

COHESION POLICY AND SUSTAINABLE DEVELOPMENT

A Literature Review

Supporting Paper 1

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1 INTRODUCTION

This is the literature review report and Supporting Paper 1 to the final report¹ of the project ‘Cohesion Policy and Sustainable Development’ (contract number: 2009.CE.16.0.AT.069 and 2009.CE.16.C.AT.035). It has been drafted by the Institute for European Environmental Policy (IEEP) with CEE Bankwatch Network (hereafter Bankwatch), BIO Intelligence Service S.A.S, GHK, Institute for Ecological Economy Research (IÖW), Netherlands Environmental Assessment Agency (PBL) and Matrix Insight.

This report should be quoted as follows:

Medarova-Bergstrom, K., Hjerp, P., Cachia, F., Evers, D., Grubbe, M., Hausemer, P., Kalinka, P., Kettunen, M., Medhurst, J. Skinner, I. Thissen, M., and ten Brink, P., (2010) *Cohesion Policy and Sustainable Development-a literature review*, Supporting Paper 1. A report for DG Regio, April 2010.

This literature review is part of the study examining how Cohesion Policy can contribute to managing the shift to the green economy and to develop the framework for Cohesion Policy post 2013, by addressing the following questions:

- How can Cohesion Policy contribute to the shift to the green economy?
- What win-win solutions exist between economic/social and environmental objectives, which could be financed through Cohesion Policy?
- What harmful subsidies with a negative impact on the environment, nature and ecosystems exist, and what are the potential alternatives to these, taking into consideration the impact on the economic and social pillars?
- Is there a need for a change in Cohesion Policy to enhance integration of environmental considerations and win-win solutions?
- How can policy options enhancing environmental sustainability be incorporated into a consistent and complex regional development strategy and governance system?
- What policy options exist related to ensuring the effective delivery of sustainable development within Cohesion Policy, particularly in relation to the application of polluter pays principle and financial engineering?

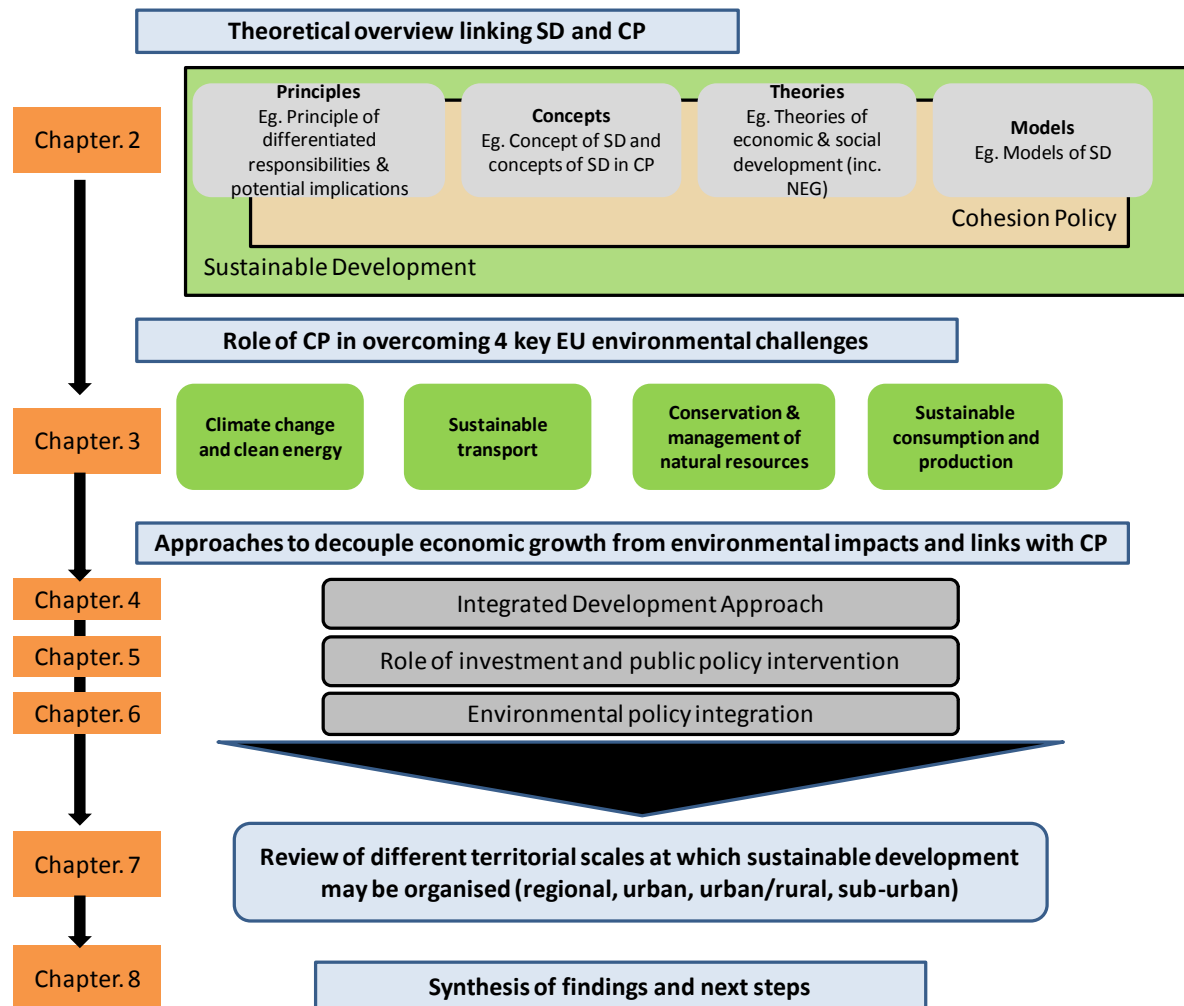
The focus of the study is on the four key environmental themes, climate change and clean energy, sustainable transport, conservation and management of natural resources and sustainable consumption and production, identified by the EU SDS. Due the importance of biodiversity in context of Cohesion Policy, biodiversity will be given special attention under the “management of natural resources”, as a sub-theme.

The purpose of this literature review is to provide a solid platform on which to build the rest of the tasks as well as being a comprehensive document on its own right on how Cohesion Policy can contribute to managing the shift to the green economy and develop the

¹ Hjerp, P., Medarova-Bergstrom, K., Cachia, F., Evers, D., Grubbe, M., Hausemer, P., Kalinka, P., Kettunen, M., Medhurst, J., Peterlongo, G., Skinner, I. and ten Brink, P., (2011) *Cohesion Policy and Sustainable Development*, A report for DG Regio, October 2011

framework for Cohesion Policy post 2013. More specifically this literature review has and will directly contribute to the development of the methodology report, setting the approach taken for the rest of the tasks. A schematic overview of the literature review is given in Figure 1.

Figure 1: Schematic Overview of the Literature Review



The structure of this literature review is as follows.

Chapter 2 presents the theoretical overview and consists of the underlying principles, concepts, theories and models in a number of areas, including:

- Sustainable Development in Cohesion Policy;
- Models of Sustainable Development;
- The Relationship between Theories of Development and Sustainable Development
- Principle of differentiated responsibilities and potential implications for development pathways and technological lock-ins;
- Theories of Economic and Social Development, including in particular NEG (relationship between economic, social and economic dimensions); and
- Role of deliberative and participatory processes in ensuring SD.

Chapter 3 provides a summary of the situation in the EU regarding the four key environmental challenges and the role of Cohesion Policy in this.

Chapter 4 summarises integrated development approaches, which enhance economic development under environmental constraints (such as carbon constrained world and changed climate conditions).

Chapter 5 looks at the role of investment and other public policy interventions, it more specifically provides a summary of existing literature with regard to:

- The impact of investment on growth, jobs and competitiveness, specifying what impacts can be expected for the different types of investment;
- The costs and benefits of climate- and biodiversity-proofing investments
Identification of investment categories with the potential to contribute to sustainable development, with a categorisation of potential interventions according to economic and environmental performance and a list of potential win-win interventions; and
- Cohesion Policy investments with high negative environmental externalities.

Chapter 6 discusses the methods and criteria to assess for environmental policy integration.

Chapter 7 consists of a review of different territorial scales at which sustainable development may be organised (regional, urban, urban/rural, sub-urban) and provides examples of interventions which may require interregional co-operation.

Chapter 8 concludes by providing a synthesis of the findings so far and next steps.

2 THEORETICAL OVERVIEW

2.1 Background

2.1.1 *EU Cohesion Policy and Structural Funds*

Since the beginning of European integration processes financial instruments and initiatives have existed to address economic and social imbalances. Co-financing of projects in Member States has been under way by the ESF since 1958, the European Agricultural Guidance and Guarantee Fund since 1962 and the ERDF since 1975 CEC (2008e). However, the legal basis for these instruments was only put in place in 1986 by the Single European Act². The Treaty of Lisbon, which entered into force in 1 December 2009, amends the Treaty of the European Union (TEU) and the Treaty on the Functioning of the European Union (TFEU) (former Treaty establishing the European Community (TEC)) without replacing them. The legal basis of the Cohesion Policy is stipulated in Articles 174-178 of the TFEU (OJ 2008).

Article 174 of the TFEU (former Article 158 of the TEC) stipulates that:

‘In order to promote its overall harmonious development, the Union shall develop and pursue its actions leading to the strengthening of its economic, social and territorial cohesion’.

Originally, EU Cohesion Policy focused on economic and social cohesion by providing support to poorer regions to compensate them for the negative effects from adjusting to the European market. From this perspective, Cohesion Policy had a purely compensatory nature. Under the current 2007-2013 period there is already a shift in the focus of the policy by aligning it more closely to the objectives of the Lisbon Strategy for growth and jobs, thereby the policy also started to support richer regions in order to stimulate growth and facilitate job creation. The objective of ‘territorial cohesion’ is added by the Treaty of Lisbon alongside the objectives for economic and social cohesion and is currently subject of a reflection process which aims to provide a definition.

The general debate on territorial cohesion began in the early 1990s and has led to a number of developments including: the adoption of the European Spatial Development Perspective (ESDP) in 1999; reinforcing cooperation through the INTERREG programme; the establishment of the European Spatial Observatory Network (ESPON); and the adoption of the territorial agenda and its Action Plan in 2007. However, the current more specific debate started in October 2008 with the publication of the Green Paper on Territorial Cohesion (EC 2008a) which was subject to a public consultation. This debate is occurring within a much wider reflection process on the future of EU Cohesion Policy.

An exact definition of territorial cohesion has at the time of writing not yet been decided. However, the concept of territorial cohesion is based on the logic that different

² The Single European Act (SEA) signed in Luxembourg on 17 February 1986 by the nine Member States and on 28 February 1986 by Denmark, Italy and Greece, is the first major amendment of the Treaty establishing the European Economic Community (EEC). It entered into force on 1 July 1987.

geographical areas, such as mountain ranges or remote islands, have inherent features which bring specific development opportunities or problems, and therefore territories require their own tailored development programmes. The concept also entails more coordination between regions and Member States which span territories such as mountain ranges or coastal areas, and involve greater consideration and coordination of the territorial impacts of many of the EU's policies across these territories such as energy, environment, transport and so on.

The European Regional Development Fund (ERDF) was established in 1975 following the findings of the so called 'Thompson Report' (COM (73)550), published by the European Commission in 1973, which concluded that 'although the objective of continuous expansion set in the Treaty has been achieved, its balanced and harmonious nature has not been achieved'. Initially, the fund was set up for a three-year period with a budget of €1,300 million. The amount of funding for Structural Funds was significantly increased over time:

- In March 1988, the European Council in Brussels allocated ECU 64 billion to the Structural Funds - a doubling of annual resources compared to the previous period;
- In December 1992, the European Council allocated ECU 168 billion for the Structural and Cohesion Funds for the Financial Perspective 1994-1999 which was a third of the EU budget;
- Following a decision taken by the European Council in March 1999, the 2000-2006 budget for Cohesion Policy totalled €213 billion for the fifteen Member States; and
- An additional allocation of €22 billion was provided for the new Member States for the period 2004-2006.
- The European Council agreed in December 2005 on the budget for the period 2007-2013 period and allocated € 347 billion on Structural and Cohesion Funds.

The most recent reform of Cohesion Policy for 2007-2013 has to be understood from the context of the increased regional disparities of the inclusion of the ten new Member States as well as the increased focus on the renewed Lisbon strategy of 2005 on growth and jobs. As a consequence most of the resources have been targeted for the Convergence objective with a focus on the less developed regions.

The Community Strategic Guidelines 2007-2013 (EC 2006) established the framework for Cohesion Policy for the 2007-2013 programme cycle. The Guidelines were entitled Cohesion Policy in Support of Growth and Jobs, and emphasise key elements of the Lisbon Strategy, including three overall priorities for programmes financed through Cohesion Policy:

- Improving the attractiveness of Member States, regions and cities by improving accessibility, ensuring adequate quality and level of services, and preserving their environmental potential;
- Encouraging innovation, entrepreneurship and the growth of the knowledge economy by research and innovation capacities, including new information and communication technologies; and

- Creating more and better jobs by attracting more people into employment or entrepreneurial activity, improving adaptability of workers and enterprises and increasing investment in human capital.

The General Regulation 1083/2006/EC defines the principles, rules and standards for the European Regional Development Fund (ERDF) and the European Social Fund (ESF) as well as the Cohesion Fund for the programming period 2007-2013. The principal purpose of the Structural Funds (ERDF and ESF) is to promote the economic and social development of disadvantaged regions, sectors and social groups within the EU and to ‘contribute to the harmonious, balanced and sustainable development of economic activities, the development of employment and human resources, the protection and improvement of the environment, and the elimination of inequalities, and the promotion of equality between men and women’.

The Regulation 1084/2006/EC seeks to address this issue by placing the operation of the Cohesion Fund within the framework of the Structural Funds, including requirements in relation to participation, and sustainable development. The Cohesion Fund is intended to strengthen economic and social cohesion within the Community through the provision of EU finance to programmes and projects in the poorest Member States, specifically in the fields of environmental protection and transport infrastructure.

2.1.2 Sustainable Development and Cohesion Policy

Article 3 of the Treaty of the European Union states the objectives of the European Union and defines the principle of sustainable development with its three pillars – economic, social and environmental:

‘It shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance.’

Article 11 of the TFEU further stipulates the principle of environmental integration:

‘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.’

The Lisbon Treaty leaves the EU’s core provisions on environmental policy substantively unchanged. A specific reference to combating climate change is included in relation to ‘promoting measures at [the] international level to deal with regional or worldwide environmental problems’ (Article 191 TFEU (former Article 174 TEC)). Article 191 (2) also stipulates the key principles of environmental policy: precautionary principle, prevention at the source of environmental problem and polluter pays principle.

A series of reforms in the EU regional policy were also undertaken to accommodate the integration of environmental objectives. Since 1988, Structural Fund programmes have taken into account environmental requirements and from 1993 environmental sustainability

became a necessary component of the development strategies of Member States. Analysis of the first ‘greening’ of regional policy in the 80s notes that ‘procedural guidance’ on EPI by the Commission (ie environmental profile, list of indicators, handbook on environmental impact assessment, etc.) played a crucial role (Lenschow 2002).

In the 90s the Commission undertook a more ‘indirect steering role’ relying on active initiatives by Member States. This did not prove to be very effective approach and soon the Commissioner for Environment at that time, Margot Wallström, stressed she will play the role of a ‘policewoman’ towards Member States and warned that EU funding could be withheld in case of breaches of EU environmental *acquis* (Lenschow 2002).

Since 2000 Structural Fund programmes have been subject to a more systematic and comprehensive framework integrating environmental considerations into all aspects of programme development and implementation. In the 2007-2013 period the concept of ‘environment’ and ‘sustainable development’ were articulated as ‘horizontal principles’ and environmental authorities were encouraged to actively participate in the full policy cycle of regional programmes (Wilkinson 2007). The result has been a greater emphasis in programmes on projects directly related to environmental sustainability, such as projects and partnerships to promote eco-industries and clean technologies, sustainable tourism activities, cleaner public transport, as well as the construction of large environmental infrastructure. The ‘earmarking’ of slightly more than 65 per cent of the regional funding to the Lisbon Strategy objectives however down scaled the integration efforts and again reaffirmed the superiority of economic objectives over environment ones.

The current set of requirements imposes four obligations:

- to analyse the environmental situation of the programme area;
- to appraise the environmental impact of the proposed strategy based on the principles of sustainable development and in agreement with Community law;
- to make arrangements to involve the competent environmental authorities in the preparation and implementation of the proposed operations; and
- to comply with Community environmental policy and legislation.

The guidelines also call for strengthening the synergies between environmental protection and growth, through actions to:

- Address the significant needs for investment in infrastructure (particularly in convergence regions) to comply with environmental legislation in water, waste, air, nature and species protection;
- Promote land-use planning to ensure attractive conditions exist for businesses and skilled staff, such as through reducing urban sprawl and the rehabilitation of the natural environment;
- Promote investments which contribute to the EU Kyoto commitments; and
- Undertake risk prevention measures through improved management of natural resources.

These guidelines recognised that environmental investments have economic benefits - decreased external environmental costs; stimulation of innovation, and job creation. The

provision of environmental services (eg waste and wastewater treatment), natural resource management, land decontamination and protection against environmental risks, were identified as being of priority, and emphasis was placed on tackling environmental pollution at its sources. They also call for improvements in energy efficiency and renewable energies.

A Commission Communication on the results of the negotiations concerning Cohesion Policy strategies and programmes for the programming period 2007-2013 (CEC 2008f) revealed that Member States have largely focused on allocating EU funds to ensure accessibility through prioritising measures to respond to globalization and structural changes. New Member States for instance focused on developing transport infrastructure by channelling 24 per cent of the total EU funds allocation for such investments. Innovation and Research and Development was also among the priorities in all Member States receiving 25 per cent of the total funding while entrepreneurship and business support received 8 per cent. In the social domain, Member States concentrated EU funds into participation in the labour market and development of new skills for workers, integration of immigrants and social inclusion.

According to the Commission's figures in its Communication (CEC 2008f) environmental measures received approximately €105 billion for the 2007-2013 financial period, which is 30 per cent of the total EU Structural Funds and two times more than environmental allocations in 2000-2006. Majority of these investments are devoted to direct infrastructure investments related to water and waste treatment, renewal of contaminated sites, pollution reduction, and support for nature protection and risk prevention. For example, Romania has channeled 80 per cent of its Cohesion Fund allocated for the environment explicitly for the implementation of the EU environmental *acquis*. Latvia, via targeted investments from EU funds, aims to increase the number of inhabitants benefiting from waste water treatment services from 9 percent to 62 per cent. Analysis of the 2000-2006 environmental spending in Spain and Italy showed that EU funds interventions in wastewater treatment contributed to improved compliance with the Urban Wastewater Treatment Directive, although the interlinks between spending and broader impacts on the water quality for instance are difficult to establish (EEA, 2009b).

In addition, around €2.7 billion is to be spent for direct biodiversity and nature protection measures for the 2007-2013 financial period and another €2.5 billion for the promotion of natural assets and natural heritage, some of which can be directly linked to biodiversity (CEC, 2009c). The Commission also maintains that EU funds support indirectly environmentally friendly developments such as clean and efficient energy (€9 billion), sustainable transport systems (€6.2 billion), eco-innovation, environmental management for businesses, urban and rural regeneration, and eco-tourism. However, a number external evaluations of EU funds point to the low level of Structural Funds spending on broader EU environmental objectives such as combating climate change (FOEE and CEE Bankwatch Network 2007; IEEP 2008). These reports also point to the potential contribution of projects, funded through these instruments, to greenhouse gas emissions and therefore their role in undermining EU climate change objectives.

2.1.3 The Barca Report

The EU Commissioner for regional development has suggested that a modern Cohesion Policy must aim to reduce the underutilisation of resources in regions by providing public

goods aimed at improving skills, innovation capacity, entrepreneurship, sustainability, employment or accessibility. In other words, the primary mission of Cohesion Policy should be to enable all European territories to grow at the pace fully reflecting their endowment, including otherwise idle human resources and under-used social capital and infrastructure. In relation to this, the Commissioner asked Dr. Barca (Ministry of Economy & Finance, Italy) to prepare an independent report assessing the effectiveness of the EU's Cohesion Policy to date, and to make proposals reforming it for the period post 2013. The report and its recommendations are not Commission policy, but will contribute significantly to debate on the future of EU funds. Key messages include:

- underlining the significance of Cohesion Policy for fulfilling the EU's development goals as it can tailor interventions to local conditions;
- a critique of current eligibility for EU intervention as it takes no account of functional regions, at very different stages of development; and
- placing emphasis on Cohesion Policy interventions required to support 'core challenges', while supporting local institutions in all regions.

Recommendations for reform post 2013 include a reform of governance arrangements:

- consolidation and simplification of policy goals, concentrating resources on core priorities, with a large proportion of funds (up to 65 per cent) to address fewer (3-4) key priorities;
- a menu of six priority policy areas: innovation and climate change (within an 'efficiency' group); migration and children ('social inclusion' group), and skills and ageing (cutting across both 'efficiency' and 'social inclusion' groups);
- promoting additional, innovative and flexible spending, promoting the principle of additionality through linking all EU funds to domestic public spending and the EU Stability and Growth Pact;
- highlighting the importance of effective quality and performance monitoring for ensuring interventions address policy priorities;
- the report also makes the case for rural development and other funds with a place-shaping role to be brought under Cohesion Policy;
- the units of intervention should be the 'functional region';
- maintaining current proportions for distributing funds between lagging and non-lagging regions (currently 82 per cent of structural funds are concentrated on the lagging or 'convergence' regions);
- promoting experimentalism and mobilising local actors, creating a separate fund of around 0.1 per cent of the total cohesion budget which would be competitively accessed across the EU, to allow local actors to be involved in innovative or experimental projects;
- promoting the learning process, developing mechanisms to share understanding on the success of Cohesion Policy interventions: what works, how it works etc.;

- strengthening the role of the Commission, to play a greater role in the development of place based policy; and
- a further reduction of financial management and control procedures, reducing audit and administrative requirements.

2.2 Concept and Models of Sustainable Development

2.2.1 Background

Perhaps the most well known and often quoted definition of sustainable development comes from the Brundtland Report: 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED 1987,p.43). Brundtland concludes that environmental degradation is linked with patterns of economic development and argues that environment and development policies must be integrated in all countries. It proscribes the centrality of continued economic growth for environmental protection, highlighting the need for multilateral cooperation and reform of economic practices such as trade, finance and aid.

