the eligible projects.

The consideration of all environmentally relevant industries, lead markets and future technologies within the operational programmes of the ERDF funding is, however, no indication of how much funding has been set aside for these areas and whether these eco-innovation areas are ultimately benefiting from funding. Therefore, the actual use of financial means under the German ERDF has been compared to an eco-efficiency analysis of different economic sectors. The eco-efficiency analysis highlights those sectors which are performing particularly critically and thus have an urgent need for eco-innovation. The analysis shows to what extent these critical sectors are benefiting from the German ERDF funding.



## Eco-efficiency of industry

For the eco-efficiency analysis of economic sectors in Germany, a method was developed which allows the calculation of eco-efficiency parameters on the basis of publicly available data. The eco-efficiency parameters are calculated from the ratio of environmental pollution to gross value added which are based on a one-year period and differentiated for specific economic sectors.

The following conclusions can be drawn from the results of the analysis:

- Eco-efficiency varies significantly between manufacturing industry sectors, which means that needs can be assessed according to economic sector as ranging from “low to high”.
- The energy supply sector (NACE Rev.1.1:40)<sup>4</sup> has a high need for funding, because it has the lowest eco-efficiency rate of the economic sectors analysed in Germany.
- Although the energy supply sector is addressed by many measures (e.g. use of renewable energies, research into energy technologies and measures to increase energy efficiency), it is only funded by a small budget (just about 3.3 % of the available funding and only 0.2 % of all funds actually used by the end of 2008).
- Economic sectors whose eco-efficiency is significantly improvable are the industries of coke production, refined petroleum products and nuclear fuel (NACE Rev.1.1:23), manufacturing of glass and glass products, ceramics and non-metallic mineral processing (NACE Rev.1.1:26), manufacturing and casting of basic metals (NACE Rev.1.1:27) as well as manufacturing of chemicals and chemical products (NACE Rev.1.1:24).

The conclusions emphasise that ERDF funding in Germany is only slightly focused on industrial eco-efficiency, so far. But where such an orientation occurs, for example in the energy sector, only a small proportion of the financial means are being provided.

**ERDF funding in Germany is only slightly focused on industrial eco-efficiency**

In-depth evaluation of selected areas:

The funding areas of energy, biotechnology and transport were analysed as case studies to determine whether or to what extent the practice of funding fulfils sustainable development requirements based on environmental and climate protection objectives.

\* **NACE:**  
EU economic-sector classification system

<sup>4</sup>NACE Rev.1.1: Classification of Economic Activities in the European Community



## Energy

Our analysis of the area of energy funding makes clear that the funding of energy technologies, industries and clusters linked to the environment is subject to many ERDF programmes but has a low budget share. Because of low eco-efficiency within the energy supply sector and its high relevance in terms of climate, resource and environmental protection, increased funding is important.

There are various instruments which can be used meaningfully in the energy sector. Good practice examples in the field of cluster development in the photovoltaic industry or the use of internal energy efficiency improvements indicate this. Competition based project selection procedures should be used more often in future for certain energy technology sectors because of the attendant possibilities and advantages, such as target-oriented promotion of eco-innovation, a mobilisation effect and the transparency of the procedures.

With respect to the lead market of energy and efficiency technologies, in the future ERDF funding should be aligned with the guiding principles of sustainable energy supply and made operational by fact-based criteria. There are quantitative and qualitative criteria which need to be considered of which seven key examples are given hereafter:

- Amount of energy saved by reduction in energy consumption, in kilowatt hours per year.
- Amount of power generated from renewable energy sources, in kilowatt hours per year.
- Amount of renewable energy sources which are absorbed into the energy grid.
- Efficiency increases during conversion into electricity of fossil fuels and renewable energy sources as a percentage.
- Knowledge and know-how transfer in production and usage of renewable energy resources as part of the funding projects.
- Consulting and coaching services for efficiency enhancement of products and production processes as part of the funding projects.
- Strengthening the value added chain of renewable energies and efficiency technologies as part of the funding projects.