Agreement on the importance of the concept of sustainable development can be found across the political spectrum. The core ideals embedded in it are central to the mechanisms through which Cohesion Policy is expected to manage the shift to a more sustainable economy. Jacobs (1995) highlights the following core objectives:

- economic decisions are to be taken with consideration of their environmental consequences;
- current decisions and practices are to take into account their effect on future generations;
- the right of all people to an environment in which they can flourish is to be respected;
- conservation of resources and protection of the non-human world;
- a wider definition of human well being beyond narrowly defined economic prosperity; and
- institutions are to be restructured to allow all voices to be heard in decision making.

Sustainable development still remains a broad definition, open to interpretation, embodying a range of ideals and principles whose realisation is necessary to a more sustainable future. Diverse groups agree that it is significant but tend to disagree about its implications. Consensus on the importance of the concept can disguise the extent to which it is understood by different people and interests. It is an essentially contested concept - institutional arrangements and policies and strategies do not simply follow from its invocation.

2.2.2 Concepts and Models

Sustainable development is most often conceived in policy and programme design and evaluation as the need for integration of the '3 pillars' of economic, social and environmental interests in order to maximise 'quality of life' (frequently condensed to a consideration of GDP/capita) without compromising the interest of future generations.

The four capitals framework covers economic, social and environmental interests, but distinguishes in the social pillar between human (individual) capital and social capital, concerned with the cultural and institutional arrangements that effect social welfare. The concept of capital derives from economics, whereby capital stocks (assets) provide a flow of goods and services, which contribute to human well-being (Ekins 1992). The Four Capitals can then be defined as:

- **manufactured (or man-made) capital**, broadly synonymous with economic infrastructure;
- **natural (or environmental) capital** covering all forms of eco-systems and natural resources that provide services for social welfare;
- **human capital**, relating to the stock of human productivity potential of individual people based on their health, motivation, talents and skills; and
- **social capital**, relating to the stocks of social trust, norms and formal and informal networks that people can draw upon to access resources and solve common problems.

In its narrowest interpretation capital is used to mean manufactured goods which themselves produce, or facilitate the production of, other goods and services. This kind of capital is referred to as 'manufactured capital'. The concept of capital has been extended in a number of directions, to take into account the quality (as opposed to the quantity) of labour (human capital), the networks through which labour and society more generally is organised and which create the social context for economic activity (social/organisational capital), and the natural resources and environment which both provide inputs into the economic process and maintain the existence of life on earth (natural capital).

It goes further than the three pillars in describing the linkages between the different interests and offers a potentially more powerful appreciation of what the 'integration' of disparate policy interest in support of sustainable development might mean in practice. The model provides an operational definition of sustainable development (rather than general statements describing aspirations) and satisfies the basic test of any conceptualisation of SD of being able to indicate where development might be considered to be unsustainable.

The application of the four capitals model allows decision makers to apply a crucial test – when is development not sustainable? At any given time stocks of particular types of capital are in decline at the same time as other stocks are increasing. The substitution of one form of capital for another has the potential to lead to an overall decline in total capital, and hence unsustainable development. The substitution between capitals, or trade-offs, is a key component of the framework (GHK *et al* 2005). It raises the question of whether it is the total stock of capital that must be maintained, with substitution allowed between the various forms (weak sustainability) or whether, below certain stock levels (critical thresholds), particular components of capital are non-substitutable, ie they contribute to welfare in a unique way that cannot be replicated by another capital component, thus preventing unlimited substitution (strong sustainability).

Sustainable development theories refer to trade-offs to describe situations where an increase in one form of capital is associated with a decline in another. The challenge is therefore to establish the existence and nature of trade-offs (and the extent to which these can be reduced or offset), and to engage in an explicit determination of whether declines in particular forms of capital are unsustainable by reference to the possible existence of

critical thresholds and the acceptability of compensation implicit in the trade-off. The model's evaluation of the contribution of an intervention (such as Structural Funds) to sustainable development depends on the weights attached to different forms of capital.

2.3 Principle of Differentiated Responsibilities and Potential Implications for Development Pathways and Technological Lock-In

2.3.1 Background

The principle of 'common and **differentiated responsibilities**' is based on the principle of equity embedded in international law and has been applied in environmental regimes dealing with global environmental problems. It reflects historically the differences between developed and developing countries in their contribution to global environmental problems on the one hand and their economic and technological capacity to tackle them on the other (CISDL 2002). It translates into 'differentiated environmental standards set on the basis of a range of factors, including special needs and circumstances, future economic development of countries, and historic contributions to the creation of an environmental problem' in order to protect, preserve and enhance the environment. Importantly, this principle underpins the issue of rights, incentives and responsibilities and recognizes that different countries, regions and territories have different capacities at addressing environmental challenges and these capacities will inevitably influence the development pathways and likely technological lock-in of these countries.

Recent work has begun to understand technological change and development in terms of the social, economic and cultural setting in which they develop. This leads to the idea that successful innovation and take up of a new technology depends on the path of its development - so-called '**path dependency**' - including the particular characteristics of markets, the institutional and regulatory factors governing its introduction and the expectations of consumers. Of particular relevance is the extent to which these factors favour incumbent technologies against newcomers i.e. increasing returns to adoption (positive feedback) lead to '**lock-in**' of incumbent technologies, preventing the take up of potentially superior (more sustainable) alternatives.

Arthur (1994) identified four major classes of increasing returns:

- **Scale economies:** When a technology has large set-up or fixed costs, unit production costs decline as these are spread over increasing production volume. An existing technology often has significant 'sunk costs' from earlier investments, meaning that firms will be reluctant to invest in more sustainable alternatives;
- **Learning effects:** As specialised skills and knowledge accumulate through production and market experience, this acts to improve products or reduce their cost (i.e. unit costs declining with cumulative production);
- **Adaptive expectations:** Increasing adoption reduces uncertainty for both users and producers as they become increasingly confident about quality, performance and longevity of the current technology (i.e. there is a lack of 'market pull' for more sustainable alternatives); and
- **Network economies:** Advantages accrue to agents adopting the same technologies as others, creating a barrier to the adoption of a more sustainable technology with different

attributes (i.e. resulting in one technology achieving market dominance at the expense of the other).

2.3.2 Implications of Technological Lock-in for Sustainable Development

The concept of technological lock-in has important implications for the understanding of sustainable development and the policy framework needed to promote this. Unruh (2000, 2002) has argued that industrial economies are in a state of carbon lock-in to current carbon intensive, fossil fuel based energy systems, resulting from a process of technological and institutional coevolution, driven by path-dependency. He introduces the notion of a Techno-Institutional Complex (TIC), to capture the idea that lock-in occurs through combined interactions among technological systems and governing institutions. For such a system, lock-in is intensified by:

- systemic relations among technologies, infrastructures, interdependent industries and users, which act to reinforce the dominance of the system, as physical and information networks grow in value to users as they become larger and more interconnected; and
- institutions that reinforce the technological system, both in terms of formal rules, such as regulatory structures, and informal constraints, such as codes of behaviour.

As a result current carbon-based energy and transportation systems in industrialised countries form locked-in techno-institutional complexes. For example, electricity generation is driven by the desire to satisfy increasing electricity demand and a regulatory framework based on reducing unit price, promoting the building of gas-fired power stations.

2.3.3 Implications Technological Lock-in for Policy

There appear to be two main implications for policy from the idea of technological lock-in:

- Existing technologies, and particularly technological systems, have benefited from a long period of increasing returns. These are reinforced by the institutional factors, acting to lock out the development of new technologies, particularly more sustainable technologies, which have high unit costs and are yet to benefit from scale economies, learning effects, adaptive expectations and network effects; and
- Policies that can act to promote those types of increasing returns in more sustainable technologies have the potential to stimulate the development and take up of those technologies much more rapidly than would otherwise be the case.

Previous work by Anderson (2001), drawing on the views of stakeholders from the business, policy making and academic communities, examined the role of policies in supporting environmental innovation. This outlined the importance of innovation in helping to solve environmental problems and presented the case for policies to support such innovation:

- innovation provides a range of positive externalities, by creating options for substitution, mitigating against uncertainties and enabling environmental problems to be solved sooner than they would otherwise;

- policy measures can stimulate these by accelerating the natural rate of innovation, helping to overcome lock-in to existing technologies or technological systems and/or lock out of emerging, more resource efficient technologies; and
- a range of policy instruments are available, including financial support mechanisms, public procurement, producer responsibility, innovation networks and modernisation and transformation of infrastructures.

Gross and Foxon (2002) classified these instruments according to: how they support basic R&D; help to develop markets for innovative new products or processes; or provide financial incentives for the development or deployment of cleaner technologies:

- public support of basic R&D for technologies in the early stages of development;
- market development policies, helping to create or stimulate markets for low-carbon technologies;
- regulations to tilt or ‘modulate’ the market by setting long-term, outcome-based targets or obligations for cleaner technologies to gain a certain proportion of the market; and
- financial incentives, most notably in the earliest phases of technology development, most notably in the form of capital subsidies, tax credits or hypothecated revenues.

A number of industrialised countries have adopted policy measures to promote the development of renewable energy and low carbon technologies, driven by concern over climate change (PIU 2002). However, it has been argued that current carbon-based energy systems still form a technological lock-in and current measures are not enough to put industrialised economies on the path to achieve deep cuts in carbon emissions. One problem for the uptake of new technologies and the redirecting of the technological development path has been market characteristics and consumption patterns. Thus, it is necessary to investigate how a better mix of policy instruments addressing production as well as consumption aspects to promote low carbon innovation, alongside other environmental policy measures, could overcome this carbon lock-in and facilitate the path to a low carbon economy. Here, Sustainable Consumption and Production (SCP) offers a conceptual framework to address social, economic and cultural settings and identify the mix of relevant policy instruments.

2.4 Theories of Regional Economic Development and New Economic Geography

2.4.1 Background

In this section we give a short overview of the literature on regional economic development and recent insights derived from the New Economic Geography (NEG). The NEG will be treated in the context of the wider literature on agglomeration economics. The main difference between the NEG proper and related economic geography theories is that the first describes a distribution of economic activity and population resulting in different welfare effects while the latter concerns the implications of different spatial distributions of people and activity for productivity and GDP levels or growth. Recently both approaches became intertwined, and increased productivity effects in agglomerations also occur in NEG models.³ Both theories share the recently observed trend towards increased

³ The vertical linkages model of Venables (1996) is one of the first examples where productivity effect is integrated in the NEG model.

urbanization as an outcome. In this short overview, we will not focus on the NEG literature itself as extensive reviews are available in journals (Puga, 2002, Combes and Overman, 2004), books (Baldwin et al., 2003, Fujita and Thisse, 2002) and policy documents (World Bank 2009, Barca 2009, Farole, Rodríguez-Pose and Storper 2009). Instead, we will concentrate on the sustainability of the processes inherent to NEG and the sustainability of possible outcomes of the endogenous processes resulting from strong agglomeration economies. Sustainability in this overview is, in line with the literature, defined as the interplay of reproducing and sustaining welfare for future generations, where welfare includes environmental aspects.

2.4.2 Regional Economic Development

Regional economic development has its roots in classical regional economic growth theory and geographic theories of development. Theories on agglomeration advantages as an explanation for this observed spatial concentration of economic activities have been widely used in economic geography and regional economics since Von Thunen (1842), Marshall (1890), and Weber (1909).

More recently, regional economic development theory has become dominated by the NEG and associated agglomeration-based theories of economic development. These regional development theories are, contrary to earlier theories, primarily based on endogenous growth theory and characterized by mathematical rigor and empirical testing. The new theoretical insights from NEG are in line with the empirical observation that inter-regional disparities especially within countries have grown since the 1980s (Puga, 2002, Combes and Overman 2004, Brülhart and Traeger 2005).

NEG theory is in many respects different from ‘old’ economic geography, more specifically in its use of general equilibrium models and its focus on transport and the welfare effects of the spatial distribution of firms, thereby abstracting from specific attributes (institutions) of cities, regions, international relations and other networks than physical infrastructure.

New Economic Geography and other recent developments in regional economic development theory

The New Economic Geography literature proper is based on a seminal paper by Krugman (1991), which discusses the distribution of economic activity and population over space and its welfare implications. It describes agglomeration forces leading towards a dynamic and self-enforcing process of increased agglomeration, and the higher levels of welfare of the population in these agglomerations. According to the NEG, these welfare effects are generated by consumers’ preference for variety, the supply of which increases with the economic size of a region. Thus, the original NEG model is concerned about the welfare implications of the distribution of people and industries over space and the dynamic process that results in large and small agglomeration, and *not* about productivity or growth⁴. Later theoretical and empirical NEG models did include the effect of the spatial distribution of people and activity on productivity and economic growth.

⁴ See also Brakman et al. (2009) for an introduction to the New Economic Geography.

Role of Networks in Regional Economic Development theories

Infrastructure networks (manufactured capital) and infrastructure investments occupy a special place in the NEG literature (eg Bröcker *et al* 2009, Bröcker *et al* 2004, Thissen 2005). Infrastructure may be used to lower trade cost or create bigger agglomerations without migration by reducing the time-distance between regions. This process can produce different, and sometimes unexpected, effects. Creating bigger agglomerations in the periphery via infrastructure investment may seem like good policy from an equity point of view, but it is not efficient (overall growth will be lower) and it may induce larger income inequality within regions between capital owners and wage-earners (see Baldwin *et al.* 2003, chapter 17). Inter-regional infrastructure that reduces trade costs between regions may also produce different effects. It may reduce income inequality between regions when trade costs are already low but it will increase them when the trade costs are high. This increased income inequality is caused by the large positive effects resulting from additional migration to the bigger agglomeration, in relation to the small effect of lower transport costs (Baldwin *et al.* 2003). This effect was also shown in empirical NEG models with respect to the opening up of peripheral regions in Europe (Bröcker *et al.* 2004, Bröcker and Schneekloth 2006, and Korzhenevych and Bröcker 2009). Finally, it may be shown that better infrastructure in the presence of congestion costs may even result in lower overall economic growth, high spatial concentration and high income inequality (Baldwin *et al.* 2003). Trade costs between regions, however, are also affected by the logistics sector and the non-physical networks of business contacts (see below). The limited availability of regional trade data in Europe at present prevents the analysis of these effects and their possible influence on economic growth.

Non-physical networks (social capital) are potentially important as channels for knowledge spillovers and their possible effect on innovation. It is argued that the spatial diffusion of knowledge and its effect on innovation is of major importance for ensuring productivity growth and increasing the welfare of nations. As knowledge is hard to appropriate it generates benefits to other agents through several spillover mechanisms. Understanding the geographical structures that underlie these spillover benefits is necessary for any evidence-based innovation policy for promoting Europe's transformation into a knowledge-based society (Fritsch and Slatchev 2007). In contrast to geographically localized channels of knowledge spillovers such as labor mobility (Almeida and Kogut 1999), spinoff dynamics (Klepper 2007) and informal networking (Lissoni 2001), research collaborations are increasingly taking place over long distances. Non-physical research collaboration networks are typically not well approximated by physical distances. This implies that both geographically localized knowledge spillovers from regions nearby, and knowledge spillovers from research collaborations over long distances via network connections are important knowledge production and the innovative performance of regions. Frenken *et al* (2007) find that both localized knowledge spillovers and the knowledge spillovers stemming from collaboration in a network affect the innovative performance of NUTS3 regions within the European Union. These results provide support for EU policies aimed at creating European collaboration networks (a European Research area).

Agglomeration Economies and NEG

The driving mechanism in NEG-based agglomeration economies is that increased size of agglomeration leads to increased productivity (and/or welfare), which will attract more people to migrate to these larger agglomerations. These external economies to the spatial scale of activities will cause cumulatively higher productivity levels and higher economic growth. Naturally there are also dispersion forces at work, but after a certain threshold of

transport cost and freeness of trade has been reached, the strength of agglomeration economies will outweigh the dispersion forces. Depending on the actual size of transport costs this results in a certain number of agglomerations that may differ in size.⁵ As such, this theory is closely related to other theories of agglomeration economies, which are based on regional knowledge spillovers, shared intermediate and labour markets and urbanization and density advantages of services and infrastructure. All these theories have in common that an increase in the size of an agglomeration will result in higher productivity in the agglomeration that will cause a cumulative process of increased urbanization, agglomeration and economic growth. The empirical evidence for the existence of agglomeration economies is strong: a review by Rosenthal and Strange (2004) found that a doubling in the size of an agglomeration leads to an increase in productivity somewhere between 3 and 11 percent.⁶

2.4.3 Sustainable Regional Economic Development

Sustainable regional economic development implies that the dynamic economic process should be optimal from a comprehensive welfare perspective, and incorporate effects on the environment. The dynamic process that leads to large agglomerations described by the New Economic Geography does however not necessarily result in a (social) welfare optimal situation when there are strong negative effects associated with the increase in size of large agglomerations (congestion, pollution) or there are strong negative effects of the decrease in size of small cities in the periphery. The reason that the result might not be optimal is that people or firms do not take the effect of their action on others into account. Thus, when people migrate from a small city to a large agglomeration, they do not take into account that other people in the big agglomeration will benefit economically from the increase in the size of the agglomeration, while those who stay behind in the small city lose out. Although these effects are small for individuals migrating, they become large if many people migrate. This may result in over-migration to big agglomerations (Ottaviano and Thisse 2002 and Baldwin *et al.* 2003) and a decline in welfare levels for future generations and therefore an **unsustainable** development path. Little research has been done on the optimal size of cities. The OECD (2006) estimates this size for productivity effects in the short run, given all locally bound physical capital such as physical infrastructure, and in a static framework to be about 6 million people.⁷ Henderson (2009) arrives at a much higher estimate for the optimal size of cities in China.

Public goods also play an important role in the likelihood of the market generating excessive agglomerations. In large agglomerations, too much demand might be generated

⁵ See Fujita, Krugman and Venables (1999) for an analysis of multiple agglomerations in the base model with neutral space. See Stelder (2005) for a simulation analysis using the model to reproduce an approximation of the actual size distribution of European cities given the presence of locally bounded physical capital such as road infrastructure.

⁶ Melo *et al.* (2009) report an interval which is even larger. With a sample of 34 studies on agglomeration economies, for 729 estimated values of elasticity, the authors find a variation up to 29%. Melo *et al.* (2009) in a meta-analysis find that the differences depend significantly on the inclusion of human capital, on the time of analysis, on the industrial sectors included and on the considered geographical area. In another meta-analysis which considers 31 studies, De Groot *et al.* (2007) conclude that the theory provides “strong indications for sectoral, temporal and spatial heterogeneity”.

⁷ It should be noted that the estimation is not conform NEG models but only relates productivity to population size.

for public goods with a maximum capacity (congestible public goods; Buchanan 1965, Scotchmer and Wooders 1987), although Fujita and Thisse (2002) argue that this problem can be solved in the NEG model by usage fees. The smaller cities in the periphery may however be faced with the more difficult problem of underutilization of public goods like hospitals and schools. These effects are magnified in areas of natural population decline.

If more negative externalities of large agglomerations that are not taken into account in the decision to migrate, it becomes more likely that the market will generate too much agglomeration. These diseconomies of scale may involve congestion costs, high housing costs and environmental degradation (Duranton and Puga 2005). Insights into these external effects are important for a sustainable regional development strategy. To elaborate this, we will discuss the impact of the increase in size of large agglomeration in combination with the decrease in size of small villages with regard to human, social and environmental capital.⁸

Impact of Agglomerations on Human and Social Capital

Most theories on human and social capital argue in favour of larger agglomerations. That is, larger agglomerations lead to more social interactions and larger possibilities for knowledge spillovers (Rosenthal and Strange 2008, Glaeser 1999), leading to positive external economies that reduce the threat of over-migration to large cities. However, the New Economic Geography model shows that increased concentration will also cause an increase in the income inequality between large agglomerations and the periphery (see also Papageorgiou and Smith 1983). This increased inequality may be politically unacceptable. The negative effect of less social interaction in small cities in the periphery that decrease in size is inconclusive, also in the case of negative spillovers affecting poor people in poor places (Glaeser, 2008).

Impact of Agglomerations on Environmental Capital

To investigate the relationship between environmental capital and agglomeration economies it is necessary to have a closer look at the effects of increased agglomeration and density on the one hand and a more sparse spatial structure in the periphery on the other. Increased regional specialization in production and larger trade flows between large agglomerations also have to be taken into account.

The relationship seems often to point in opposite directions with both advantages and disadvantages arising from increased regional concentration of economic activity and population⁹. Expert interviews at the Netherlands Environmental Assessment Agency¹⁰

⁸ Please note that the other forms of capital are already discussed in the context of the NEG.

⁹ For instance, an increase in the size of large agglomeration may affect agricultural productivity since existing agglomerations are usually located close to high-quality land (EEA 2005) and the reduction of the size of the agricultural sector in peripheral regions (marginal agriculture) and the increase in productivity in these areas will affect employment in these areas and the possibilities for the sustainability of agriculture-dependent villages (Baldock et al. 1996). On the other hand, larger and denser agglomerations have less space for durable energy production from wind or sun. More dense cities however use less energy per person because of smaller houses, more apartments and less traffic per person (Kenworthy 2006). Air quality is to a large extent affected by traffic. Although spatial development affects the amount of traffic, its role is limited (Snellen 2002) and especially if compared to the effect of overall growth in the economy or population (Boarnet and Crane 2001). Other effects such as possible water shortages are not necessarily more problematic because the shortage of water is not only due to an increase in population, but is to a large extent driven by agriculture and type of industrial activity (EEA, 2009).

found that spatial planning is often a second-best or third-best policy area for achieving sustainable development from the perspective of environmental capital. The most effective (first best) policy is often regulation to prevent detrimental external effects and pricing policies to stimulate positive external effects. This does not imply that spatial planning has no effect on environmental capital but its effects seem limited and case specific, although especially a decline in habitat fragmentation will have a positive effect on natural resources Goonetilleke et al. (2005).

Place Based Development Policy and Agglomeration Economies

Recent policy reports on policy implications of agglomeration economies discuss policies in the context of place-based development policy (Barca 2009, Worldbank 2009). The discussion mainly focuses on the importance of agglomeration for efficiency and economic growth and the possible detrimental effect if place-based policies attempt to inhibit agglomeration. Barca (2009) therefore explicitly concludes that place-based policies aimed at reducing inequalities (social inclusion) should not restrict the mobility of people because that would be harmful for income growth (efficiency). Glaeser (2008) gives three primary arguments against place-based aid that inhibits the mobility of people and firms. It is inefficient because it increases economic activity in less productive areas, while the beneficiaries of the aid may be the richer people in the impacted area thereby increasing inequalities within the region.

Moreover, if there are negative spillovers of poor people in poor places, this would be particularly harmful (Glaeser, 2008). Typical policies that would not restrict the mobility of people are, for example, those targeted at increasing human capital (education). The mobility of firms should also be taken into account. In a situation with free mobility of firms, support for starting new firms (startups) may not limit economic mobility. The evaluation of the success of such policies is difficult because it may reduce inequalities between people but not between places.

More generally policies in a world characterized by the presence of agglomeration economies have to take into account the following three effects (Combes et al. 2002), which can all be interpreted as arguments in favour of policies that are tailored to the specific territorial context (Barca 2009). First of all, policy effects are highly non-linear. Thus, policies in a certain region may have a different effect than policies in other regions depending on the location and the size of the region. The effects of “small policies” may be dramatic while “large policies” elsewhere have no effect at all (Puga 2002, Combes 2002). Second, policy effects may have to pass a certain threshold to have any effect at all and they may be non-reciprocal.

This can be easily understood from the process of agglomeration itself. For a policy to generate an agglomeration effect in the periphery and attract people and firms from other regions it should surpass a certain critical mass. After establishing this agglomeration in the periphery, however, withdrawing the policy will not result in a return to the old situation. Even a complete reversal of the policy (a tax instead of the original subsidy) may not reverse the process. This brings us to the third characteristic of policies in a world characterized by the presence of agglomeration economies: hysteresis and path-dependency. This implies that not only the specific territorial context but also the

¹⁰ The experts involved were Rob Folkert and Hans Eerens (energy), Henk Westhoek (agriculture), Ton Dassen and Robert Koelemeijer (air quality), Hans Hilbers and Hans Nijland (mobility), Mark van Veen and Rijk van Oostenbrugge (biodiversity), Nico Pieterse (Flooding), and Frits Kragt (Water quality).

(economic) development in the past will determine future developments and should be taken into account when implementing a certain policy.

A sustainable place-based policy should be based on an extension of the model including more aspects than only GDP and should investigate the dynamic process in agglomeration economies which may not necessarily result in a (social) welfare optimal situation. The conclusion that there are too many negative externalities in large agglomerations, which are bigger than the benefits associated with large agglomeration, can however not be derived from the discussion of the potential effects (see above). The case for small regions becoming too small seems easier to make. A final note should be made about the comparative static nature of especially the NEG literature. These NEG models are generally based on long run equilibrium situations and are not strong in the transition process describing how to get to this situation. This implies that there is often little attention for negative effects that may occur regarding unemployment or other forms of underutilisation of resources in the short run. These short run detrimental effects may be cause for policy action. Although recently work is being done on applied dynamic models (Korzhenevych and Bröcker 2009, Korzhenevych 2010), it seems too early to be conclusive on the effects in these models.

2.5 Role of Deliberative and Participatory Processes in Ensuring SD

2.5.1 Background

Deliberative and participatory processes refer to multilevel governance, i.e. the dispersion of governance across local, regional, national, and supranational authorities and institutions. Deliberative and participatory processes have received much attention in the context of regional and local development. Stronger local and regional governance structures can promote economic development by enhancing the authorities' ability to pursue effective interventions. Nevertheless, national and supranational forms of regulation are needed to mitigate tendencies toward territorial competition or so-called 'new regionalism' whereby places seek to maximize their economic performance at the expense of others (Pike, A et al 2006). Regional governance may be particularly important in facilitating economic restructuring through "supply-side" interventions. Matzner and Streeck (1991) contend that for precisely targeted labour market policy, "the structure of public administration must be such that it can reach down into the networks that mediate exchanges in civil society, putting these into effective use" (Matzner and Streeck 1991).

2.5.2 Deliberative processes

The core idea behind deliberative or discursive processes is that decisions are made legitimate through a process of argument and deliberation in which all sections of the community have an equal right to be heard and the decisions are made through the force of the better argument. This means that other forms of power and political influence derived from wealth or patronage should have no place. Key characteristics of deliberative approaches include:

- public argument and debate between citizens, through democratic means of association;
- builds commitment to the resolution of public policy 'problems' through collective choices; and

- those institutions involved gain legitimacy through the process of public deliberation.

Deliberative institutional arrangements are participatory in that the values and needs of all groups in society form the basis of political deliberation and the legitimacy of actions is rooted in reasoned agreement. Deliberative processes are designed to take account of:

- the dispersed nature of information and knowledge;
- the plurality of values and commitments of Member States and different communities within them;
- the size and scope of the problems facing Member States, in that institutions are capable of cutting across political and economic boundaries.

Dryzek (1996) notes that deliberative processes do not necessarily require complete decentralisation, although more local forms of decision making are likely to allow a higher level of participation. Indeed, large scale institutions will be required to deal with the complex, cross cutting issues posed through Cohesion Policy.

2.5.3 Public participation

Implementation of the Partnership Principle in Cohesion Policy was found to improve the effectiveness in development and monitoring of programmes, result in better project selection, provide for more legitimacy and transparency as well as ownership of Structural Funds outputs, contribute to innovation, learning and development of institutional capacity at sectoral and territorial levels (Tavistock Institute 1999). Cooperation between the Commission and authorities on all levels, as well as economic and social partners, including civil society organizations, can therefore contribute to more effective integration of sustainability principles into Cohesion Policy.

CEE Bankwatch Network and Friends of the Earth Europe (2005) point out practical examples of successful cooperation between environmental NGOs and authorities on national and regional level, including the elaboration and adoption of project selection criteria better reflecting the needs of sustainable development. The participation of civil society representatives in Monitoring Committees of EU funds can also be useful in this area.

3 ENVIRONMENTAL CHALLENGES

The key environmental challenges addressed upon below were identified by the Renewed EU Sustainable Development Strategy, as adopted by the Council in June 2006. These are:

- Climate Change and Clean Energy;
- Sustainable Transport;
- Sustainable Consumption and Production; and
- Conservation and Management of Natural Resources.

Although the four themes are defined and addressed separately, it is imperative to note all themes are inherently intertwined and mutually supportive. For instance, promoting healthy ecosystems strengthens the adaptive capacity for climate change resilience. Planning for sustainable transport for example would also imply taking into consideration Natura 2000 into the planning phase.

It should also be noted that Cohesion Policy and its structural instruments could have positive impact on these environmental challenges, for instance by investing into improving the environmental performance, building climate resilience or stimulating the uptake of eco-technologies and a modal shift in transport, for instance. At the same time, Cohesion Policy might also increase the pressure on them by financing large projects which are in conflict with valuable habitats or lead to increased greenhouse gases emissions. Moreover, for the future Cohesion Policy it is even more important to understand how promoting and investing in environmental goods and services can help improve social cohesion and find greener sources of competitive edges for regions. All these interlinkages are explored to some extent in the literature review but more importantly are subject to analysis in Supporting Paper 2 and Supporting Paper 4 of this project.

‘Sustainable Consumption and Production’ (SCP) is a novel environmental challenge in the EU SDS. SCP has yet not been addressed in an EU Cohesion Policy context, and thus, in this literature review some attention will be given to the broader concept of SCP.

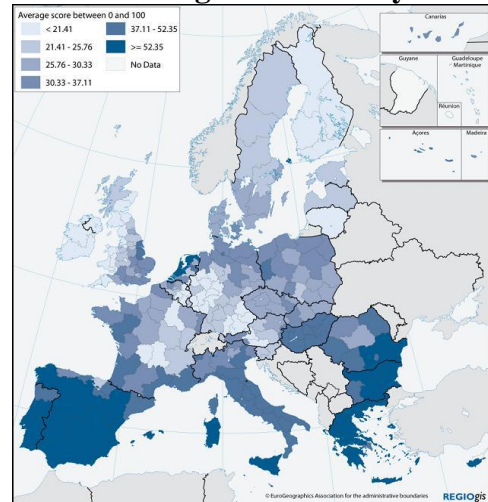
3.1 Climate Change and Clean Energy

The trend of EU greenhouse gas (GHG) emissions has been moderately favourable over the last three years. The EU is moving in the right direction towards meeting its Kyoto Protocol targets. However, global emissions are 40 per cent higher today than they were in the Kyoto base year 1990 (CEC 2009). As a result of the increased concentration of GHG in the atmosphere, significant climate changes are already visible globally, and are expected to become more pronounced in the future. In Europe the average temperature is almost 1°C higher compared to the past century and the effects are clearly visible. Southern Europe is projected to dry out further and the summer 2003 heat wave caused an estimated 70,000 premature deaths. Furthermore, climate change will heavily affect Europe's natural environment and nearly all sections of society and the economy, including agriculture, forestry, fisheries, tourism and healthcare.

A recent study by DG Regional policy shows that **climate change is going to have asymmetric territorial impacts on European regions**, their economies, natural and

human systems and that these regions will have different capacity and potential to mitigate or adapt to these climate change impacts (EC 2008). Therefore, climate change can increase already existing economic and social disparity in the EU. The Stern review (2006) suggested that the benefits of targeted and early action outweigh the costs of action meaning that it will be most cost effective for member states to invest in mitigation and adaptation now rather than paying the bill of the consequences.

Climate change vulnerability index



Source: DG Regio, Regions 2020

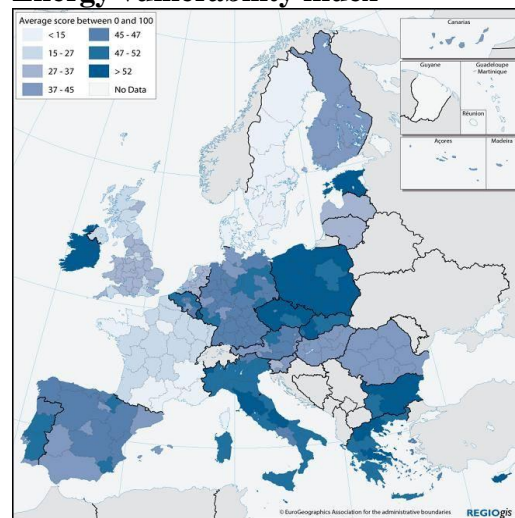
- South and Eastern Europe most vulnerable;
- Existing conditions are projected to worsen in the Mediterranean regions, exacerbating existing disparities
- 170 million people live in strongly affected regions, more than one third of EU population;
- North and Western regions less affected, except lowland coastal areas.

The Renewed EU SDS formulated a set of targets for climate change mitigation and adaptation. Notwithstanding, already in March 2007, the European Council endorsed an integrated approach to EU climate and energy policy that formulated the more ambitious 20/20/20 targets. In January 2008, the European Commission presented its ‘climate change and energy package’, which proposed binding legislation to implement the 20/20/20 targets by 2020. In December 2008, the package was agreed by the European Parliament and Council, which among others introduced the Renewable Energy Directive. The directive aims at improving the legal framework for promoting renewable electricity and requires national action plans to be developed. It further sets a target of a 10 per cent share of renewable energy in the transport sector by 2020, which is currently almost exclusively dependent on oil (OJ 2009).

At present, **renewable energy** sources account for 7 per cent of the European primary energy demand. Biomass, which is mainly used for heating, is the main renewable energy source. The share of renewable energies for electricity generation is 14.3 per cent. The contribution of renewables to primary energy demand for heat supply is around 10 per cent. Although core set indicators on greenhouse gas emission trends, communicated by the EEA, depict a decrease in total GHG emissions since 2004 in the EU-15, the total GHG emissions between 1990 and 2006 had decreased by 2,7 per cent and therefore the Kyoto targets of a 8 per cent reduction still have not been reached. At the same time total GHG emissions in EU-27 have decreased by 7.7 per cent due to a significant decrease in the new Member States (EU-12) between 1990 and 2000. However, it is worth noting that between 2005 and 2006 emissions increased in the EU-12. Emissions have also increased significantly in the transport sector and energy industries (EEA 2009a). Thus, the current situation depicts major challenges of reducing GHG emissions in particular in the transport

sector as well as fostering energy efficiency improvements (especially in (social) housing) and the uptake and use of renewables.

Energy vulnerability index



- Eastern and southern periphery more affected by security of supply;
- Regions relying on energy intensive sectors such as transport and manufacturing are likely to be more affected;
- Energy efficient regions could benefit from ‘win-win’ opportunities;

Source: DG Regio, Regions 2020

On the 1 April 2009, a White Paper on **climate adaptation** was published (CEC 2009a). The White Paper sets out a two-phase framework to increase the EU’s resilience to climate change. The first phase, running 2009-2012, is devoted to further research and analysis to lay the groundwork for the implementation of a comprehensive adaptation strategy in the second phase, which is to begin in 2013. The EU sees its role as a facilitator and coordinator of integrated action and recommends the development of methodologies for climate-proofing infrastructure projects and considers how these could be incorporated into the TEN-T and TEN-E guidelines and guidance on investments under Cohesion Policy in the current period. Hence, future challenges related to adaptation and vulnerability to climate change need additional attention under Cohesion Policy, even though they were given a much higher priority in the spending cycle for 2007–2013 than previously.

Current concerns on climate change and energy also bear close links with challenges related to the conservation of biodiversity and ecosystems (eg ecosystem services) within the EU (see Section 3.3 below). Therefore, ensuring coherence and seeking synergies between biodiversity conservation and the policies on climate and energy is of increasing importance, eg in the context of setting priorities for and assessing the overall sustainability of Community financing for Cohesion Policy. For example, it is widely acknowledged that the possible negative impacts of biofuel production on biodiversity need to be carefully considered (eg changes in land use patterns and the risks associated with alien species) (eg Kettunen *et al* 2009b).

Furthermore, ecosystems (eg forests, peat, wetlands and marine areas) store and sequester carbon and can, therefore, help mitigate climate change. Healthy ecosystems also have a positive effect on climate change adaptation by maintaining ecosystem services that reduce natural disaster impacts (coastal and river protection, control of desertification), stabilise soils and enhance resilience to changing conditions (eg Millennium Ecosystem Assessment 2005, TEEB 2009a, TEEB 2009b, CBD AHTEG 2009, EU Ad Hoc EWG on Biodiversity and Climate Change 2009). Consequently, maintenance of natural and/or naturally functioning ecosystems can offer significant win-wins for biodiversity conservation and socio-economic resilience to climate change, also in the context of EU Cohesion Policy

3.2 Sustainable Transport

The overall objective of the Sustainable Transport strand of the Renewed EU SDS is “*to ensure that our transport systems meet society’s economic, social and environmental needs whilst minimising their undesirable impacts on the economy, society and the environment.*” (Council of the European Union 2006). The background is, that whilst transport infrastructure, and the mobility that this enables, fosters economic growth and social development in the EU, it does, however, simultaneously impose negative externalities to the environment in terms of air and noise pollution, degradation of ecosystems and biodiversity, land take, resource use, waste generation and, of increasing importance and political relevance, emissions of GHGs. In fact, transport, the biggest emitting category (one-fifth of all EU-27 GHG emissions in 2007) increased its GHG emissions between 2000 and 2007 by 7 per cent (Eurostat 2009). In addition, transport is not always socially and economically benign; accidents and the health impacts of air pollution and noise are significant social costs, while congestion and environmental damage have adverse economic impacts.

From a public health perspective, changes since 2000 concerning sustainable transport show overall rather favourable signs. Fatalities due to road accidents in the EU-27 have fallen steadily between 2001 and 2007, even so, the EU target of halving the number by 2010 has not been met (Eurostat 2009). Also the overall emissions of particulate matters in the EU-27 showed significant decreases of 3 per cent per year between 2000 and 2006, however, in spite of these reductions no significant improvement in concentration of particulate matters have been achieved in urban areas with high traffic levels (Eurostat 2009).

Most important, from the perspective of GHG emissions, the development has taken an unfavourable direction (Eurostat 2009). The EU SDS goal of decoupling economic growth and the demand for transport have not been realised, on the contrary. In spite of a slight decoupling of passenger transport growth from economic growth, freight transport continues to grow at a rate faster than that of GDP, transport’s CO₂ emissions continue to increase, and problems of air pollution and noise from transport continue (CEC 2009).

Similarly, the transport sector has a significant, and to a large extent negative, impact on landscapes within the EU. It is commonly acknowledged that the development of transport networks has been among the main reasons for fragmentation of ecosystems within the EU, leading to negative impacts on habitats and biodiversity (eg Kettunen *et al* 2007). In addition, air pollution caused by the transport sector can also have adverse affects on biodiversity. To some extent fragmentation of landscapes due to transport infrastructure can be avoided or mitigated by environmentally sensitive planning, at national, regional and local scales and by implementing specific measures (e.g. wildlife bridges and tunnels) that reduce the barrier effects of roads and railways. However, the true efficacy of the latter efficacy in providing necessary functional connectivity between habitats and supporting broader ecosystem processes remain unclear.

The EU SDS goal of a shift towards a more environmentally friendly transport mode has not been achieved. The indicators of the modal split of transport in the EU-27 depict essentially no significant changes in the modal split for passenger transport between 2000 and 2007, whereas the share of road inland freight transport has increased by 0.4 percentage point per year (Eurostat 2009). Especially, in Central Eastern European countries, there has been a massive exodus of freight and passengers from rail and public

transport to road over the last 15 years. Still, however, the share of passengers transported by public transport in the CEE countries is considerably higher than in the EU-15.

In its monitor report from 2009, Eurostat notices that whereas the share of investment in rail infrastructure increased between 2000 and 2003 to 34 per cent, road investments regained a share of 60 per cent between 2003 and 2006 bringing the EU further away from achieving the SDS goals (Eurostat 2009).

Cohesion Policy incorporates (Articles 171 and 177 of the TFEU) clean urban transport and public transport as well as other environmentally-friendly transport investments into the scope of assistance available from the funds (ERDF, ESF and Cohesion Fund). Clean urban transport as well as railways, multimodal transport and intelligent transport systems are included among the promoted Lisbon categories of expenditure. However, all large-scale transport infrastructures, including motorways and airports, are also on the Lisbon list.¹¹ The Community Strategic Guidelines for Cohesion 2007-2013 include the promotion of *'environmentally sustainable transport networks, particularly in urban areas'* among the priorities for funding. The Communication *'Cohesion Policy and cities: the urban contribution to growth and jobs in the regions'* stresses the need to *'improve the affordability, efficiency and effectiveness of public transport, as well as linking the different transport modes'* and to *'promote the use of cycling, walking and other alternative and 'soft' forms of transport'* as part of an integrated transport strategy for urban areas (CEC 2006a). Hence, future Cohesion Policy funds will clearly need to take account of the wider sustainability issues around transport.

3.3. Sustainable Consumption and Production

Essentially, climate change, loss of natural resources, loss of biodiversity and environmental damage caused by emissions and waste are results of unsustainable patterns of consumption and production (CEC 2004). This also means that energy and resource efficiency gains in production or through better products may lead to no overall environmental impact reduction due to unsustainable patterns of consumption, eg cost reductions due to efficiency gains may boost consumption leading to a so called *'rebound effect'* (Tukker *et al* 2008). The Sustainable Consumption and Production (SCP) agenda recognises and conceptualises the interdependence and dynamic between product, production methods and consumption patterns. This makes the key challenge Sustainable Consumption and Production a more comprehensive and holistic approach to the objective of sustainable development compared to the other key challenges, which are sectorally or thematically defined.

In the policy reality, the most widespread approach – according to a survey of national strategies – is to apply *'building blocks'* of SCP, eg instruments like labelling, GPP, education etc. (ETC and RWM 2007). Furthermore, the policy agenda of SCP seems to focus on the key consumption clusters *'food and drink'*, *'housing & buildings'* as well as *'mobility'*, which are identified to have the greatest environmental implications (ETC and SCP 2010; ETC and RWM 2007; and Tukker *et al* 2006).

At the European level, a milestone was set as the Renewed EU SDS defined SCP as one of the key challenges. The EU SDS formulates the objective *'to promote sustainable*

¹¹ See Article 9(3) and Annex IV of the general regulation for cohesion policy 1083/2006.

consumption and production patterns' (Council of the European Union 2006) in the EU and its Member States. Besides operational objectives and targets, the EU SDS also includes several actions, including the proposal to develop an EU Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan which has been presented in July 2008. The main objective of the Action Plan is *'to improve the energy and environmental performance of products and foster their uptake by consumers'* (CEC 2008a).

Besides EU efforts, Member States have commenced their own SCP activities¹². Government-driven (top-down) approaches and civil-society-driven (bottom-up) approaches and also mixes thereof can be observed; some of the approaches are stand-alone conceptual documents (eg in the Czech Republic, Finland, Hungary, Poland and the UK), whereas in other countries (eg Austria, France, Italy, Malta and the Netherlands) SCP is embedded in national sustainable development strategies. Other countries pursue approaches that do not rely on a coherent conceptual basis, e.g. in the form of a policy document, but rather focus on the development and implementation of selected policy instruments (eg Denmark, Germany).

In general, the main focus of current SCP approaches is on the supply side while policies to promote more sustainable consumption patterns are relatively under-developed. This is also reflected by the current situation of the key challenge SCP. Notwithstanding the positive effects, the tremendous increase in consumption over the last few decades (CEC 2008a) has led to several negative environmental externalities. And moreover, negative externalities also impact on the social dimension of sustainable development, ranging from widening gaps in income distribution to health-impairing lifestyles. In 2009, the European Commission concluded in its review of the EU SDS that, whereas the subcategories 'production patterns' and 'resource use and waste' show positive signs, consumption patterns (mainly regarding energy consumption and car ownership) show clear unfavourable developments (CEC 2009).

The overall evaluation depicts a positive trend in production patterns. However, the number of EMAS-registered organisations and the registration of Eco-labels have not increased as much in the new Member States as in the EU-15 (Eurostat 2009).

To address the current situation SCP requires further policy measures to address consumption patterns, which are under-developed in comparison to the production and disposal aspects (Rubik *et al.* 2009). Furthermore, the slow increase of Eco-label and EMAS registrations in the EU-12 reveals a need to address production patterns in EU policies, such as in Cohesion Policy.

SCP has not yet been addressed by Cohesion Policy but it has the potential to contribute to a broader proliferation of SCP in Europe, eg, by supporting the implementation of sustainable public procurement practices, by training and education supports, such as environmental management training for companies or environmental education for the general public, as well as by attaching criteria to access funds related to consumption or production patterns¹³.

¹² See, e.g. CEC (2004); ETC/RWM and EEA (2007); OECD (2008); Szlezak *et al.* (2008)

¹³ See for example: Capozza *et al.* (2006) who discuss the impact of the structural funds with regard to Integrated Product Policy (IPP), that can be regarded a precursor of SCP, in Italian regions.

3.3 Conservation and Management of Natural Resources

The renewed EU SDS key environmental challenge ‘Conservation and management of natural resources’ enhances a number of subthemes including: biodiversity, freshwater resources, marine ecosystems, and land use. These themes are concerned with the integrity of the biosphere and the life-supporting services it provides, whereas aspects related to the management of raw materials such as metals, minerals and fossil fuels are subject to the key challenge ‘sustainable consumption and production’ (Eurostat 2009).