**With respect to the lead market of energy and efficiency technologies, future ERDF funding should be aligned with the guiding principles of sustainable energy supply**

## Biotechnology



**Industrial biotechnology should be supported in areas where it can be the most promising ecological as well as economical alternative.**

So-called white or industrial biotechnologies (IBT)<sup>5</sup> are considered to be particularly relevant for a sustainable economy, as they offer the potential for (1) resource and energy-saving production techniques, (2) the substitution of toxic and poorly degradable substances, and (3) the development of renewable raw materials as input resources for materials and industrial products. White biotechnologies are also regarded as relevant because they can potentially address not only efficiency requirements, but also the consistency of materials and material flows. The development of renewable raw materials as inputs for industrial production and the resulting conservation of fossil resources helps to reduce greenhouse gas emissions and thus contribute to climate protection. Although the quantitative importance (in terms of number of enterprises, employees and their turnover) is currently still small, there are many possible applications, whose exploration is in many cases just beginning.

Products and processes of the interdisciplinary technology IBT are deployed in many areas, amongst others in the chemical, food and pharmaceutical industries, but also in the feed, paper, textile, leather and energy industries as well as in pulp and paper processing. They are often inexpensive and in many cases environmentally friendly alternatives to traditional methods and thus of great importance in the context of cleaner production. Biotechnologically engineered non-toxic enzymes in detergents thus ensure, for example, that large amounts of other polluting “wash-active” substances can be avoided.

To take advantage of the opportunities offered by IBT and its potential to optimise eco-innovation, it is useful to consider environmental quality objectives and appropriate eligibility criteria. This means that industrial biotechnology is not promoted for its own sake, but should be used where it can be the ecologically as well as the economically most promising alternative.

The essential criteria for the promotion of eco-innovation in industrial biotechnology are listed below:

- The funding (or projects being supported) should be linked to specific environmental objectives, e.g. the reduction of emissions which contribute to air and water pollution.
- Projects which are able to provide radical environmental improvements should be given priority.
- In principle, renewable raw materials should be preferred as inputs, whereas projects should be particularly grant-worthy if they use renewable resources from the non-food area, or waste from the food industry.
- Applications for funding projects should be based on life cycle assessments (LCA) and life cycle considerations. These should be supplemented by analysis of the sustainability of biotechnological processes if necessary and thus take into account intermediate consumption and use-related environmental impacts.

<sup>5</sup> Biotechnology is defined as the scientifically justified use of living organisms or parts of them to produce goods or services using modern technologies.

- Projects should indicate a reference to applications, i.e. they should primarily arise from industrial R&D or innovation support. Therefore, the primary goal should be the implementation of basic knowledge into business practice.
- The funded projects should have the chance to attain high market penetration and thereby widespread impact.

Based on the analysis of several funding case studies it is clear that environmental and user needs are only a minor issue in the current promotion of industrial biotechnology under the ERDF. By waiving environmental eligibility criteria, the biotechnology industry's potential to benefit the environment and climate remains idle. Furthermore, due to the focus on basic and industrial research and development (R&D), the potential of IBT applications for the broad-based diffusion of eco-innovation in user industries is not taken adequately into account.

Our conclusion from the case studies of IBT funding under the ERDF is that a realignment of German biotechnology funding should be considered. The discussion of the reorientation of such funding should consider specific environmental eligibility criteria and objectives for the purposeful support of eco-innovation. Greater involvement of stakeholders who guarantee compliance with specific environmental eligibility criteria should be considered, e.g. through participation of environmental organisations or scientific advisory boards. In addition, affirmative action should be introduced to ensure a targeted use of funding for eco-innovation. The participation of the demand and user-side in support measures should be taken into account to allow for need-based funding. Furthermore, realigning support to focus on applied research projects ought to be examined, because this allows for a distinction to be made between focus and niche application industries and consequently more prospects for climate, resource and environmental protection. It means that where IBT applications are already available on the market (main user industries), primarily instruments to promote innovation and diffusion are used. In the niche user industries, industrial R&D and promotion of innovation should be strengthened to achieve the enhanced viability of IBT applications.