A recent monitoring report by Eurostat depicts some positive trends in the amount of deadwood in forests and in the quality of surface water in rivers, although leaving a significant room for further improvements (Eurostat 2009). However, the abundance of selected species, the marine ecosystems, land use and forest degradation are still showing negative trends and drawing an overall critical picture of current situation of the key challenge ‘conservation and management of natural resources’ (Eurostat 2009).

3.3.1 Water

From a sustainability perspective, the main challenges regarding water is to ensure that the rates of extraction from water resources are sustainable in the long term and to promote sustainable water use based on a long-term protection of available water resources. It is therefore important to protect and enhance the status of aquatic ecosystems, reduce groundwater pollution, and achieve levels of water quality that do not give rise to unacceptable impacts on, and risks to, human health and the environment.¹⁴ Although we have been successful in combating pollution, society has experienced an increasing demand for water resulting in water scarcities in some regions of Europe. However, shortage of water is not only due to an increase in population, but is to a large extent driven by agriculture and type of industrial activity (EEA 2009). Larger agglomerations are not necessarily more problematic from this perspective (see Section 2.4 on NEG).

Spatial development often seems a second-best solution to achieve improved sustainability regarding water use and treatment. Anti-pollution regulation measures are generally more effective. However, the institutional setting is very different among European countries. There seem to be a wide variety of options for improvement in water quality (EEA 2005).¹⁵ The most important effects of spatial development seem to involve economies of scale in sewage treatment plants where a city size below 200,000 inhabitants results in less efficient use (Stowa 2005). The solution to this problem may be pressure sewage pipelines from sparsely populated areas to concentrate sewage to have sufficient capacity at the plant.

3.3.2 Biodiversity

Despite of a number of recent achievement in EU biodiversity policy (eg the establishment of the Natura 2000 Network), it has been acknowledged that the EU’s 2010 target to halt

¹⁴ See EEA about water (<http://www.eea.europa.eu/themes/water/about-water>).

¹⁵ See about differences in institutional water policy in agglomeration in Europe also the map on (<http://www.eea.europa.eu/themes/water/mapviewers/uwwt-agglos>).

the loss of biodiversity will not be met¹⁶. According to the assessment by the Commission only around 17 per cent of EU's most vulnerable habitats and species are in favourable conservation status (CEC 2009b). Furthermore, pressures on biodiversity in the wider environment continue to increase within the 80 per cent of the EU land area not covered by the Natura 2000 network, (EEA 2009). Therefore, there is an increasing concern over the continuing degradation of European ecosystems, including their capacity to provide ecosystem services and their ability to adapt to the pressures created by climate change.

In terms of agricultural land use, intensification of agricultural and fishing practises and the development of larger and/or more efficient agricultural systems are known to have strong negative effect on biodiversity. Furthermore, specific and unique habitats located in more sparsely populated areas of the EU (eg rural areas under extensive agriculture) are known to be very important in terms of biological diversity. It has been commonly acknowledged that urbanisation and the concentration of humans into larger centres have led to the abandonment of rural areas and traditional agricultural practises around the EU. This has further led to the decline of species and habitats dependent on a certain level of human intervention (EEA 2006, Kazakowa *et al.* 2007).

Urban areas are not as rich in biodiversity as the more rural areas in the EU, however they can play an important role in supporting the conservation of biodiversity at broader landscape scale. For example, networks of parks and vegetation along rivers and roadside can provide habitats for several species and function as ecological pathways and corridors that allow the movement of species within the wider landscape (Kettunen *et al.* 2007).

Biodiversity and ecosystem within and in the vicinity of urban areas can also play an important role in the provisioning of different ecosystem services (ie resources and beneficial natural processes supplied / maintained by ecosystems¹⁷). For example, parks and other green areas are known to play an important role in maintaining air and water quality within urban areas. These areas also play an important role in terms of recreation, mental and physical health, and artistic inspiration and education (Kettunen *et al.* 2009a, TEEB 2009). Intensification of land use within urban centres and the expansion of urban areas may jeopardise the maintenance of important ecosystem services and result in significant impacts on human welfare.

The development of both urban and rural landscapes affects the so called 'green infrastructure' of an area. If not carefully considered, these developments can cause fragmentation of landscape and habitats, resulting in the loss of ecological connectivity and negative impacts on biodiversity.

¹⁶ E.g. "the Message from Athens" by the high-level conference to frame EU post-2010 biodiversity policy (27-28 April 2009) and the Conclusions of the "Nordic Biodiversity Beyond 2010" Symposium (26-27 October 2009)

¹⁷ Ecosystem services are generally categorised as follows: provisioning services (e.g. fish, game, livestock, water, fuel and pharmaceuticals), regulating services (e.g. carbon sequestration and climate regulation, waste decomposition, purification of water and air, mitigation of natural hazards and crop pollination), cultural services (e.g. cultural and spiritual inspiration, recreational experiences, ecotourism), and supporting services (e.g. nutrient dispersal and cycling, primary production) (Millennium Ecosystem Assessment 2005)

These activities can, however, significantly contribute to the fragmentation of habitats and landscapes, jeopardising the normal functioning of ecosystems (eg the maintenance of ecosystem services). There is also clear evidence that policies focusing only on supporting the intensification of agricultural and fisheries activities lead to the degradation and overexploitation of ecosystems. Furthermore, promoting biofuel production within the EU without due consideration on its ecological risks and impacts might lead to negative impacts on biodiversity and ecosystems (eg potential invasion of alien species) (Kettunen et al. 2009b).

Secondly, the conservation of biodiversity has become a more prominent part of the Community framework supporting regional development and cohesion. In particular, actions promoting conservation and sustainable use of biodiversity (e.g. financing of the Natura 2000 network and prevention of ecosystem risks) form an integral part of the Structural and Cohesion Funds under the 2007-2013 budget framework (Miller et al. 2008). It is hoped that integrating the financing for biodiversity and Natura 2000 sites into the wider context of regional development will help to link conservation objectives with the broader management of land and natural resources, resulting in a more effective and mainstreamed implementation of Community's biodiversity policy.

In addition, it has been increasingly acknowledged that biodiversity and healthy ecosystems play a fundamental role in securing sustainable development and human wellbeing in long-term (TEEB 2009a). **Although biodiversity and ecosystem services are inherently interrelated, we need to conceptually discern one from the other.** It should be noted that the capacity of ecosystems to provide services depends on the functional and structural attributes of the systems, which can include diversity of species (eg genetic resources, wildlife tourism, etc.) but also the overall abundance of species (available fish catch, total forest biomass) or the diversity and quality of physical structures within an ecosystem (extent of vegetable cover that stores and purifies water) (Kettunen et al 2010).

Ecosystems can play a major and cost-effective role in helping society to both mitigate and adapt to the consequences of climate change, eg preventing deforestation can be an effective way to reduce current carbon emissions. Furthermore, wetlands and coastal habitats can provide effective natural protection against environmental risks, such as flooding and storms induced by climate change. It is critical that the value of services are understood and integrated into the economic signals/policy making, and integrated into EU funding (Kettunen *et al* 2009), eg either by applying biodiversity proofing tools to funds, or via investment in the natural capital or other capacity building to support its maintenance and continued provision of services.

Acknowledging the failure to meet the target and focusing on the challenges ahead, the EU has now started to look beyond the 2010 horizon and discussions on the post-2010 goals and policy regime are rapidly gearing up (Environment Council 2009). While preventing any further loss of biodiversity remains high on the agenda, there is also a growing interest amongst various stakeholders (eg the European Commission) in the possibility of focussing the post-2010 EU biodiversity policy agenda more on the protection and sustainable use of overall ecosystems and the services derived from them¹⁸.

¹⁸ Eg “the Message from Athens” and the Conclusions of the Nordic Biodiversity Beyond 2010 Symposium (above) and the Chair's Conclusions from the Swedish EU Presidency High-level Meeting “Visions for Biodiversity Beyond 2010 – People, Ecosystem Services and the Climate Crisis” (7-9 September 2009)

The actions promoting conservation and sustainable use of biodiversity are supported by seven different Community funding instruments, including Structural Funds and the Cohesion Fund, as it was decided that for the 2007-2013 financing period biodiversity funding should be integrated within the funding streams for different Community policy sectors. The aim of this integrated approach is to further embed the implementation of the EU's biodiversity goals into other relevant policy sectors. For example, it is hoped that integrating the financing of Natura 2000 sites into the wider policy context will help to link them with the broader management of land and natural resources. These considerations are still preliminary and there have been no detailed discussions yet on how this new idea would complement the existing arrangements for financing biodiversity. In principle, directing EU financing for securing the maintenance of ecosystems and their services (eg related socio-economic benefits) could increase the political and public support for EU spending on biodiversity (IEEP 2009).

4 INTEGRATED DEVELOPMENT APPROCHES

4.1 Links between the Environment and Economic Development

Policymakers around the world are increasingly recognising that the past classification of ‘environmental’ policy as separate from ‘economic’ policy is outdated. Environmental interventions are able to deliver numerous economic and social benefits in the form of ‘**win-win**’ solutions and offer integrated development approaches to European regions. These ‘win-win’ solutions, however, cannot always be provided by the market and therefore environmental policies seek to tackle **market failures**, by controlling pollution, regulating resource use and protecting and managing the natural environment (IVM et al 2009).

Market failure occurs when the market does not produce optimal welfare (Stern, T. 2003). Important manifestations of market failures, studied in-depth and well documented in environmental economics, are as follows:

- 1) **Public goods** – natural resources, global climate or the atmosphere are public goods which benefits everyone and therefore should be collectively preserved;
- 2) **Externalities** – unintended side effects such as pollution or waste generation of economic activity;
- 3) **Asymmetric information**– limited access to information from business or households about the benefits from environmental interventions may deter the realisation of ‘win-wins’; and
- 4) **Monopoly power** – monopoly buyers and sellers of certain goods or services can lead to loss in the opportunities to realise both economic and environmental benefits.

By influencing the use of resources, environmental policy affects the way in which economic activity evolves. It encourages the more efficient use of energy and materials and the development of new, cleaner products and services, while discouraging activities that are environmentally damaging (IVM et al 2009). In doing so it spurs innovation and influences the allocation of labour, capital, land and raw materials, either through direct regulation or through the pricing mechanism. At the same time, environmental resources have important impacts on the economy, through the provision of ecosystem services such as the provision of clean air and water, the regulation of the climate and protection from floods and hazards. These ecosystem services are essential for supporting most economic activity. Certain sectors such as tourism and agriculture are particularly dependent on the quality of the environment and on the ecosystem services it provides.

4.2 Moving beyond GDP

Historically, economic development has sought to maximise GDP, while ignoring non-monetary assets, such as human health and well-being, social networks, clean air and water, and biological diversity. As a result, economic development has often occurred to the detriment of human and natural resources, which are clearly valuable to human society, but are usually not included in economic accounting systems.

Sustainable development can also be framed in terms of a movement away from reliance on GDP per capita as a measure of development. GDP was never designed as a comprehensive measure of societal well-being; it is an aggregate measure of economic activity accounting for consumer spending, investment, savings, public spending, and international trade flows. Hence it is inadequate for capturing progress on the environmental, social, and human dimensions of welfare. GDP has shortfalls even as a measure of purely economic development, for instance, it does not account for non-market services such as domestic labour or voluntary work, or externalities (external costs) arising from pollution and long-term environmental damage.

There have been a number of initiatives in recent years to develop adjusted indicators that represent a broader measure of societal progress and/or sustainable development. For example, the OECD is conducting a Global Project on Measuring the Progress of Societies¹⁹ in an attempt to coordinate this work. France recently set up the high level Commission on the Measurement of Economic Performance and Social Progress, chaired by Nobel laureate Joseph Stiglitz, with the objective of examining what additional information, other than GDP, is required to provide a relevant picture of economic performance and social progress. Generally, there are three ways of approaching the measurement exercise:

- extending traditional economic accounts based on GDP in order to account for environmental or social issues;
- developing composite indicators of progress that incorporate various types of information into a single measure; and
- selecting a number of 'key' indicators spanning economic, social, and environmental dimensions without any attempt to combine these into a single measure (OECD Observer 2004).

The EC's 2009 communication 'GDP and beyond – Measuring progress in a changing world' emphasized the need to continue work towards developing 'more inclusive indicators that provide a more reliable knowledge base for better public debate and policy-making', particularly in light of the recent economic crisis (EC 2009). The Commission proposed five actions in this area: complementing GDP with environmental and social indicators, improving the timeliness of environmental and social data, improving the accuracy of reporting on distribution and inequalities, developing a Sustainable Development Scoreboard based on the set of EU SDIs, and extending national accounts to encompass environmental and social dimensions.

4.3 Economic benefits from environmental interventions

Investments in environmental goods and services will not only contribute to improving the overall environmental performance of a Member State or a region but also can reap numerous ancillary effects for social cohesion and economic development and thus creating 'win-win' solutions for the economy and the environment. Research has showed that well-designed and targeted environmental interventions can *inter alia* enhance productivity, stimulate innovation, increase employment (and/or the quality of employment), and

¹⁹ http://www.unescap.org/stat/apex2/APEX2_S.2_OECD.pdf

strengthen the capital base (IVM *et al* 2009). Some of these ‘win-win’ opportunities are discussed in more detail, as follows:

- **Resource productivity and security**

Technological progress has brought significant rises in labour productivity, with negative effects on employment, as fewer workers are required to generate a given output or GDP. Steadily rising wages have led companies to focus on reducing labour costs, while paying less attention to the productivity of other inputs in the production process, such as raw materials and energy. The use of resource-saving alternatives that reduce procurement and processing costs can lead to increases in total factor productivity and promote sustainable growth.

‘Resource productivity’ is of growing importance in a world economy facing increased resource scarcity, upward pressure on raw materials prices, and the constraints of climate change and energy security. Reductions in resource use lead to lower production costs, placing downward pressure on prices. This in turn stimulates domestic demand and makes EU exports more competitive in world markets. Policies to encourage resource efficient production also have the potential to generate innovation, help maintain natural capital, create jobs, and improve national self-sufficiency and energy security (Rocholl *et al* 2006).

The SCP agenda recognise that environmental impact reductions of products through efficiency gains or reduced emissions not naturally lead to a final overall environmental impact reduction. Especially when efficiency gains lead to reduced costs we may experience the so called ‘rebound effect’. Hence, a more holistic approach to sustainable development strategies including the consumption dimension is needed.

According to Tukker *et al*, production, markets and consumption form a regime of an interdependent and coevolving set of technologies, symbolic meanings, services, consumer practices, rules, interests, financial relations and expectations, making it difficult to change one part without the rest (Tukker *et al* 2008: 1219). Hence, these characteristics should be considered by sustainable development strategies. It is worth noting, that integrating policies to promote sustainable consumption patterns does not run counter to the promotion of green technologies, innovations, job creation, national self-sufficiency and energy security.

- **Skills and jobs**

According to a GHK study (2009) on the impacts of climate change on European employment and skills in the short to medium-term, the industry and business changes needed to respond to climate change policies are likely to result in many opportunities to place European companies ahead of global competitors but that conversely, a failure by European firms to anticipate this may lead to difficult adjustments which will leave employees inadequately prepared or trained for alternative employment (GHK 2009). According to a 2009 study on the impacts of climate change on European employment and skills in the short to medium-term, the move to a low carbon economy will place a premium on creativity and innovation and will echo the general economic pressure for better management and higher level skills (GHK 2009).

A study by OECD and IEA (2008) on likely effect of climate change action on employment and GDP concluded that policies to meet carbon reduction targets would result in a

redirection of economic activity and employment, rather than a reduction. GHK (2007) estimated that total EU27 employment in eco-industries and all activities dependent on the environment amounted to 21 million people. When including multiplier effects, the total estimate was 36 million, representing 17 per cent of EU employment (GHK 2007). More recent estimates by Ecorys (2009) put direct employment in the EU eco-industries at 3.4 million in 2007, having grown by more than 70 per cent since 2000 (Ecorys 2009).

Among the indirect investments in the environment, investments in energy efficiency and renewable energy sources in particular have proven to bear a particular potential for win-win opportunities. In an assessment of the expected overall impact of CO₂ reductions on employment a study carried out for the European Trade Union Confederation came to the conclusion that in a number of regions in the EU high unemployment rates are related to past and present job losses due to the progressive elimination of inefficient industrial electricity generation facilities using fossil fuels.

Through the implementation of climate policies and in particular through investments that are required to reach greenhouse gas emissions reduction targets, the lost jobs could be compensated by a simultaneous increase in the demand for more educated and skilled workers (Dupressoir *et al* 2007). This applies also to more specific energy efficiency measures, such as the insulation of buildings, which has the advantage of creating a number of jobs which cannot be outsourced (Dupressoir *et al* 2007).

The same is true for investments aimed at facilities allowing the effective exploitation of energy produced with locally sourced biomass. An US report on the *Economic Benefits of Investing in Clean Energy* (2009) illustrates that spending on clean energy will create higher net source of job creation relative to spending the same amount of money on high-carbon fuels because of the three sources of job creation associated with any expansion of spending – direct, indirect, and induced effects (Pollin *et al* 2009).

Taking the example of investments in home retrofitting and building wind turbines the report illustrates those three different types of effects: Direct effects are the jobs created by retrofitting homes to make them more energy efficient, or building wind turbines. The indirect effects are the job associated with industries that supply intermediate goods for the building retrofits or wind turbines, such as lumber, steel, and transportation. The induced effects, finally, are the expansion of employment that results when people who are paid in the construction or steel industries spend the money they have earned from producing the immediate and intermediate goods for clean energy industries on other products in the economy (Pollin *et al* 2009).

The report illustrates that a combination of clean energy investments creates in excess three times more jobs per a given amount of spending than, for example, the fossil fuel industry.ⁱ Three main factors are considered responsible for that: the relative labour intensity, which means that relative to spending within the fossil fuel industries, spending on clean energies utilizes far more of its overall investment budget on hiring people, and relatively less on acquiring machines, supplies, land and energy itself. The second factor is the domestic content, which means that investment into clean energy relies much more on economic activities taking place regionally – such as retrofitting of homes or upgrading the electrical grid system in communities locally. Finally, the last factor is the pay levels; clean-energy investments producing far more jobs at all pay levels (Pollin *et al* 2009). The Commission's own estimates suggest that energy end-use efficiency investments can create

three to four times the number of jobs created by comparable energy supply investments ie coal-fired and nuclear power plants (EC 2005).

- **Competitiveness, growth and innovation**

Innovation can occur in technologies, conservation of resources and energy, production patterns, and hence reduce the costs and provide competitive advantage to businesses and economies. While investment into renewable energy sources has the potential to generate incomes for both public entities and private operators of these installations the benefits of investments in energy efficiency can in large part be reaped by companies who will in the long run, after the initial investments have been paid off, see their production costs fall, this bearing the potential to make certain regions more competitive and attractive to investors. Investment in energy efficiency and renewable energy sources can also take into account the natural endowment of regions and therefore exploit competitive advantages certain regions might have compared to others. An example of GHG reduction investments which requires coordinated action and a long-term perspective but is ultimately a source of both resource and economic efficiency is combined heat and power generation.

Many of the technologies needed to reduce greenhouse gas emissions – technologies that use energy more efficiently and generate it from renewable sources – already exist. Their use could make an enormous contribution, while simultaneously promoting energy security and stimulating innovation. Other technologies require longer-term development, but for those nations and companies that choose to move quickly, there is a real opportunity to get ahead of the technological curve. Likewise, governments and companies that fail to realize these opportunities will soon fall far behind competitors already honing their strategies to compete in a carbon-constrained world.

In a study published in 2009, on Improving the Climate Resilience of Cohesion Policy Funding Programmes, ENEA (the European Network of Environmental Authorities) comes to the conclusion that the new markets which will be created in low-carbon energy technologies and other low-carbon goods and services have good growth potential, and employment in these sectors should expand accordingly. According to this report, only a few countries currently have the vision of environmentally driven growth and the potential of energy and climate change has not sufficiently been recognised as a motor for regional economic development yet (ENEA-REC 2009).

Case example

Denmark is one of the best performing member states with regard to Combined Heat and Power generation. The country has a total of around 670 centralised and decentralised CHP plants. Centralised and decentralised CHP plants differ because centralised plants initially produced electricity and were located in large Danish cities, whereas decentralised power plants were originally heat plants located in medium-size and smaller cities. The largest plants are owned by large energy companies, while the smaller plants typically are owned by production companies, municipalities or cooperative societies (Danish Energy Agency 2009).

The important financial resources that needed to be mobilised for the necessary investments were primarily generated through energy tax revenues which have been used to finance R&D; mandatory connection of new structures to district heating networks within districts; conversion of the heating plants of existing buildings for connection to district heating networks; restriction of residential use of certain heating fuels in district heating areas; and construction of combined heating and power plants (Manczyk and Leach 2001). It can be argued that Denmark exploited regional differences in the development of CHP as it was decided to expand the fuel-efficient combined heat and power system to medium and small-size cities, and the newly found natural gas in the North Sea was used extensively in decentralised CHP plants throughout most of Denmark (Danish Energy Agency 2009). Denmark was divided into heating areas, one, west of the Great Belt, served primarily by natural gas, and one to the east of the Great Belt, served primarily by combined heat and power (CHP) (Manczyk and Leach 2001). This example illustrates well how regional specificities can be exploited and specific types of industries attracted through public investment into technologies likely to generate win-win opportunities.

- **Quality of life and fuel poverty**

The Commission has also estimated that the benefits from energy savings can amount to €1000 per household annually (CEC 2008d) thus improving living conditions and alleviating 'energy poverty'. Reducing CO₂ emissions in the EU by 10 per cent by 2020 would generate health benefits estimated at € 8 to 27 billion (CEC 2007a).

- **Improve capital base**

Environmental interventions can improve the condition of all four capitals discussed earlier - man-made, natural, social and human – which form the basis of the economy. Subsequently, improving the capital base of territories will strengthen the resilience of the economy; improve the attractiveness of places for living but also for investments; and facilitate a transition towards resource efficient and low carbon economy.

- **Provision of environmental goods and services**

Investing in the natural environment can lead to the provision of environmental goods and services which can have numerous ancillary effects on the social domain and economic

development. They can improve the quality of life, diversify the local economy while ensuring the sustainable utilisation of natural resources (ENEA 2007 and TEEB (2009).

- **Environmental interventions and the transition towards sustainable and resilient economy**

Such a transition would require structural changes of the economy in order to boost low carbon and resource efficient sectors, improving resource and energy security and building the resilience of the economy against the impacts of climate change.

4.4 Benefits vs costs

Despite the growing evidence for the numerous benefits from environmental interventions for the social and economic domain, the cost of environmental protection is also an important factor to be taken into account (Sexton et al 1999). Traditional views maintain that expensive environmental action can harm the economy, cause job losses and weaken competitiveness. The implementation of environmental legislation which requires investments in environmental infrastructure can also be quite costly (construction of waste water treatment plants, waste management facilities, etc.). There are also transaction costs associated with the environmental legislation in relation to oversight and monitoring by agencies or extensive paperwork by companies (Sexton et al 1999).

The economic cost of coping with environmental challenges, such as climate change, is difficult to estimate for various methodological reasons (EEA 2007) but a couple of studies put forward some estimates. Regions 2020 study commissioned by DG Regional Policy and the EEA report (2007) suggest that asymmetric territorial impacts of climate change will entail different costs for different countries. A study by the OECD elaborates on the costs of integrating climate adaptation measures that could incur for different economic sectors. The study underlines that the costs can vary depending on the time frame or the uncertainty about the specificity of impacts; financing only measures that directly address the damage or also the development of ‘adaptive capacity’ in the case of future damage. In any case, early action on climate proofing investments is likely to realise higher benefits compared to the incurring cost.

Stern (2006) estimated that in order to address climate change countries should invest one per cent of their GDP in climate related measures. If investments are delayed the cost of ‘inaction’ could reach 5 to 20 per cent of GDP (Stern 2006). Notably, the economic dimension associated to the loss of biodiversity also constitutes a significant socio-economic challenge. Estimates by Braat *et al.* predict that the cost of not halting biodiversity will lead to a loss of ecosystem services equivalent to around 7 per cent of GDP by 2050 (Braat *et al.* 2008).

5 ROLE OF COHESION POLICY INVESTMENT

Structural and Cohesion Funds are the EU's main financial instruments of Cohesion Policy to reduce the gap between poor and rich regions. Between 2007 and 2013 the Structural Funds (including the Cohesion Fund) have a budget of €347 billion, amounting to one-third of the EU's total budget. EU funds have an important leverage effect on attracting additional public and private financing and in this regard play a crucial role determining the development pathways of many European regions.

Earlier (see Section 4.1), we have discussed basic causes for market failure such as **public goods, externalities, information failure and monopoly**, which justify environmental interventions. With regards to Cohesion Policy, there are additional justifications in relation to supporting structural change and ensuring equity.

Regions 2020 study showed that four challenges including globalisation, demographic change, climate change and energy will affect adversely the different European regions in the future. These impacts will require **structural changes** in the economies of these regions in relation for instance to improve the resilience of economies to climate change impacts and strengthening energy security (DG Regional policy 2008). Cohesion Policy, which traditionally supports regions to implement structural reforms, is justified to play a role in the transition pathways to low carbon and resource efficient economies of European regions.

The Barca review points to a range of arguments which suggest that adapting to climate change and a low-carbon economy is an issue of relevance for EU Cohesion Policy. It considers that choosing climate change as a core priority of Cohesion Policy could add to the sustainability of the Union. Interventions for adaptation are not only very place-specific, they are also interdependent and interdependencies extend across national borders, calling for trans-European cooperation (Barca 2009). The Barca report also points out that as emission intensity varies between industries, mitigation of climate change will tend to have differential effects on regions and some places will be affected more than others (Barca 2009). The transition process taking place in a number of regions is expected to continue in a near future, further leading to a reduction of the number of jobs for the least qualified workers. Thus, certain regions might be more hit by climate change mitigation measures and these, depending on their geographical features and the dynamism of the labour market in these regions, would certainly be enhanced by support to the reconversion from fossil fuel intensive industries to clean energies.

On **equity** grounds, environmental interventions in Cohesion Policy are justified as the policy ultimately aims to support lagging behind regions and disadvantaged groups in society. The reason for this is that markets may deliver economically efficient solutions which impact on the economic development, however, these may vary across the different regions and territories (IVM et al 2009).

Therefore, a strong case can be made of the role of Cohesion Policy to provide support for environmental interventions. It can do it in two ways, both of which are likely to offer 'win-win' solutions to the economy and the environment. Through **direct environmental investments** (natural resources, biodiversity protection, environmental infrastructure, etc.) Cohesion Policy can assist regions to achieve better environmental performance, to provide

environmental goods and services, to reduce economic costs (from climate change impacts or due to improve resource efficiency for instance) and to implement the heavy Directives of the EU *acquis* (those requiring significant investments). Cohesion Policy can support **indirect environmental investments** in order to ‘green’ energy, transport and production systems and therefore contribute to innovation, competitiveness, new markets and business niches, growth, employment and overall better quality of life (ENEA 2007).

Reports by IVM et al (2009), ENEA (2008), ENEA-REC (2009) and the GRDP (2006) have found that supporting environmental interventions (both direct and indirect) in Cohesion Policy is likely to realise the following ‘win-win’ benefits:

- Tackling poor environmental quality and unsustainable practices that are barrier to development;
- Promoting economic diversification;
- Provisions of infrastructure for economic modernisation and competitiveness;
- Stimulating skills and innovation to provide new high value opportunities in the knowledge economy;
- Creating opportunities for tourism and improving attractiveness of places for investors, workers and businesses;
- Tackling the effects of industrial decline and dereliction;
- Provision of new opportunities in peripheral regions and under-developed rural areas;
- Economic multiplier effects associated with all the above.

In summary, it can be argued that there is a strong case for integrating environmental and economic objectives into a Cohesion Policy programme which can realise numerous benefits spilling-over social and economic domains such as reducing business costs through more efficient use of resources; developing new businesses based on environmental goods and services; promoting the identity of an area based on its environmental quality as a part of inward investment strategy; creating jobs and developing new skills; and reducing health costs. An evaluation by GHK et al (2007) showed that environmental investments under the Cohesion Policy are able to have a significant impact on regional economic development, contributing to the increase of GDP by 1-2 per cent in most Member States. This is particularly important in time of economic crisis when new sources of growth are sought but also on the long term – in order to secure sustainable, greener paths for development (EC 2010).

5.1 Green stimulus packages

The stimulus packages prepared to respond to the economic crisis at national and EU level had the aim to inject fast investments in order to boost economic activity and ensure a rapid recovery. Of course, it should be noted that the stimulus packages are different than cohesion policy investments as they constitute a one-time exercise to stimulate the economy; they can be highly political as well. From sustainable development point of view, however, the stimulus packages were important as they created a momentum in the political realm for notions such as ‘Green New Deal’ seeking new sources of growth and jobs. At EU level, President Barroso put forward a proposal for the **European Economic**

Recovery Plan (EERP) which explored ideas such as ‘smart’ growth for low-carbon development; synergies between economic and environmental policy were a key part of the European Economic Recovery Plan (CEC 2008b). The Recovery Plan incorporated the strategic aim of speeding up the shift towards a low carbon economy, reasoning that a strategy to limit climate change and promote energy security would ‘encourage new technologies, create new green-collar jobs and open up new opportunities in fast growing world markets [...]’. Some of these ideas that emerged in 2008 are now embedded in the recently adopted Europe 2020, the overarching economic Strategy of the Union, the successor of the Lisbon Strategy for growth and jobs, which expires at the end of 2010.

The stimulus packages also underline the role of public financing to mobilise additional financial resources for common objectives and targets. As part of the EERP, a number of amendments of Cohesion Policy were undertaken, one of the most prominent ones – to allow all member states to increase the threshold of the ERDF to 4 per cent, targeting energy efficiency and renewable energy in social housing (CEC 2008c). Under the system of shared management, it was then under the discretion of member states whether or not to benefit of this new ‘green’ opportunity.

A number of studies attempted to study the ‘greenness’ of the stimulus packages (HSBC 2009; Wuppertal 2008; E3G and WWF 2009) but a key question arises on how one defines what ‘green stimulus’ is before one attempts to measure it. DG Environment proposed a number of criteria that measures should meet in order to qualify as a green stimulus (adapted from DG Environment 2009 and Bowen *et al* 2009):

- Timing (‘shovel ready’ measures);
- Job creation impact;
- Support for vulnerable sectors and social groups/long term social impact;
- Environmental impact;
- Boosting productivity and innovation/positive ‘lock-ins’; and
- Synergy effects and policy coherence.

In 2009, the Commission published a report, upon the request of the Environment Council, assessing the green elements of the recovery packages put forward by European Member States (DG Environment 2009). Most Member States included ‘green elements’ in their packages. These were usually related to energy and climate related investments targeting to improve energy efficiency or to support the take up of renewable energy and other eco-technologies. Less attention was paid to opportunities stemming from water, waste and nature conservations measures and the overall conclusions of the DG Environment’s report is that ‘a number of opportunities were not taken up in any significant manner. These include: the promotion of resource efficiency (recycling, waste prevention and treatment, water efficiency measures); investing in protecting and managing ecosystems greening public procurement’. Bowen *et al* (2009) also underline that boosting ‘green measures’ will not be sufficient for a transition towards a low-carbon economy. They argue that investments which could increase the pressure on the environment or ‘lock-in’ economies on intensive carbon pathways should be phased out as they will offset the positive impact of the ‘green measures’.

5.2 Green investments in line with the Lisbon and Europe 2020 Strategies

The original Lisbon Strategy was prepared in 2000 as a roadmap for EU's social and economic development in times of globalisation and aging society. In 2005, the Strategy was 'relaunched' to focus its priorities on creating growth and jobs, and improve its governance structure. The Commission's own evaluation claims that overall the Lisbon Strategy had some positive impacts on the European economy and helped building 'broad consensus on the reforms that EU needs'. At the same time, the evaluation is quite straightforward in describing the failings of the Lisbon Strategy, stressing that 'the delivery gap between commitments and actions has not been closed' as the Strategy's goals of creating 70 per cent employment and allocating 3 per cent of EU's GDP for financing research and development are not going to be met. The Strategy's vague governance structure resulted in unclear institutional responsibilities and relatively low sense of ownership. The Strategy has also failed in establishing the link to other strategies such as the EU Sustainable Development Strategy and EU climate and energy policies. Furthermore, the evaluation claims that earmarking €228 billion of the 2007-2013 Structural Funds for Lisbon priorities has helped making the case for using EU's budget potential to support EU strategic objectives but has not proven to be as successful as originally hoped (EC 2010a).

In March 2010, the Commission adopted Europe 2020 Strategy of the European Union following a public consultation (EC 2010). It contains three main priorities, one of which is 'sustainable growth: promoting a more resource efficient, greener and more competitive economy'. Moreover, the Strategy includes five headline targets one which is aligned with the 20/20/20 climate targets (including a possibility to move to a 30 per cent targets for emission reduction in case other developed countries pledge similar targets); renewable energy and energy efficiency. The Strategy envisions Cohesion Policy and its structural instruments as one of the key delivery mechanisms of the Europe 2020 objectives and targets.

5.3 'Crowding out' and 'crowding in' effects

The role of investments should be considered also in terms of possible '**crowding out**' effects. The crowding out effects can occur in case of expansionary fiscal policy which leads to little or no effect on aggregate output because other components of the demand decline (Burda and Wyplosz 2005). In other words, increasing public expenditure can lead to the decrease of **private investments** or **public expenditure** elsewhere. In relation to Cohesion Policy spending, the question of possible 'crowding out effects' is an important one.

Most evaluations of the impact of Cohesion Policy focus on the impacts on growth based on the assumption that EU funds lead to an increase in national public investments which in turn leads to an increase in GDP growth rate (Wostner and Slander 2009). The impact of Cohesion Policy on national public spending, however, has been relatively under-researched.

According to the principle of additionality, Member States have to co-finance EU-funded projects but must not 'crowd out' spending for national public investments elsewhere (EC 2007). Wostner and Slander (2009) found out that generally Cohesion Policy funds tend to increase the total net amount **public expenditure** and hence fulfil the 'additionality' requirement. They specify, however, that additionality occurs in case of smaller inflows

whereas in the case of higher inflows a ‘crowding out’ effect can be observed. Hagen and Mohl (2009) further argue that Cohesion Policy payments per GDP appear quite important compared to total public investments in the ‘old’ (Spain, Ireland, Portugal and Greece) and ‘new’ (new Member States) cohesion countries, which indicates that for these countries it might be hard to co-finance EU projects without cutting expenses elsewhere. Their conclusions suggest that Cohesion Policy spending does not seem to increase public investments and indicates a clear ‘crowding out’ of national spending. Another study conducted by Ederveen, Gorter, de Mooij and Nahuis (2002) on the impact of EU funds on the national regional funding for Objective One regions showed that on average one euro Cohesion Policy support crowds out 17 cents of national regional spending.

Crowding out private investments can have significant negative impacts on regions on the long term by leaving them vulnerable to economic decline once the Cohesion Policy funding has been exhausted (Farole et al 2009). Interestingly, a case study from Spain evaluating the effects of Structural Funds between 1994 and 1999 found that a positive ‘**crowding-in**’ effect on private investments outweighs the negative ‘crowding out’. De la Fuente’s (2002) calculations suggest that every euro of public investment from EU funds in Spain seems to increase private investments by around twenty cents.

In this regard, the question of appropriate level of Cohesion Policy funding for the different priority areas is important in order to ensure that it does not ‘crowd out’ national spending for environmental objectives and it ‘crowds in’ private investments in environmental goods and services. Therefore, these questions will be explored in depth in Supporting Paper 3 with further insights from the case studies (Supporting Paper 4).

5.4 Leverage effect of the EU Structural and Cohesion funds through financial engineering and innovative financial instruments

According to the EC estimates, between 2000 and 2006 every Euro invested by Cohesion Policy leads to further expenditure in Objective 1 (now the Convergence objective) regions averaging € 0.9. In the former Objective 2 regions (now the objective Regional Competitiveness and Employment) this induced expenditure can go as high as 3 times the amount initially invested.

Considering the limited public resources and significant impact of the financial crisis on public investments and credit availability, it is important to consider new types of financial instrument financed by Cohesion Policy that could increase leverage effect of the funds and make them more accessible for local actors.

Art. 44 of the EC Regulation 1083/2006 set up the legal basis for creation of certain type of financial instruments, which at first place are allowing certain financial engineering as an alternative to grant aid and second, the risk sharing with national and regional intermediaries (risk sharing mechanisms).

The use of financial instruments such as loan guarantees, microcredits, microcredit guarantees, venture capital and securitisation instead of non-reimbursable grants, allow to recycle the public funds and to leverage private capital, increasing the efficiency and the impact of public resources allocated to SMEs. Usually, the funds are channeled from the responsible European institutions through, either financial intermediaries or national or regional public institutions. This allows to better reach the different territorial levels throughout Europe and to share the risk among diverse actors.

Results of new financial engineering instruments like JESSICA, JEREMI and ELENA managed in cooperation with European Investment Bank are still to be carefully estimated. The new elements in management of the EU Structural Funds introduced through them will be taken into account and further analysed as part of the study. For example the support provided by EIB, which will provide specialist expertise and potentially loan financing, and it is also likely to attract additional loan resources from other international financial institutions. Providing that JESSICA is built on a market-driven approach, it is anticipated that the Structural Funds used in JESSICA will also attract substantial additional capital from commercial banks and other private sector investors.

Additionally, JESSICA is expected to create stronger incentives for successful implementation of projects by ERDF beneficiaries, by providing them with wider opportunities to employ the more traditional grant tools with loans and other financial instruments. Long-term sustainability will be reinforced through the revolving character of the ERDF (and ESF where eligible) contribution to funds specialising in investing for urban development. The recycling of funds through investments in revenue-generating projects, presents an opportunity for JESSICA to create a lasting legacy for the Structural Funds in the EU (EIB 2007).

Some lessons could be drawn from other EC financial programs as the existing Marco Polo Programme, which is designed to shift goods from the roads to other transport modes. The programme, which has a budget of €740 million for 2007-2013, is estimated to generate for every €1 in grants €6 in social and environmental benefits (CEC 2004).

5.5 Investment Categories with the Potential to Deliver ‘Win-Win’

Energy Efficient Transport Systems

Creating sustainable transport systems has great potential for significantly improved environmental standards. In some countries, unemployment is partly caused by poorly planned transport systems which can constrain the mobility of workers even over comparatively short distances, for example within urban centres. Where inadequate transport constitutes a major obstacle to household expenditure and livelihoods, improved transport and housing patterns not only improve household income but may also have a huge impact in terms of people’s access to jobs and economic opportunities. Apart from job creation, other economic benefits include reduced congestion, agglomeration benefits, cost savings, increased productivity and competitiveness. Transport investment can also have an important influence on productivity by increasing the effective density of people and jobs within a given distance (UNEP *et al* 2008).

Investments in sustainable transportation can generate net employment increases through jobs in manufacturing of buses, light rail, subways, and railways; in the provision of the required infrastructure, and in planning, running, and maintaining transit systems, outweighing any reductions in employment in car and truck manufacturing and related fields. Rail transport is both more fuel-efficient and more labour intensive than road transport (WWF 2008). Based on German studies, Renner (1991) suggests that this is true for track construction relative to road construction, which generates the fewest jobs of any public infrastructure investment. Policies aiming to rebalance transport modes in favour of rail in particular would lead to net growth in overall employment of around 2 per cent on

average per year over the period 2000/2030 for passenger transport and 1.25 per cent for freight transport (Dupressoir *et al* 2007).

Renewable Energy

The promotion of renewable energies has helped to create thousands of jobs over the past decade and provided a fresh stimulus for the economic development of many less prosperous regions in the EU. A recent Commission study found that stronger policies on renewable energy sources (RES) to reach the European 20 per cent renewables target can provide a significant boost to the economy, give jobs to 2.8 million people in the RES sector and 410,000 additional jobs, and lead to total gross value added in the RES sector of about 1.1 per cent of GDP (Ecofys 2009).

A case study of Güssing, Austria by GHK *et al* (2009) provided compelling evidence that structural funding for renewable energy (in this case, building district heating and renewable energy plants) can boost job growth in regions with high unemployment. GHK *et al* (2009) also found that Germany's renewable energy sources act had been highly effective in generating employment. Indirect employment effects also arise in the intermediate input sectors of these industries, such as the metal industries and mechanical engineering.

Energy Efficiency

Investing in energy efficiency is the cheapest and most effective way to address current energy challenges at national, regional and local levels. EE measures can achieve great reductions in energy consumption in a number of sectors – housing, industry, commercial, etc. It is estimated that only the buildings, which contribution to emissions equals 40 per cent, has the potential to realize 28 per cent energy saving of the final energy use by 2020 (CEC 2008d).

At the same time, ancillary effects include improved living conditions and integration of jobless or low skilled persons into the workforce hence strengthening social cohesion (Dupressoir *et al* 2007). The Green Paper on energy efficiency stipulates that '*Energy end-use efficiency investments create three to four times the number of jobs created by comparable energy supply investments i.e. coal-fired and nuclear power plants*' (EC 2005). Increasing employment opportunities are highest particularly in sectors such as construction, cooling and heating equipment among others (UNEP and SCBI 2007). Most of these jobs are linked to insulation and energy renovation of buildings for improved energy efficiency and also to the construction and installation of infrastructure. Insulation and installing low-energy consumption heating could further create 1 million jobs. A worldwide transition to energy-efficient buildings would create millions of jobs, as well as greening existing employment for many of the estimated 111 million people already working in the construction sector. Investments in improved energy efficiency in buildings could generate an additional 2-3.5 million green jobs in Europe and the United States alone, with the potential much higher in developing countries.

Biodiversity

GHK *et al* (2007) looked at the importance of biodiversity and eco-system services for the economy and jobs. It argued that biodiversity and eco-system services contribute to around one-third of all industrial sectors through the provisioning of different ecosystem services (see 3.3.2 above for definition).

A publication by the Birdlife International (2007 and 2008) provides a number of case studies on European regions that used EU funds to invest in biodiversity conservation and ecosystems management, which showed the potential of such investments on regional employment and growth. The publication argues that biodiversity investments can improve the attractiveness of places and consequently attract more jobs.

Similarly, the recent initiative on the economics of ecosystem and biodiversity (TEEB) provides further concrete evidence on how support to conserving biodiversity, ecosystem and their services can have positive impacts on sustainable development, eg growth and employment, both at the global and European level (TEEB 2009a). Investment in the maintenance of naturally functioning ecosystems and protected areas (eg so called landscapes 'green or ecological infrastructure') can yield several positive outcomes. Furthermore, these investments also often make economic sense in terms of cost effectiveness and rates of return, once the whole range of benefits provided by maintained, restored or increased ecological services are taken into account.

For example, there is increasing evidence on how investing in wetland ecosystems as well as watersheds, instead of man-made infrastructure (eg dykes or waste water treatment plants) can help to sustain or enhance the provision of important ecosystem services such as purification of water and protection against floods. Furthermore, investing in the maintenance or restoration of ecosystems can support the maintenance of pollinating insects, biological control agents and other species with economic value (eg game, fish, fruit, natural medicines, 'raw material' for pharmaceutical and cosmetic industries). It can also support food and health security by maintaining genetic diversity of crops. For example, in the United States, the agricultural value of wild, native pollinators (ie those sustained by natural habitats adjacent to farmlands) is estimated at billions of dollars per year (Daily et al. 2009 in TEEB 2009). Also, well designed 'no take' zones in marine protected areas (MPA) can function similarly. A review of 112 studies in 80 MPAs found that fish populations, size and biomass all dramatically increased inside reserves, allowing spillover to nearby fishing grounds, helping to maintain local livelihoods in longer term (Halpern 2003 in TEEB 2009).

Furthermore, nature and biodiversity are an important driver of tourism, the world's largest industry. Over 40 per cent of European travellers surveyed in 2000 included a visit to a national park (Eagles and Hillel 2008 in TEEB 2009a). For example, in New Zealand economic activity from conservation areas on the west coast of South Island led to an extra 1,814 jobs in 2004 (15 per cent of total jobs), and extra spending in the region of \$221 million/year (10 per cent of total spending), mainly from tourism (Butcher Partners 2005 in TEEB 2009a). Consequently, support to sustainable nature-related tourism can help create 'win-win' situations for both biodiversity and regional development.