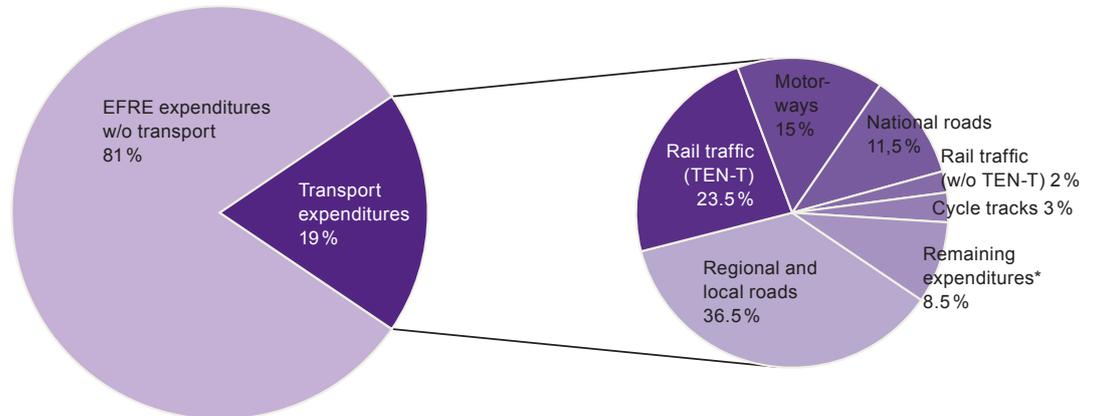
## Transport

According to the operational programmes of the federal states and the operational programme “Transport Infrastructure of the Federal Republic of Germany”, more than €3 billion in ERDF funding is allocated to the transport sector in the current funding period of 2007-2013. This is almost one-fifth (18.75 %) of the total ERDF funding which is available in Germany.

With more than 36 % of the funding, the largest share is for regional and local roads, followed by the categories of railways (TEN-T) which has just under a quarter of transport's financial resources. The latter amount is completely from the federal transport programme. With about 11 %, after motorways (15 %) the national roads are the fourth largest expenditure category. All other categories comprise well below 5 %.

Figure 4: ERDF funding in the transport sector (about €3 billion)

\*Remaining expenditures are here representative for motorways (TEN-T), multimodal transport, intelligent transport systems, airports, ports, regional and local inland waterways (TEN-T).



**Only one-third of ERDF support for transport can be classified as environmental friendly**

Only a third of the total ERDF funding which is earmarked for the transport sector can be described as linked to the environment.<sup>6</sup> In relation to the above mentioned problems caused by traffic, this proportion is clearly too low. In fact, almost €2 billion (over 63%) is designated for the construction and maintenance of motorways, national roads as well as for regional and local roads. In particular, the funding of railways (without TEN-T) is far too low, comprising some 2% of the funds (just under €70 million). Even the amount being invested in cycle tracks is (with more than 3% share) higher.

Against the background of rising CO<sub>2</sub> emissions related to transport, also mentioned earlier, the distribution of funds must be assessed very critically. About 20% (nearly 200 million tonnes) of all CO<sub>2</sub> emissions in Germany are from the transport sector, 109 million tonnes of which are from cars and 50 million tonnes are truck-related. Therefore the two modes of transport are far ahead of CO<sub>2</sub> emissions produced by air traffic (19 million tonnes) and clearly ahead of rail-related CO<sub>2</sub> emissions (only 8 million tonnes). The average CO<sub>2</sub> emissions per passenger per kilometre for cars are 147 grammes, whereas long distance railways produces only about a third of that, namely 54 grammes. The current distribution of funding means that the federal transportation programme's effective contribution to climate protection remains far below its full capacity.

<sup>6</sup>Cf. table 8 in the annex of the long version



# INNOVATION POLICY

Within the European Regional Development Fund, innovation is one of the priority fields of intervention. Solely in Germany are 48% of all ERDF funds allocated to this area.

# TRANSPORT

Only one-third of ERDF support for transport can be classified as environmentally friendly. Funding should be completely shifted towards sustainable mobility.

# ENERGY

ERDF funding for energy and efficiency technologies should be aligned with the guiding principles of sustainable energy supply.



# BIOTECHNOLOGY

Industrial biotechnology should be supported in areas where it can be the most promising ecological as well as economical alternative.

# ECO-INNOVATION

ERDF funding has to set up obligatory targets to support important lead-markets and fields of technology.

	<p><b>Why we are here</b> To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.</p> <hr/> <p>wwf.de</p>
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