Category	Positive gains for social and economic domains
Direct	
Biodiversity and ecosystem services	Provides environmental goods and services (provisioning, regulating, cultural and supporting); Improves attractiveness of places (locational quality) and hence can attract more labour force into greener areas; attached certain industries (eg access to cleaner water); Increase house values; and Benefits from 'green infrastructure'
Waste prevention/recycling/reuse	Creates more jobs compared to landfills and incineration facilities; Improves overall the resource efficiency of the economy; and Reduces dependence on resource imports and extraction.
Water and waste water	Access to clean water Better quality of life Attractiveness of places/territories Improved resilience of ecosystems to provide ecosystem services
Indirect	
Energy efficiency	Improves living conditions; Integrates jobless or low skilled persons into the workforce; Creates three to four times the number of jobs created by comparable energy supply investments; and Provides competitiveness edge for industry
Renewable energy	Policies to reach the EU 20 per cent renewables target can provide a significant boost to the economy, give jobs to 2.8 million people in the RES sector and 410,000 additional jobs, and lead to total gross value added in the RES sector of about 1.1 per cent of GDP.
Energy efficient transport systems	Provides access to mobility services and agglomeration benefits; Improves access to jobs; Creates jobs in planning, running, and maintaining transit systems, outweighing any reductions in employment in car and truck manufacturing and related fields; Reduces congestion, cost savings; and Increases productivity and competitiveness Improves quality of housing and life in general Reduces energy poverty
Eco-innovation and environmental technologies	Improved resource efficiency and improved productivity Strengthen competitiveness Creates innovation and new business niches, new sources of growth Creates new employment Reduces dependence on resource imports Creates jobs for both low and high qualified workers
Skills and training	Training and re-qualification of workers in green sectors Capacity building for project promoters and relevant administrations

5.6 Investments with high environmental externalities

The literature suggests that there is no comprehensive evaluation of Cohesion Policy spending with relation to its impact on key environmental components – climate change, sustainable transport, natural resource use and biodiversity, and sustainable consumption and production. Therefore, this study (see Supporting Paper 2) will assess the environmental performance of Cohesion Policy programmes.

Drawing on the literature on **environmentally harmful subsidies**, however, Cohesion Policy investments can be placed under the category of direct public subsidies. Here the most obvious case is the one of investing in motorways projects which consumes approximately 11,6 per cent of the 2007-2013 allocations under Cohesion Policy. In this respect, the Barca report stresses that if Cohesion Policy will promote a policy agenda seeking to reduce pressure on the environment and climate, it should revisit its transportation portfolio and consider phasing out such subsidies and shift funding towards measures stimulating mobility services and modal shift.

Subsidy reform is not simply about getting rid of subsidies, but also about reforming them – in some cases choosing a different focus (ie road to rail) or additional focus (eg electricity charging points in road infrastructure), in other cases adding in ‘conditionalities’ or ‘cross-compliance’ requirement which can increase the power of policy filters and reduce impacts.

From biodiversity and habitat preservation point of view the case of transport investments has been one of the most critical ones as well. Here, Cohesion Policy should seek to apply better environmental assessment tools, improved land use planning techniques and biodiversity proofing tools. The discussion on tools and strategies for environmental integration in Cohesion Policy therefore is a crucial one in terms of decoupling economic growth from environmental impacts.

6 ENVIRONMENTAL POLICY INTEGRATION

6.1 Definition of Environmental Policy Integration

The concept of EPI can be traced back in the 70s but it gained significant prominence after it featured in the Brundtland report in 1987 (WCED 1987) and Agenda 21 (UNCED 1992) particularly in relation to sustainable development and ecological modernisation (Nilsson and Eckerberg 2007). Lenschow (2002) frames EPI as ‘a first-order operational principle to implement and institutionalise the idea of sustainable development’ (Lenschow 2002). Developing comprehensive strategies for EPI, however, have been developed more recently and have demonstrated a varying degree of success (Lenschow 2002, EEA 2005, IEEP 2007).

The idea of taking into account environmental concerns into sectoral policy-making came about when it was acknowledged that key pressures on the environment and ecosystems are deeply entrenched into sectoral policies. It was also recognised that a more fundamental shift in traditional policy-making was necessary where an emphasis is given to anticipating/preventing environmental impacts instead of ‘cleaning up’ or deploying ‘end-of-pipe’ technologies. Originally, the responsibility for EPI lied predominantly in the environmental domain but the result was rather disappointing (Jacob and Vokelry 2008). Consequently, more emphasis was placed on approaches and tools for delivering EPI within and across other sectoral domains.

6.1.1 Policy context for EPI in the EU

At EU level the concept of EPI was embedded in the EU Treaties and later it was taken up in the EU Environmental Action Plans (EAP), EU Sustainable Development Strategy and the so called ‘Cardiff’ process.

The principle of environmental integration in sectoral policy making has been officially stipulated in 1986 in the Single European Act. In 1997, the Amsterdam Treaty in Article 6 linked more strongly EPI to sustainable development. The Lisbon Treaty, which entered into force on 1 December 2009, retains the principle of EPI with a slightly modified wording in Article 11: ‘*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*’. Previous research however has shown that establishing a legal basis for EPI is insufficient and does not guarantee that environmental concerns will be taken into account (European ECO Forum 2003; IEEP 2007).

The efforts towards environmental integration have been taken up in a series of EU Environmental Action Plans. Notably, the third and fourth EAP explicitly stipulated the requirement for integrating environmental objectives in other sectoral policies while the Fifth EAP provided a more substantive framework for attaining EPI at EU level (Lenschow 2002). The current 6EAP articulates the principle of integration but refers the integration efforts to the Cardiff process (IEEP 2007). The development of the Seven Thematic Strategies under the 6 EAP facilitated a new institutional setting for policy coordination which could be conducive to EPI (EEA 2005).

In 1998, the 'Cardiff process' gave another impetus for integration efforts which went beyond the environmental domain calling for all Council formations to integrate environmental considerations into their sectoral policies. Nine Council formations – energy, agriculture, transport, development, internal market, industry, general affairs, economy and finance and fisheries developed EPI strategies which were evaluated annually. Environmental integration has been strengthened via the deployment of novel policy instruments, institutional restructuring and enhanced cross-departmental cooperation (EEA 2005). This was seen as a shift towards a more decentralised approach to EPI embedded into sectoral domains which are better suited to decide over the most appropriate policy measures (Jacob and Volkery 2008). However, progress in the Cardiff process has showed mixed results, as the concept of EPI has remained in the realm of political rhetoric (EEA 2004, Nilsson and Eckerberg 2007). The Commission's own annual review of the Cardiff process was critical and reference to it did not feature in the 2005 and 2006 Council conclusions (IEEP 2007).

Another important delivery mechanism for EPI is the EU Sustainable Development Strategy launched in 2000 and renewed in 2006. The Strategy, however, has received much criticism on its substance, coherence and implementation (Pallemaerts 2006). The integration agenda within the EU SDS had to compete with other overarching policy goals of the EU such as the objective for competitiveness after the relaunch of the Lisbon Strategy in 2005 focusing on growth and jobs. Moreover, the EU SDS has been seen increasingly as an add-on to the Lisbon Strategy instead of a powerful holistic strategy on its own. Lafferty et al (2004) argue that the failure of the integration efforts for SD is due to the fact that the discussion failed to become part of a broader political process where environmental objectives are central, even principle (Lafferty 2004).

Other strategic processes at EU level could also potentially be conducive to EPI. The multiannual financial programming to the EU budget, and particularly the EU budget review 2007-2008, is argued to offer a unique opportunity for environmental policy integration (EEA 2005, Wilkinson 2007).

6.1.2 Defining EPI

The concept of EPI, similar to sustainable development, can be a subject to different interpretations. Ute Collier (1994) developed one of the early conceptualisations of EPI and provided a threefold definition:

- Achieve sustainable development and prevent environmental damage;
- Remove contradictions between policies as well as within policies (in other words improving policy coordination or policy 'coherence'); and
- Realise mutual benefits and the goal of making policies mutually supportive.

Collier's definition however falls short of defining what is needed for policies to be integrated and how EPI can be operationalised so that the presumed 'mutual benefits' are exploited by sectoral actors.

Lafferty and Hovden (2003) offer a definition according to which EPI implies:

'an attempt to aggregate presumed environmental consequences into overall evaluation of policy, and a commitment to minimise contradictions between environmental and sectoral policies by giving principled priority to the former over the latter'.

They suggest that in order to ensure that environmental concerns are moved from the periphery to the core, the environmental/ecological objectives of protecting and preserving life support systems should be given a 'principle priority'.

Lenschow and Jordan (2000) argue that policies are 'environmentally integrated' when 'non' environmental actors acknowledge the consequences of sectoral policies on the environment and undertake actions to correct these. This is close to the approach undertaken by Nilsson and Eckerberg (2007) who seek to define EPI in relation to the specific sectoral context. Lenschow (2002) also argues that EPI is an approach which can reconcile economic and environmental objectives through reforms in organisational structures and routines and specific strategies and tools (Lenschow 2002, Hertin and Berkhout 2003, Jacob and Volkey 2008).

One of most applied definitions of environmental policy integration was developed by the EEA (2005) and differs significantly from the proposed by Lafferty and Hovden (2003) definition:

'EPI involves a continual process to ensure environmental issues are taken into account in all policy-making, generally demanding changes in the political, organisational and procedural activities, so that environmental issues are taken on board as early as possible and continuing during implementation. The product of EPI should be an overall improvement in policy and its implementation.'

It suggests that 'environmental issues are taken into account' but not necessarily that they are given a 'principle priority'. It also refers to the reforms needed in political, organisational and procedural domains as well as the 'preventive' nature of the concept but also implies that ultimately, EPI is also about the overall improvement of sectoral policies in relation to the state of the environment.

6.1.3 EPI and sustainable development

It is important to discuss EPI also in relation to sustainable development. As mentioned before EPI can be considered as an essential element of the governance system for sustainable development (Lenschow 2002). At the same time, sustainable development requires that a balance of all three pillars (economic, social and environmental) is ensured, whereas EPI can be defined as giving 'principle priority' to environmental objectives over other policy objectives (Lafferty 2004).

The Cardiff process for EPI at EU level, for instance, is analysed by Pallemarts (2006) who stresses that whereas Article 6 refers to the integration of environmental objectives in other policies in order to deliver sustainable development, Council texts talk about integrating environment *and* sustainable development into other policies, creating confusions over what is to be integrated (Fergusson *et al* 2001). In this study, it should be made clear that we will focus on approaches to deliver and measure the integration of 'environmental' objectives in cohesion policy and its structural instruments. The

assumption is that integrating and reconciling environmental and economic objectives will enhance sustainable development across European regions.

6.1.4 EPI in a multi-level governance context

As it will be demonstrated, cross-cutting issues such as EPI operate in a complex multi-level governance context – not only vertically, involving different levels of governance (EU, national, regional and local) but also horizontally, involving a diverse range of policy actors and their vested interests at each level (Jordan and Schout 2005, Nikvist 2008). Moreover, Lenschow and Jordan (2000) have argued that EPI can only be achieved if explored and addressed properly at all governance level within the EU polity. However, the issue of EPI in a multi-level context has not been thoroughly studied (von Homeyer and Knoblauch 2008).

EU regional policy operates in such multi-level governance system involving EU, national and regional/local levels). General Regulations and strategic orientations are set out at EU level but the responsibility of setting policy objectives and creating administrative structure occurs at lower levels of the governance system. However, it has been argued that this decentralisation posed a serious challenge for the Commission to ensure that EPI is delivered on the ground (Wilkinson 2007). Lenschow (2002) discusses different governance approaches to EPI in this context and claims that EPI very much depends on the provision of an operational guidance provided by the EU and the active involvement of civil society.

6.2 Costs and Benefits of Climate- and Biodiversity-Proofing Investments

Climate change and biodiversity are inherently horizontal phenomena which affect all economic sectors and activities and therefore needs to be taken into account into sectoral planning and budgeting. From a purely economic point view, one needs to justify what are the benefits of integrating climate change measures compared to costs that are incurred to the different policy areas. It is argued that ‘climate proofing’ of investment programmes and projects suggest that the cost of climate proofing at a design stage of a programme/project is lower than the costs of maintenance and repair in the case of damage due to climate changes (ADB 2005). Following this proposition, Cohesion Policy is a policy area which also needs to integrate climate measures across its portfolio of investments and hence the question of costs and benefits is highly relevant. Similarly, the socio-economic value of biodiversity and healthy ecosystems (e.g. the ecosystem services they provide) should form an integral part of the review (Kettunen *et al* 2009) (see below). Any costs associated with biodiversity proofing of the EU investments under Cohesion Policy are likely to be significantly less than the negative impacts of biodiversity loss and the degradation of ecosystems in a long term.

ENEA-REC (2009) with contributions from Member States published a report which explores different approaches to climate proofing Cohesion Policy programmes and projects in the 2007-2013 financial period. The report is limited to the Member State level and does not provide a clear definition of what ‘climate proofing’ is. However, it provides a first overview of good practices of ‘climate proofing’ along the entire policy cycle of cohesion policy programmes.

A case study of climate proofing as part of the transport investment portfolio of South West of England, a region which received EU funds under Objective 2, demonstrates the benefits

which spill over from the environmental domain such as: new technologies, new ways of doing business, new services, new infrastructures and more efficient ways of using regional assets. The aim of the transport portfolio for this region is to stimulate the development of a new mobility culture by three step investment approach: 1) focusing on investing in reducing the need for mobility (new generation broadband); 2) investing new infrastructure (new train development, pool bridge) and 3) investing in innovation (energy efficient engines). An evaluation (Huke 2009) of the investments that the South West of England achieved by investing in new generation broadband (£100 public/private investment) led to the following benefits:

- 15 per cent average increase in business productivity;
- 70 per cent of business reduced business travel;
- 76 per cent of businesses made a saving in fuel; and
- 84 per cent improved work life balance.

There is scope for Cohesion Policy investments to factor in the possible damage from climate change but also the potential benefit of climate change measures which could spill over from the environmental domain and contribute to job creation, social cohesion and competitiveness. Although the concept is relatively new, there is growing good practice among more progressive regions and Member States which could be better explored and there is scope to investigate similar win-win measures stemming from climate proofing strategies and instruments under Supporting Papers 3 and 4 of this study.

A study exploring climate change integration into sectoral policy making has developed a checklist of criteria and key questions for climate integration, as shown in table 1 (Mickwitz et al 2009).

Table 1: Criteria for climate change integration,

Criterion	Key question
Inclusion	To what extent are direct as well as indirect climate change mitigation and adaptation impacts covered?
Consistency	Have the contradictions between the aims related to climate change mitigation and adaptation and other policy aims been decided and are there procedures for determining the relative priorities?
Weighting	Have the relative priorities of climate change mitigation and adaptation impacts compared to other policy aims been decided and are there procedures for determining the relative priorities?
Reporting	Are there clearly stated evaluation and reporting requirements for climate change mitigation and adaptation (including deadlines) <i>ex ante</i> and have such evaluations and reporting happened <i>ex post</i> ? Have indicators been defined, followed up and used?
Resources	Is internal as well as external know-how about climate change mitigation and adaptation available and used and are resources provided?

Their multiple case study analysis across EU countries showed that:

- climate policy integration is efficient only when it is applied at multiple levels of governance (local, regional, national and EU levels);
- the opportunities and limitations for reframing climate change as an economic driver are fully identified and utilised;
- proper institutions and resources are deployed; and
- monitoring, assessment and retrospective evaluations are rigorously and systematically undertaken.

In addition to climate change, the conservation of biodiversity and the sustainable management of European ecosystems (eg their ecosystem services) has been identified as a key environmental concern for the future. However, the current assessments indicate that biodiversity is not among the core areas currently supported by the EU budget. For example, the amount specifically earmarked for biodiversity under the EU funds²⁰ in 2007-2013 forms only around 0.5 per cent of the total EU budget (Kettunen et al 2009c).

No comprehensive study exists on the impacts of Cohesion Policy investment on biodiversity. Similarly, there has been no exhaustive assessment of the overall costs and benefits of biodiversity proofing. However, a body of evidence is available demonstrating negative impacts of Cohesion Policy funding on biodiversity and ecosystem services (eg TEEB 2009a).

Consequently, and given the increasingly acknowledged role of biodiversity and ecosystems in underpinning the human welfare (eg World Resource Institute 2005, TEEB 2009a), it would be important to ensure that biodiversity forms an increasingly integral part of the Community financing for Cohesion Policy. While the focus on other environmental priorities, such as climate change, is to be welcomed in the future Cohesion Policy (e.g. the EU budget review and the upcoming negotiations on the financial framework) provide also a valuable opportunity to make the case for adequate levels of funding for biodiversity.

6.3 Criteria for Evaluating Progress towards EPI

Defining EPI is closely linked to the question of how to measure it. Underdal's work on integrated marine policy offered the fundamental for further work on evaluating the 'integratedness' of environmental and other sectoral policies (Underdal 1980). He puts forward three criteria which need to be met in order for a policy to be integrated:

1. Comprehensiveness to the input stage;
2. Aggregation to the processing of inputs; and
3. Consistency to outputs.

According to Underdal a policy is integrated 'to the extent that it recognises its consequences as decision premises, aggregates them into an overall evaluation, and penetrates all policy levels and all government agencies involved in its execution' (Underdal 1980). In other words, integrated policy is the one that seeks to improve policy outcomes by ensuring that the link between the sectors and their impacts are well established.

²⁰ i.e. LIFE+ expenditure, EAFRD Natura 2000 payments and the allocation for biodiversity under ERDF (see Kettunen et al. 2009 for further explanation)

In 2002, the OECD, as part of a broader project on governance for sustainable development, undertook a slightly different approach by developing a checklist for policy coherence in integration. It focuses on criteria for assessing institutional and decision-making practices for policy integration in view to improving governance for sustainable development, as shown in table 2 (OECD, 2002).

Table 2: Criteria for policy coherence and integration, OECD 2002

Criteria	Questions
Common understanding of sustainable development	<p>What efforts have been made to provide a clear and widely acceptable operational objectives and principles for SD?</p> <p>Is the SD concept understood by the public, government and public organisations?</p> <p>Are the benefits of SD made evident with examples and statistics?</p>
Clear commitment and leadership	<p>Is there a high level commitment for the formulation of SD objectives?</p> <p>If the commitment clearly communicated to various sectors and the across the government?</p> <p>Is leadership expressed through a sequence of priorities over time?</p> <p>If the government maintaining a sense of urgency?</p> <p>Are pioneer activities of selected agencies and local communities encouraged and rewarded?</p>
Specific institutional mechanisms to steer for integration	<p>Is there an institutional catalyst in charge of SD?</p> <p>Is the catalyst located strategically within the governmental machinery?</p> <p>Are there specific reviews of laws and regulations aimed to check of they are in conflict with SD?</p> <p>Are there mechanisms to ensure effective feedback between different levels of government?</p> <p>Are organisations moving from a sector perspective to more issue-oriented agenda?</p> <p>Is SD integrated into regular government processes such as the budget for instance?</p> <p>Is there a clear framework for assessing the performance of public organisations with regards to SD?</p> <p>Are there evaluation and reporting mechanisms to support sustainability appraisal in the public sector?</p> <p>Have specific external and independent auditing and reporting mechanisms been established?</p> <p>Has a body been put in charge of providing guidance to organisations upon request?</p>
Effective stakeholder involvement in decision-making	<p>Are there effective communication mechanisms established within the government or independent body to inform consumers about the consequences of consumption decisions?</p> <p>Has the legal framework been adapted to provide provisions for consultations and participation?</p> <p>Are there clear guidelines on when, who and how consultations should be carried out?</p> <p>Is the public involved at each stage and every dimension of the policy development?</p> <p>Are there mechanisms for evaluation and feedback on consultations?</p> <p>Is transparency ensured and reinforced at different level of government?</p>
Efficient knowledge management	<p>Are there transparent mechanisms for managing conflictual knowledge?</p> <p>Does the government ensure a framework is in place to allow discussions to focus on areas of disagreement, by developing scenarios and options?</p> <p>Are there clear mechanisms to ensure a regular flow of information from the scientific community to decision-makers?</p> <p>Are specific efforts made to support forward-looking and policy relevant knowledge?</p>

Hertin, J and Berkhout, F (2003) propose a framework to evaluate institutional strategies for EPI based on four functions of EPI – agenda setting, horizontal communication, capacity building and policy learning. They argue that sectoral policy initiatives tend to be formulated with little regard to the environment. The reasons for this can be explained as a general lack of capacity but also can be sought in ‘deeply rooted institutional factors’. The latter leads to departmentalised administrative structures which create bias towards policies unable to exploit the eco-efficient potential of modern technologies. Therefore, they propose that EPI is evaluated as policy processes and outputs based on the four core functions of EPI, as shown in table 3.

Table 3: Framework to evaluate institutional strategies for EPI, Hertin and Berkhout 2003

Function of EPI	Examples of evidence of integration
Sectoral agenda setting	Environmental protection part of missions statement Assessment of environmental impacts of sector policies Environment regular agenda item at high-level meetings
Horizontal communication	Inter-departmental working groups/committees Routine early consultation on sectoral policies/projects
Sectoral capacity building	Environmental units Environmental information services System of officials charged with environment High-level environmental official (‘green minister’)
Policy learning	‘Positive’ framing of environmental issues Constructive inter-departmental co-operation

Lafferty et al (2004) argue that one approach to operationalise EPI is by differentiating horizontal and vertical dimensions of the concept. For each dimension, a checklist of operational benchmarks is proposed, as shown in table 4.

Table 4: Dimensions and benchmarks for EPI, Lafferty (2004)

Horizontal EPI	Vertical EPI
<i>Constitutional mandate</i> , setting out provisions for environmental rights and goals	<i>Scoping report</i> , setting out the sector’s activities and mapping key environmental impacts
<i>Over-arching strategy</i> , supported by the chief executive authority	<i>Forum</i> , established as a platform for consultation among key policy actors
<i>National action plan</i> , including both over-arching and sectoral targets and timeframes	<i>Sectoral strategy</i> , designed to bring change, identifying key principles and goals for the sector
<i>Responsible executive institution</i> , assigned with overall coordination, implementation and monitoring of the integration process	<i>Action plan</i> , developed to implement the sectoral strategy, which includes priority actions timetables, targets, policy instruments and responsible institutions
<i>Communication plan</i> , outlining inter-sectoral communication channels	<i>Green budget</i> , providing the financial motivation for the Strategy and action plan
<i>Independent authority</i> , providing unbiased monitoring and reporting on national and sectoral implementation of the process	<i>Monitoring programme</i> , to oversee the implementation against targets and timeframes

The two dimensions draw upon traditional approaches to policy implementation and public policy stages. The vertical integration concerns a single sector and implies greening of the relevant sectoral policy. The horizontal dimension reflects greening of policies across the entire government. The benchmarks proposed in the table are regarded as minimum requirements for achieving and evaluating cross-sectoral integration of environmental goals (Lafferty et al 2004).

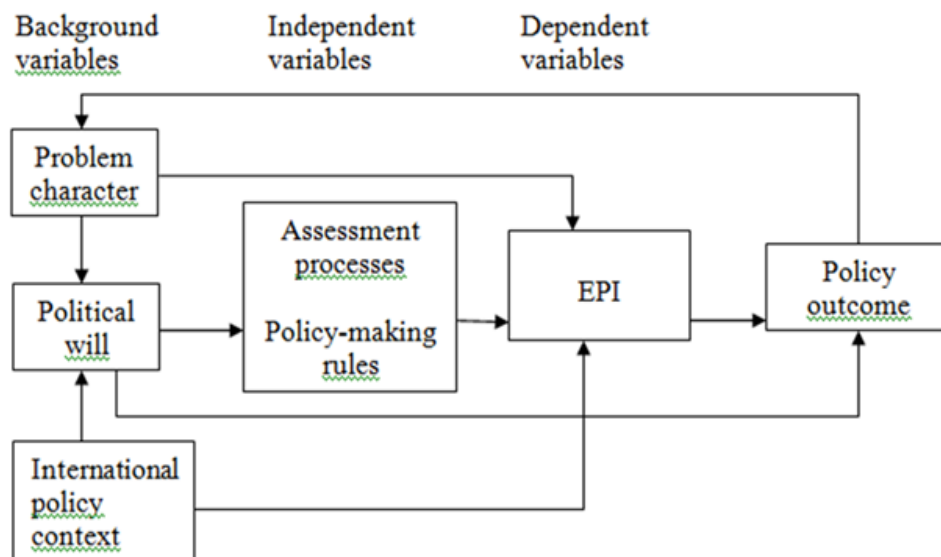
Jacob and Volkery (2008) have undertaken one of the most comprehensive reviews of policy instruments for achieving EPI and developed a typology form of a ‘toolbox’. The typology differentiates between what the authors frame as *centralised* (applied at central government level) and *decentralised* (applied within a relevant policy sector) *tools*. In this respect, the differentiation presented by Jacob and Volkery reflects Lafferty’s definition of the horizontal and vertical dimensions of EPI. A number of tools are repeated in both categories as they could equally be applied, as shown in table 5.

Table 5: Toolbox for EPI, Jacob and Volkery 2008

Centralised	National Environmental Plans Sustainable Development Strategies Constitutional provisions Independent institutions for evaluating and monitoring EPI <ul style="list-style-type: none"> • Parliamentary committees • National court of auditors Extending competences of environmental Ministries <ul style="list-style-type: none"> • Constitutions rights • Veto rights Amalgamation of departments Inter-departmental coordination for EPI <ul style="list-style-type: none"> • Green cabinets • Inter-departmental working groups Strategic environmental assessment / impact assessments Green budgeting Obligation to report
Decentralised	Sectoral strategies Special environmental units / environmental correspondents Strategic environmental assessment / impact assessments Green budgeting Obligation to report

The authors however underline that the application of the proposed tools does not necessarily guarantees their effective implementation. Their analysis of the application of these instruments in 30 OECD countries shows that sectoral administrations are struggling to apply decentralised EPI instrument which contradict the traditional logic of specialised, closed sectoral policy making. Hence, governments were more likely to apply ‘soft instrument’ which influence the agenda setting compared to instruments which would ultimately alter the power of actors and the resource allocation within a sector (Jacob and Volkery 2008).

Nilsson and Persson (2003) develop an analytical framework for EPI which explores EPI not only as a process and output but also as a policy outcome. In other words, it seeks to link institutional steering mechanisms and policy instruments for EPI to concrete outcomes for improving environmental performance, as shown below. It builds on the work of Lenschow who determines that the biggest challenge for EPI is to ensure that ‘substance follows from procedure’ (Lenschow 2002).

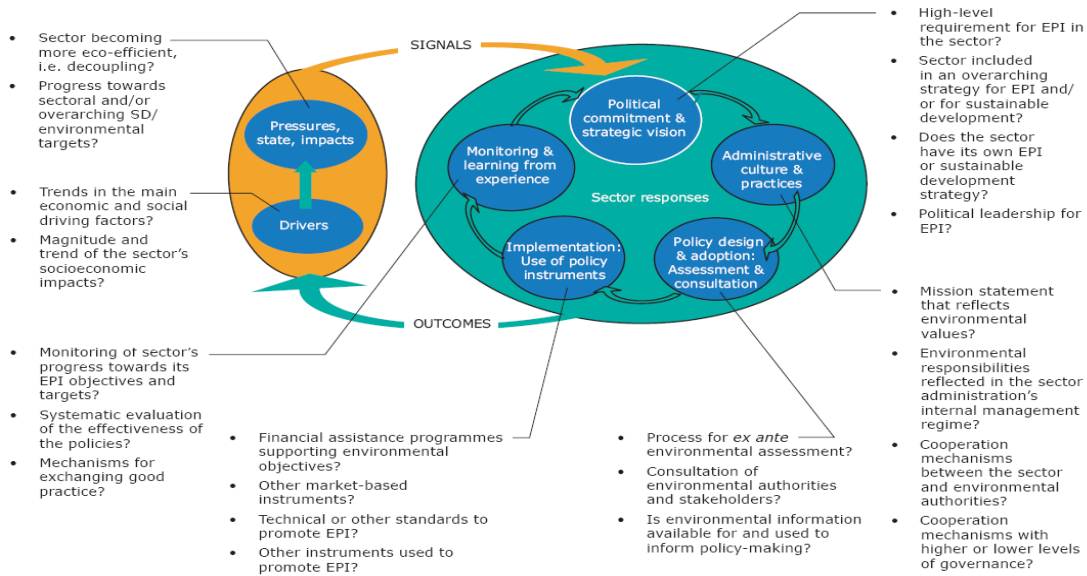


Source: Nilsson and Persson 2003

They have demonstrated that granting priority to environmental concerns does not qualify as EPI per se and stress the importance of institutions and the role of learning. Their analysis also shows that when the responsibility for policy initiatives lies in the sector itself, the opportunity to achieve EPI is stronger, therefore variables such as political will are crucial. It is argued that the predominant EPI literature is often solely tools-oriented whereas a comprehensive evaluation of EPI would require a better understanding of the sectoral context. According to Persson (2007) EPI can be ensured if sectors themselves can ‘reframe’ sectoral objectives and actions in line with environmental ones. Variables such as problems characteristic and international policy context are of primary importance to understand the driving forces behind EPI. Sectoral assessments appear to be powerful tools to understand environmental pressures from the perspective of a variety of stakeholders engaged in the assessment process.

In 2005, the EEA developed an evaluation framework for EPI which also took into account pressures on the environment and ultimately the policy outcomes, as shown in the below figure.

Figure 1 Framework for evaluating integration of environment into sector policies



The approach is strictly sectoral and only implicitly takes into account interactions within a multi-level system of governance (both vertical and horizontal). Under ‘Administrative culture and practices’ and question on cooperation mechanisms with higher and lower level of governance should reflect the vertical interactions between governance levels, whereas the following ‘policy stage’ reflects consultations with environmental authorities and stakeholders.

Quite a different approach is undertaken by Nilsson and Eckerberg (2008) who propose an analytical framework to evaluate EPI as policy learning. It mirrors the growing importance of understanding driving forces for learning, innovation and policy change.

Table 6: Analytical framework to evaluate EPI

Technical learning		Conceptual learning	
		<i>EPI</i>	
Learning about	Instrument viability and effectiveness	Problem definition, goals and strategies	Problem definition, goals and strategies
Frames	Frames are stable	Frames evolving	Frames evolving towards sustainability
Indicated in policy	Policy revisions of instruments or levels of instruments	Policy revisions of new problems and goals	Policy revisions of sustainability problems and goals
Indicated in argument	Accounts and citing of evaluations and experiences	New problem, goal and systems descriptions	Sustainability-led problem, goal and systems descriptions

The authors tested their framework through sectoral cases studies of energy and agriculture in Sweden. Their discussion reveals that what enabled EPI in practice is the evolving international and EU policy context and the presence of strong actors or actor coalitions in the sectoral policy domain who are able to exploit benefits from integrated policies.

The review demonstrates that there are a number of approaches explored so far measuring the degree and effectiveness of environmental policy integration. Based on these, this project will develop an own approach which will capitalised on the current knowledge base but adapt the approach to the specificity of cohesion policy and its structural instruments.

7 TERRITORIAL SCALES

7.1 Territorial aspects of environmental challenges

Different environmental problems and challenges have different territorial impacts. Therefore, one should first determine the spatial and functional boundaries of the 'environment' concerned (Eser 2007). Many territorial impacts of environmental challenges were already discussed in previous chapters of this literature review.

7.2 Role of Local and Regional Authorities

The case for involving local authorities from the municipality to the region in actions to reduce greenhouse gas emission has increasingly been made and a consensus has emerged that combating climate change will only be possible with a strong implication of all territorial scales, from the global to the local. In most countries, regions and municipalities are endowed with an increasing degree of decision-making power, which gives them the possibility to position themselves as pioneers within their State, both in comparison to other regions and to their State's advancement in general. This has expanded the traditional areas of action of local authorities in the area of the environment, which tended to focus on transport and waste. This is also reflected in the 2007 Commission's Green Paper on climate change, which argues that 'many decisions influencing directly or indirectly climate change adaptation are taken at the local level. This is also where detailed knowledge on the local natural and human conditions is available'. The Commission's Green Paper illustrates the varied nature and extent of problems that might affect different regions in Europe in terms of rainfall and temperature change by the end of the century. Other consequences, such as a rise in sea level or desertification, are even more space specific. **Negative effects might be much more important in some regions than in others.**

Already in 1992, the Agenda 21²¹, which was adopted at the World Summit at Rio, called for a strong involvement not only of Member States and civil society, but also of local governments. The implementation of **Agenda 21** was in fact intended to also involve action at the regional and local levels. Some national and state governments have legislated or advised that local authorities take steps to implement the plan locally, as recommended in Chapter 28 of the document. Such programmes are often known as 'Local Agenda 21' (LA21) (UNCED 1992). In fact, local build and manage a vast range of infrastructure and have an important incidence of the citizen's perceptions and beliefs through their exemplary action. This role has become even more important since greenhouse gas emission reduction targets have been set which will need that efforts be taken by all levels of government to be reached.

The involvement of the local authorities in the climate change mitigation has for example been formalised in France after the country adopted, in 2004, its climate Plan to reach its Kyoto targets, through territorial climate action plans which were progressively adopted by local authorities (Alternatives Economiques 2007). These make it possible to know the

²¹ Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations System, Governments, and Major Groups in every area in which human impacts on the environment.

level and trends of emissions in a given territory, to set objectives and indicators for evaluation and to coherently implement the different actions. They also look into adaptation which evaluates the territory's vulnerability to climate change. For certain regions, these changes will in fact be of great importance and the associated need for adaptation investments could be significant. Ecological consequences which will require adaptation investments include for example the increase in salinity of underground water and soils in coastal areas due to the elevation of the sea. The shortening of the winter season and the increased occurrence of heat waves are expected to have impacts on local economies which heavily depend on tourism. It was estimated that the range of competences of French local authorities means that 15 per cent of greenhouse gas emissions directly fall within their scope (Alternatives Economiques 2007). Local authorities (municipalities, counties or regions) are seen as having an important part to play as far as they have an important leverage in a range of sectors which are sensitive as far as GHG emissions are concerned, in particular with regard to infrastructure (town and country planning including urbanism and transport) and the goods they manage (buildings, public lighting, vehicle fleets) and the activities for which they are responsible (public transports, waste collection and treatment, energy distribution, in particular in relation to urban heating) (MEEDDM 2009).

The association representing Finnish and Local and Regional Governments considers that there are many areas where local and joint authorities can make an important contribution to the reductions in GHG emissions, for example in energy production and through energy conservation but also through urban structure, traffic and waste management. Adaptation to climate change should also be a specific area of focus in land use, construction, risk assessment and in the safe-guarding of community operations. According to Local and Regional Government Finland, climate change actions make sense also from the perspective of local economies: the municipal economy directly benefits from efforts to reduce GHG emission in energy production, infrastructure and transport (Local and Regional Government Finland 2009). The associations emphasizes that especially regarding energy use, local authorities from the level of the municipality to the region have attributions which imply that they have an important leverage. Local authorities do for example use heat and power inter alias for the heating of public buildings and for the lighting of buildings and streets. Energy is also required eg for the pumping and treatment of water and sewage.

In addition, public procurement of goods and services are of importance as local authorities may promote energy-saving goods and services with sustainable environmental and life cycle impacts. Energy sources – e.g. different fuels and electricity – are other significant municipal procurements. Similarly, local authorities' contribution in limiting urban sprawl and traffic growth are also potentially important (Local and Regional Government Finland 2009). Municipalities and regions can however be expected to play an increasingly important role in energy production as well. According to a 2007 joint publication of the EREC (European Renewable Energy Council) and Greenpeace the necessary transformation in the way energy is produced, consumed and distributed will require that one moves away from very large power stations and foster sustainable decentralized energy systems instead. While these are expected to create more jobs and empower local communities that will necessitate considerable infrastructure development at the local and regional scales which many regions will not be able to support on their own (EREC 2007).

A regional, and in some cases possibly transboundary, approach to climate change adaptation appears to be even more appropriate in a number of cases as common geographical features in one region mean that similar adaptation measures might need to be taken.

Thus, past projects already received funding under previous programming periods were already initiated in the previous programming period, for example through initiatives such as the ASTRA project, which reflects the belief reiterated in the Barca review that, the capacity to innovate, which gives opportunities for improvement as well as for managing negative effects, is specific to places and depends on the capacity of local actors to pool their knowledge and reach agreement on their preferences. It also highlights that the effectiveness or the feasibility of some adaptation interventions depends on trans-European territorial cooperation, as for example with coastal defences or for protection from river flooding (Barca 2009). Focusing on the Baltic Sea Region (BSR), the project "Developing Policies & Adaptation Strategies to Climate Change in the Baltic Sea Region" (ASTRA) assessed regional impacts of the ongoing global change in climate. Its aim was to develop adequate climate change adaptation strategies and policies. The project was co-financed by the INTERREG III B programme of the European Union, with a project budget of EUR 2.2 million. The time frame of the ASTRA project was from June 2005 to December 2007²².

The availability of financial resources which local authorities need to take the necessary initiatives for climate change mitigation and adaptation however varies widely across regions and in many cases regions may lack the financial means to do the significant investments required. Hence, a number of regions heavily depend on access to specific state sponsored credit schemes to be able to do the necessary investments (Alternatives Economiques 2007).

²² See www.astra-project.org

8 SYNTHESIS OF THE LITERATURE REVIEW

The literature review has provided an overview of the current thinking and knowledge in relation to cohesion policy, economic development theories, sustainable development, integrated development pathways, environmental integration and contemporary environmental challenges. It is a fundamental part of the study as it provides a framework for the main assumptions, concepts and approaches to ‘greening’ cohesion policy. Another aim of the literature review is to set out the foundation for the methodological approach to the entire study and to underpin the consortium’s analytical approach to the consequent Tasks 4, 5 and 6. **This synthesis should be regarded as a bridge between the literature review and the methodological report.**

The synthesis to a large extent mirrors the content and structure of the literature review by fleshing out the key concepts, models, principles and assumptions as well as offering already some valuable insights in relation to the core study questions. It discusses the evolution of cohesion policy and its structural instruments in relation to sustainable development and integration of environmental concerns in the past. Then, it highlights underlying concepts and models of sustainable development which will frame the analysis under different Tasks of the study. Theories of economic regional development are then summarised emphasising the implications for sustainable development and the environmental with a special attention to the concept of New Economic Geography. Next, it explores the current trends in key environmental challenges but also elaborates on the implications for cohesion policy.

Based on this more theoretical overview, the synthesis suggests that cohesion policy has a role to play in decoupling economic growth from environmental impacts by promoting integrated development pathways in European regions and investing in ‘green measures’, which can contribute to ‘win-win’ solutions, as well as reforming/phasing out other cohesion spending which currently puts pressure on the environment and climate. The synthesis then proposes the approach of environmental policy integration, which informs the discussion on tools and strategies for climate- and biodiversity- proofing of cohesion spending and to a large extent informs the analytical approach in Task 4 and also the evaluation criteria for the case studies in Task 6. The synthesis concludes with the implications of integrated development approaches and environmental integration for the complex multi-level governance system that cohesion policy operates in and underlines the importance of each level of governance in designing and delivering integrated programmes and projects.

Table 7: Structure of the synthesis and how it links to the core questions of the study

1.1. Cohesion Policy and Sustainable Development	Is there a need for a change in Cohesion Policy? What environmentally harmful subsidies exist?
1.2. Principles, Concept and Models of Sustainable Development	Is there a need for a change in Cohesion Policy? What policy options exist to ensure effective delivery of SD?
1.3. Theories of Regional Economic Development and New Economic Geography	Is there a need for a change in Cohesion Policy?
1.4. Key environmental challenges	Is there a need for a change in Cohesion Policy? What environmentally harmful subsidies exist?
1.5.1. Integrated Development Approaches	How can Cohesion Policy contribute to the shift to the green economy? What win-win solutions exist? What policy options exist to ensure effective delivery of SD?
1.5.2. Development path analysis	Is there a need for a change in Cohesion Policy? How can Cohesion Policy contribute to the shift to the green economy?
1.5.3. Role of Investments for Growth and Jobs	How can Cohesion Policy contribute to the shift to the green economy? What win-win solutions exist? What policy options exist to ensure effective delivery of SD?
1.5.4. Investments with high environmental externalities	What environmentally harmful subsidies exist? Is there a need for a change in Cohesion Policy?
1.5.5. Environmental Policy Integration	How can Cohesion Policy contribute to the shift to the green economy? How can policy instruments be integrated in a complex governance system? What policy options exist to ensure effective delivery of SD?
1.6. Integrated development at different territorial scales	How can Cohesion Policy contribute to the shift to the green economy? How can policy instruments be integrated in a complex governance system?

8.1 Cohesion Policy and Sustainable Development

Since the beginning of European integration processes financial instruments and initiatives have existed to address economic and social imbalances, however, the legal basis for these instruments was only put in place in 1986 by the Single European Act²³. Article 174 of the Treaty on the Functioning of the European Union (TFEU) (OJ 2008) stipulates that in order to ‘*promote its overall harmonious development, the Union shall develop and pursue its actions leading to the strengthening of its economic, social and territorial cohesion*’. Under the current 2007-2013 period there is already a shift in the focus of the policy by aligning it more closely to the objectives of the Lisbon Strategy for growth and jobs.

The ‘**territorial cohesion**’ objective adds a new dimension to the debate on the future cohesion policy. The concept of territorial cohesion is based on the logic that different geographical areas, such as mountain ranges or remote islands, have inherent features which bring specific development opportunities or problems. The concept is undergoing a reflection process and therefore offers an opportunity to enrich its definition from the perspective of more integrated sustainable development approaches, taking into account the benefits from the provision of environmental goods and services, territorial assets or tackling territory-specific issues related to the climate change impacts, degradation of habitats, etc.

The principle of **sustainable development** and environmental protection is not new to cohesion policy. Article 3 of the Treaty of the European Union states the objectives of the European Union and defines the principle of sustainable development while Article 11 of the TFEU requires that ‘*environmental protection requirements must be integrated into the definition and implementation of the Union policies and activities*’ which applies to cohesion policy as well. Article 191 (2) further stipulates the key principles such as **precautionary principle, prevention at the source of environmental problem and polluter pays principle** which need to be taken on board as well when cohesion policy programmes are designed and implemented.

Integration: A series of reforms in the EU cohesion policy have been undertaken to accommodate the integration of environmental objectives into programmes and projects. A number of ‘integration tools’ were introduced within cohesion policy interventions *inter alia* environmental profiles, indicators, handbook on environmental impact assessment, however, a more targeted efforts to integrate ‘horizontally’ the environment emerged after 2000. The result has been a greater emphasis in programmes on projects directly related to environmental sustainability, such as projects and partnerships to promote eco-industries and clean technologies, sustainable tourism activities, cleaner public transport, as well as the construction of large environmental infrastructure.

The ‘earmarking’ of 70 per cent of the regional funding to the Lisbon Strategy objectives, however, down-scaled the integration efforts and again reaffirmed the superiority of economic objectives over environment ones. Furthermore, cohesion policy continues to finance interventions which often undermine the environment, ie promoting the construction of motorways which contributes to still increasing transport GHG emissions or

²³ The Single European Act (SEA) signed in Luxembourg on 17 February 1986 by the nine Member States and on 28 February 1986 by Denmark, Italy and Greece, is the first major amendment of the Treaty establishing the European Economic Community (EEC). It entered into force on 1 July 1987.

lead to fragmentation of protected areas. These ideas are echoed in the Barca report, commissioned by Commissioner for Regional Policy Danuta Hübner, which promotes a place-based agenda for cohesion policy. Furthermore, it argues that there is a strong case for climate change and particularly climate adaptation to become one of the key priorities for the future cohesion policy.

The importance of **key environmental challenges** (such as climate change, biodiversity, consumption and production patterns and transportation) and the urgency to address them, raises the question of further reform of cohesion policy to deliver genuine EU added value and contribute to EU priorities in the regions. Furthermore, the financial and economic crisis, brought new insights on investing in 'green' measures which can offer '**win-win**' **solutions** for economic growth, social cohesion and environmental preservation. Therefore, another question to the future cohesion policy would be what its role is in the transition towards a low-carbon and resource efficient economy and what policy instruments and integration tools are best placed to facilitate this transition. In order to better understand the rationale for integrating cohesion policy and sustainable development, we provide an overview of the theoretical underpinnings of principles, concepts and models of sustainable development and economic theory.

8.2 Principles, Concept and Models of Sustainable Development

Perhaps the most well known and often quoted **definition of sustainable development** comes from the Brundtland Report: 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED 1987). Brundtland concludes that environmental degradation is linked with patterns of economic development and argues that environment and development policies must be integrated. Essentially, sustainable development still remains a broad definition, open to interpretation, embodying a range of ideals and principles whose realisation is necessary to a more sustainable future.

The concept of '**four capitals**' (manufactured, natural, human and social) is derived from economics, whereby capital stocks (assets) provide a flow of goods and services, which contribute to human well-being (Ekins 1992). The concept provides an operational definition of sustainable development and can indicate where a development pattern might be considered to be unsustainable. In this respect, it provides a valuable evaluation framework of sustainable development from the point of view of '**trade-offs**' (GHK *et al* 2005). It raises the question of whether it is the total stock of capital that must be maintained, with substitution allowed between the various forms (**weak sustainability**) or whether, below certain stock levels (critical thresholds), particular components of capital are non-substitutable, ie they contribute to welfare in a unique way that cannot be replicated by another capital component, thus preventing unlimited substitution (**strong sustainability**). The overall contribution of an intervention (such as Structural Funds) to sustainable development will therefore depend on the weights attached to different forms of capital.

Recent work has begun to understand technological change and development in terms of the social, economic and cultural setting in which they develop. This leads to the idea that successful innovation and take up of a new technology depends on the path of its development - so-called '**path dependency**' - including the particular characteristics of markets, the institutional and regulatory factors governing its introduction and the expectations of consumers. Of particular relevance to this study is the extent to which these

factors favour incumbent technologies against newcomers i.e. increasing returns to adoption (positive feedback) lead to 'lock-in' of incumbent technologies, preventing the take up of potentially superior (more sustainable) alternatives.

The concept of **technological lock-in** has important implications for the understanding of sustainable development. Unruh (2000 and 2002) has argued that industrial economies are in a state of carbon lock-in to current carbon intensive, fossil fuel based energy systems, resulting from a process of technological and institutional co-evolution, driven by path-dependent increasing returns to scale. Thus, it is necessary to investigate how a better mix of policy instruments addressing production as well as consumption aspects to promote low carbon innovation, alongside other environmental policy measures, could overcome this carbon lock-in and facilitate the path to a low carbon economy. Here, SCP is offering a conceptual framework to address social, economic and cultural settings and identify the mix of relevant policy instruments to contribute to the implementation and management of the transition.

8.3 Theories of Regional Economic Development and New Economic Geography

In order to understand how the cohesion policy can better contribute to sustainable development and achieve environmental enhancement together with economic prosperity and well-being, one needs to explore economic theories of regional economic development and establish what the implications for climate change, biodiversity, natural resources, transportation and the development in regional consumption and productions patterns are.

The discussion on new economic geography (NEG) and on agglomeration economies in general is of particular importance to cohesion policy as it gives an explanation for the **stylized facts** of increased urbanization and higher productivity in large agglomerations. It also gives a reason why, although the Progress Report on economic and social cohesion report reveals that convergence among European regions remains strong at the European level in recent years (CEC 2007), there is still divergence *within* European countries (Puga, 2002, Combes and Overman 2004, Brülhart and Traeger 2005) and large socio-economic disparities persist between and within European regions.

The New Economic Geography literature is based on a seminal paper by Krugman (1991), which discusses the distribution of economic activity and population over space and its **welfare implications**. It describes agglomeration forces leading towards a dynamic and self-enforcing process of increased agglomeration, and the higher levels of welfare of the population in these agglomerations. More recent extensions of the model and the empirical literature on agglomeration economies emphasize the importance of agglomeration for **productivity and economic growth**. Thus, the driving mechanism in the NEG-based agglomeration economies is that increased size of agglomeration leads to increased productivity (GDP) and welfare which will attract more people to migrate to these agglomerations.

These recent insights in regional economic development have important implications for **sustainable economic development** and regional development policy. The dynamic process that leads to large agglomerations described by the New Economic Geography does not necessarily result in a (social) welfare optimal situation when there are strong negative effects associated with the increase in size of large agglomerations (congestion, pollution) or there are strong negative effects of the decrease in size of small cities in the

periphery. This may result in over-migration to big agglomerations (Ottaviano and Thisse 2002 and Baldwin et al. 2003) and a decline in welfare levels for future generations and therefore determine a non-sustainable development path. However, little research has been done on the optimal size of cities and the literature is inconclusive. If more possible negative externalities of large agglomerations are taken into account the possibility of a non-sustainable development path increases. There is little evidence that increased size of agglomerations or associated spatial planning will cause strong negative effects on environmental capital.

The **policy implications** of agglomeration economies and NEG are discussed in the context of place-based development policy (Barca 2009, Worldbank 2009, Glaeser 2008). The discussion mainly focuses on the importance of agglomeration for efficiency and economic growth and the possible detrimental effect if place-based policies attempt to inhibit agglomeration. Barca (2009) and Glaeser (2008) therefore explicitly conclude that place-based policies aimed at reducing inequalities (social inclusion) should not restrict the mobility of people because that would be harmful for income growth (efficiency). Policies should also be tailored to the specific territorial context (Barca 2009) which is supported by the following three effects inherent to the NEG (Combes et al. 2002). First, policies in a certain region may have a different effect than policies in other regions depending on the location and the size of the region. Second, policy effects may have to pass a certain threshold to have any effect at all and they may be non-reciprocal. The third characteristic of policies in a world characterized by the presence of agglomeration economies is hysteresis and path-dependency. This implies that not only the specific territorial context but also the (economic) development in the past will determine future developments and should be taken into account when implementing a certain policy.

8.4 Key environmental challenges

The literature review demonstrates recent trends concerning the four environmental challenges identified for this project. Cohesion policy and its structural instruments could have positive impact on these environmental challenges both by investing into improving the environmental performance, building climate resilience or stimulating the uptake of eco-technologies and a modal shift in transport, for instance – a series of ‘win-wins’. At the same time, however, cohesion policy might also increase the pressure on them by financing large projects which are in conflict with valuable habitats or lead to increased greenhouse gases emissions – ‘win-loss’ trade-offs (to be avoided, or with ‘losses’ minimised). Moreover, for the future cohesion policy it is even more important to understand how promoting and investing in environmental goods and services can help improve social cohesion and find greener sources of competitive edges for regions – ‘triple-wins’. All these interlinkages are explored to some extent in the literature review but more importantly are subject to analysis in Tasks 4 and Task 6 of this project.

Overall the findings of the literature review depicted a high level interrelatedness between the key environmental challenges: Climate Change and Clean Energy, Sustainable Transport, and Conservation and Management of Natural Resources, ie cohesion policy intervention in one key challenge area could have a positive impact in other key challenge areas. For instance, investments in ecosystems not only foster biodiversity, but also strengthen the adaptive capacity for climate resilience, and in turn can help maintain the flow of services that can be motors for growth or inputs to livelihoods. Therefore, it is important to further analyse these interlinkages to understand and ensure coherence and seek synergies between the different areas.

The concept of SCP diverges from the other key environmental challenges addressed by not being related to specific environmental media. Instead SCP is related to social aspects like consumer and production patterns stressing the fact that, essentially, climate change, loss of natural resources, loss of biodiversity and environmental damage caused by emissions and waste are results of unsustainable patterns of consumption and production. This makes SCP a horizontal approach with linkages to all other key environmental challenges addressed and a key part of a move towards a resource efficient economy.

8.4.1 Climate Change and Clean Energy

Overall greenhouse gas emissions have decreased in recent years, however, emissions from the energy industries and transport sector are increasing. These are areas already incorporated into the scope of EU cohesion policy to some extent. A recent study by the EEA stated that a more thorough system to monitor and evaluate the impacts of cohesion funding in terms of long term energy security sustainability and greenhouse gas emission reductions is necessary. Hence, it is important to analyse existing experiences of promoting and monitoring measure to reduce greenhouse gas emissions in the framework of the cohesion policy.

There are in the context of EU cohesion policy significant potential of win-wins for biodiversity conservation and socio-economic resilience to climate change, which should be further addressed in this project. The EU recommends a stronger attention to aspects of cohesion policy related to adaptation and vulnerability to climate change. This could build on the existing focus in the Cohesion Policy programme on natural hazards management, but also take it a step further. Therefore, further analysis in this are will be important.

8.4.2 Sustainable Transport

There is a strong relation between the key environmental challenge ‘Sustainable Transport’ and cohesion policy, which already incorporates environmentally-considerate transport investment such as clean urban transport and public transport into the scope of the EU cohesion policy.

Further, a broad range of the issues of the key challenge, which are showing rather negative trends, are relevant for European cohesion policy. These are issue such as the concentration of particulate matters in urban areas with high traffic levels as well as the increase in road traffic (passenger and freight), congestion and the environmental impact in the form of increased greenhouse gas emissions, air pollution and noise.

Large-scale transport infrastructure, including motorways and airports, are also in the scope of assistance available from the funds. These investments run contra to the overall promotion of sustainable development. Hence, a further analysis of the impact of these investments for the promotion of sustainable development is important – in some cases this will be about choice of focus of funding (road to rail), in other cases about how to mitigate impacts (eg via improved use of EIA/SEA) and in other cases about greening the investment (eg green infrastructure or help make it offer positive incentives – eg electricity charge points for vehicles), and in yet others about ‘necessary’ trade-offs given mobility needs and associated economic development benefits.

8.4.3 Conservation and Management of Natural Resources

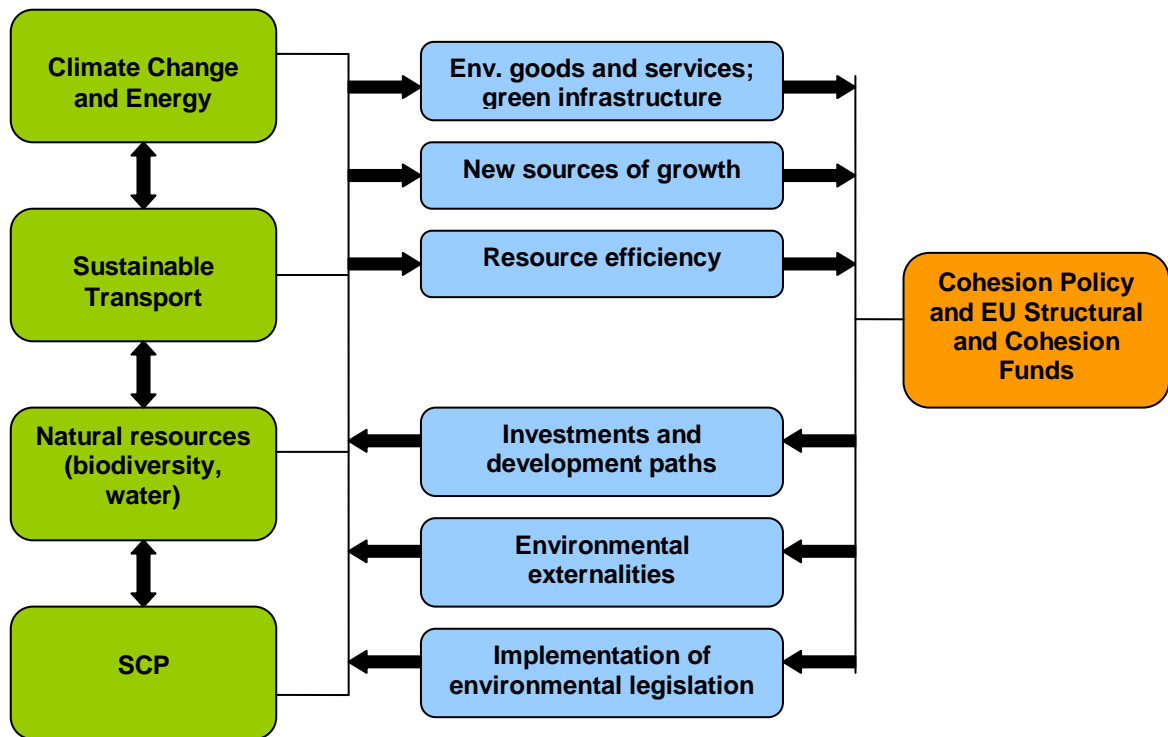
The analysis of the key environmental challenges will focus on the sub-themes ‘Water’, and ‘Biodiversity’, which are of special importance in the context of cohesion policy. There is a broad range of areas related to biodiversity, in which, there is a potential for cohesion policy to promote conservation and sustainable use of biodiversity – which includes ecosystems / habitats and not just species and genes, both within designated areas and also more outside (natural capital in general landscape and seascapes and associated ecosystem services). Examples of areas include ‘protected areas’, other ‘performing’ natural capital (eg water storage and provision from forests, flood control by wetlands, fishery nurseries in marine areas) and invasive alien species, which also risk agriculture, forestry and general infrastructure. These will be given attention within the coming tasks.

It is critical that the maintenance of ecosystem services is integrated into EU funding, either by biodiversity proofing tools to be applied to funds, or via investments in natural capital or other capacity measures (TEEB, 2009). Therefore, it is important to understand the impact and potential of cohesion policy to biodiversity and ecosystem services. This will be based on the findings from the coming tasks. Here, it is important to explore the possibilities to increase coherence between cohesion policies and biodiversity conservation, as well as further improving biodiversity proofing of activities and initiatives (eg Community projects) implementing cohesion policy objectives.

8.4.4 Sustainable Consumption and Production

SCP is a horizontal approach to promote sustainable development. It encompasses both the product, production as well as the consumption dimension into the policy agenda and, therefore, offers a more holistic approach as conventional approaches to sustainable development. Basically this approach is relevant to all policy sectors addressed by cohesion policy intervention. However, existing national strategies encompassing SCP focus primarily on the key consumption clusters ‘food and drink’, ‘housing and buildings’ as well as ‘mobility’, which are identified to have the greatest environmental implications. Both ‘housing and building’ as well as ‘mobility’ are areas related to EU cohesion policy. Hence, the coming tasks should explore aspects of SCP in national implementation of the European cohesion policy guidelines.

SCP is still a novel approach and has not yet been explicitly addressed by the cohesion policy at European level, though there is important scope both as regards specific focus of cohesion interventions (eg investment), in use of flanking measures (eg encouragement of full cost recovery for water supply) and in terms of procurement that integrates whole life costing (WLC). At the national level, although addressed in several national strategies, especially policy measures to address consumption patterns are still under-developed. Hence, it may be difficult to identify suitable cases of SCP addressing consumption patterns in cohesion policy programmes and to find documents, studies and data on the environmental performance of cohesion policy related to SCP. There is a need to further analyse the concept and potential of the horizontal approach of SCP in cohesion policy.



8.5 Approaches to Decouple Economic Growth from Environmental Impact and Cohesion Policy

Policies that aim to stimulate job creation in industries and activities such as sustainable transportation, renewable energy, energy efficiency, biodiversity and waste prevention/recycling are an effective means to balance the objectives of regional economic development with the constraints posed by climate change and resource scarcity while reducing the reliance on fossil fuels and resource extraction. Therefore, **categories of green investments with the potential to stimulate ‘win-wins’** can be organised as follows:

Category	Positive gains for social and economic domains
Direct	
Biodiversity and ecosystem services	Provides environmental goods and services (provisioning, regulating, cultural and supporting); Improves attractiveness of places (locational quality) and hence can attract more labour force into greener areas; attached certain industries (eg access to cleaner water); Increase house values; and Benefits from ‘green infrastructure’
Waste prevention/recycling/reuse	Creates more jobs compared to landfills and incineration facilities; Improves overall the resource efficiency of the economy; and Reduces dependence on resource imports and extraction.
Water and waste water	Access to clean water Better quality of life Attractiveness of places/territories Improved resilience of ecosystems to provide ecosystem services
Indirect	
Energy efficiency	Improves living conditions; Integrates jobless or low skilled persons into the workforce; Creates three to four times the number of jobs created by comparable energy supply investments; and Provides competitiveness edge for industry
Renewable energy	Policies to reach the EU 20 per cent renewables target can provide a significant boost to the economy, give jobs to 2.8 million people in the RES sector and 410,000 additional jobs, and lead to total gross value added in the RES sector of about 1.1 per cent of GDP.
Energy efficient transport systems	Provides access to mobility services and agglomeration benefits; Improves access to jobs; Creates jobs in planning, running, and maintaining transit systems, outweighing any reductions in employment in car and truck manufacturing and related fields; Reduces congestion, cost savings; and Increases productivity and competitiveness Improves quality of housing and life in general

	Reduces energy poverty
Eco-innovation and environmental technologies	Improved resource efficiency and improved productivity Strengthen competitiveness Creates innovation and new business niches, new sources of growth Creates new employment Reduces dependence on resource imports Creates jobs for both low and high qualified workers
Skills and training	Training and re-qualification of workers in green sectors Capacity building for project promoters and relevant administrations

Bowen *et al* (2009) however underlined that boosting ‘green measures’ will not be sufficient for a transition towards a low-carbon economy. They argue that investments which could increase the pressure on the environment or ‘lock-in’ economies on carbon intensive pathways should be phased out as they will offset the positive impact of the ‘green measures’. Therefore, the literature review looked not only into the possible positive gains from investing in green measures but also which investments, supported traditionally by cohesion policy which have high negative environmental externalities.

8.5.1 Investments with high environmental externalities

The literature suggests that there is no comprehensive evaluation of cohesion policy spending with relation to its impact on key environmental components – climate change, sustainable transport, natural resource use and biodiversity, and sustainable consumption and production. Therefore, Task 4 of this study will assess the environmental performance of cohesion programmes.

Drawing on the literature on **environmentally harmful subsidies**, however, cohesion policy investments can be placed under the category of direct public subsidies. Here the most obvious case is the one of investing in motorways projects which consumes approximately 11,6 per cent of the 2007-2013 allocations under cohesion policy. In this respect, the Barca report stresses that if cohesion policy will promote a policy agenda seeking to reduce pressure on the environment and climate, it should revisit its transportation portfolio and consider phasing out such subsidies and shift funding towards measures stimulating mobility services and modal shift.

Subsidy reform is not simply about getting rid of subsidies, but also about reforming them – in some cases choosing a different focus (ie road to rail) or additional focus (eg electricity charging points in road infrastructure), in other cases adding in ‘conditionalities’ or ‘cross-compliance’ requirement which can increase the power of policy filters and reduce impacts.

From biodiversity and habitat preservation point of view the case of transport investments has been one of the most critical ones as well. Here, cohesion policy should seek to apply better environmental assessment tools, improved land use planning techniques and biodiversity proofing tools. The discussion on tools and strategies for environmental integration in cohesion policy therefore is a crucial one in terms of decoupling economic growth from environmental impacts. The literature review draws on the literature on

environmental policy integration and reviews the definitions, approaches and integration (proofing) tools as well as criteria for evaluating integration.

8.5.2 Environmental Policy Integration

The concept of EPI can be traced back in the 70s but it gained significant prominence after it featured in the Brundtland report in 1987 (WCED 1987) and Agenda 21 (UNCED 1992) particularly in relation to sustainable development and ecological modernisation (Nilsson and Eckerberg 2007). The idea of taking into account environmental concerns into sectoral policy-making came about when it was acknowledged that key pressures on the environment and ecosystems are deeply entrenched into sectoral policies. It was also recognised that a more fundamental shift in traditional policy-making was necessary where an emphasis is given to anticipating/preventing environmental impacts instead of ‘cleaning up’ or deploying ‘end-of-the-pipe’ technologies. Originally, the responsibility for EPI lay predominantly in the environmental domain but the result was rather disappointing (Jacob and Vokelry 2008). Consequently, more emphasis was placed on approaches and tools for delivering EPI within and across other sectoral domains.

At EU level the concept of EPI was embedded in the EU Treaties and later it was taken up in the EU Environmental Action Plans (EAP), EU Sustainable Development Strategy and the so called ‘Cardiff’ process. In the background section of the literature review we also provided a summary of cohesion policy reforms striving to ensure environmental integration throughout the years. Research shows that there is much potential for cohesion policy to facilitate integrated development approaches through environmental policy integration. Other also argue that strategic processes such as the multiannual financial programming to the EU budget, and particularly the EU budget review 2007-2008, is argued to offer a unique opportunity for environmental policy integration (EEA 2005, Wilkinson 2007).

One of most applied definitions of environmental policy integration was developed by the EEA (2005) and differs significantly from the proposed by Lafferty and Hovden (2003) definition:

‘EPI involves a continual process to ensure environmental issues are taken into account in all policy-making, generally demanding changes in the political, organisational and procedural activities, so that environmental issues are taken on board as early as possible and continuing during implementation. The product of EPI should be an overall improvement in policy and its implementation.’

It also refers to the reforms needed in political, organisational and procedural domains as well as the ‘preventive’ nature of the concept but also implies that ultimately, EPI is also about the overall improvement of sectoral policies in relation to the state of the environment.

The literature review explores different approaches to climate- and biodiversity proofing demonstrating that the benefits of environmental integration outweigh its costs. The literature review frames the definition and scope of integration measures which informs the evaluation in Task 4 and will be delved into detail within the case studies under Task 6. The literature also presents different approaches to evaluating environmental policy

integration which will inform the evaluation methodology for the case studies under Task 6.

8.6 Integrated development at different territorial scales

As it is demonstrated, cross-cutting issues such as EPI operate in a complex multi-level governance context – not only vertically, involving different levels of governance (EU, national, regional and local) but also horizontally, involving a diverse range of policy actors and their vested interests at each level (Jordan and Schout 2005, Nikvist 2008). Moreover, it has been argued that EPI can only be achieved if explored and addressed properly at all governance level within the EU polity (Lenschow and Jordan 2000).

EU cohesion policy operates in such multi-level governance system involving EU, national and regional/local levels). The case for involving local authorities from the municipality to the region in actions to address territory specific problems has increasingly been made and a consensus has emerged that combating current environmental and climate change challenges will only be possible with a strong implication of all territorial scales, from the global to the local. General Regulations and strategic orientations of cohesion policy are set out at EU level but the responsibility of setting policy objectives and creating administrative structure occurs at lower levels of the governance system. However, it has been argued that this decentralisation posed a serious challenge for the Commission to ensure that EPI is delivered on the ground (Wilkinson 2007). Lenschow (2002) discusses different governance approaches to EPI in this context and claims that EPI very much depends on the provision of an operational guidance provided by the EU and the active involvement of civil society.

Past projects already received funding under previous programming periods were already initiated in the previous programming period, for example through initiatives such as the ASTRA project, which reflects the belief reiterated in the Barca review that, the capacity to innovate, which gives opportunities for improvement as well as for managing negative effects, is specific to places and depends on the capacity of local actors to pool their knowledge and reach agreement on their preferences. It also highlights that the effectiveness or the feasibility of some adaptation interventions depends on trans-European territorial cooperation, as for example with coastal defences or for protection from river flooding (Barca 2009).

8.7 Links to the overall methodology (Task 3)

It should be noted that the literature review document is an organic document and therefore will be evolving throughout the project implementation. However, at this stage it is crucial, based on the synthesis of the literature review, to establish the bridge towards the methodology of the study and concretely in relation to Tasks 4, 5 and 6. The table below demonstrates how the different topics from the synthesis inform the relevant Tasks by providing the key concepts, models and approaches derived from the literature review. Many of the topics are further elaborated in more details in the methodology report (Task 3).

Table 8: Topics from the synthesis and their relationship to Tasks 4, 5, and 6

Topic	Task 4	Task 5	Task 6
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1.1. Cohesion Policy and Sustainable Development	X		X
1.2. Principles, Concept and Models of Sustainable Development	X		X
1.3. Theories of Regional Economic Development and New Economic Geography	X		X
1.4. Key environmental challenges	X	X	X
1.5.1. Integrated Development Approaches	X	X	X
1.5.2. Development path analysis	X		
1.5.3. Role of Investments for Growth and Jobs	X	X	X
1.5.4. Investments with high environmental externalities	X	X	X
1.5.5 Environmental Policy Integration	X		X
1.6 Territorial scales	X		X

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