

Scoping Study on completing the European Single Market for environmental goods and services

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“This report represents the vision of the consultants and is not necessarily in line with the analytical understanding or policy views of the European Commission.”

Preface

The EU eco-industry competitiveness report (Bilsen 2009a,b) indicated various points that limit the competitiveness of this industry and formulated a set of policy recommendations to remedy the situation. Among others, the factors indicated were:

- Absence of a well functioning Single European Market
- Absence of a single labour market
- Limited access to finance in capital intensive sub-sectors.

The purpose of this scoping study is to investigate in more detail what improvements are needed in the EU Single Market to facilitate the growth of European eco-industries and to support the better trading and movement of eco-industry workers, technology and products and services.

The current study focusses on the same core and connected eco-industries as the ones in the EU eco-industry competitiveness report. Nevertheless considerable effort was done to identify Single Market issues in relatively new eco-industries such as eco-tourism, sustainable foresting, nature protection and bio-diversity and land restauration. While one may expect that also in these fields of environmental goods and services Single Market issues arise, they did not surface yet in literature, web-sites or reports.

Although the main source of information for this scoping study has been existing literature and reports as well as data, a limited number of interviews have been done in order to capture the latest information on the topic, which has often not yet been 'materialised' in notes and public available documents. Therefore we would like to thank explicitly the following persons for sharing their time and visions:

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Dr. Valentijn Bilsen

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Executive Summary

Environmental goods and services play an important role in Europe's transformation towards a green economy. A well performing eco-industry is key to attain the ambitious 20-20-20 targets set by the Spring 2007 European Council and is seen as an engine for growth and job creation in the EU for the coming years. Yet as indicated by the EU eco-industry competitiveness report, the industry that delivers these environmental goods and services cannot exploit its full competitive potential due to a number of reasons. One important reason is the lack of a well functioning Single Market for environmental goods and services.

The main purpose of this study is precisely to investigate what is needed in the EU Single Market to improve its functioning with respect to the trade of the goods, services and technologies that are produced by the EU eco-industries. The ambition of the study is to answer six questions:

- What are the main problems?
- How important are they?
- What can be done about it?
- Who should do it?
- What are the future perceived risks if nothing will be done?
- What should be investigated further?

The study concludes with suggestions for further research.

Following the approach of the EU eco-industry competitiveness study, and consistent with the latest Eurostat definition on environmental goods and services, the analysis of this study focussed on the following sub-sectors of the EU eco-industry:

- environmental technologies
- air pollution control
- waste water management
- solid waste management
- soil and groundwater remediation
- noise and vibration control
- recycling
- renewable energy production
- water supply
- nature protection/biodiversity

Beside these core eco-industries, we also included connected eco-industries such as eco-construction or sustainable construction. Also examples from the pulp and paper industry have been presented.

The main problems

Based on a systematic and thorough literature review and a limited number of interviews fourteen important problems causing a malfunctioning Single Market for environmental goods and services have been identified. They are clustered into three groups related to the stage of the production process:

I. Single Market problems affecting the output of eco-industries

1. *Lack of legal clarity at EU level*
2. *Lack of uniform implementation and enforcement of directives*
3. *National differences in (regulatory) framework*
4. *Lack of EU wide common standards in certification and testing procedures*
5. *Language barriers*
6. *Lack of 'compatibility' of different policies at EU level*

II. Single Market problems affecting R&D in environmental technologies

7. *Lack of EU wide sharing of information, knowledge, good practices and technology transfer*
8. *Differences in national policy instruments hampering technological innovation*
9. *Insufficient protection of IPR*

III. Single Market problems influencing the input factors of eco-industries; labour and capital

10. *Labour: fragmentation in education and training*
11. *Labour: lack of EU-wide recognition of qualification and skills*
12. *Labour: lack of uniform EU-wide sector-specific technical language*
13. *Labour: complex national labour market regulation*
14. *Capital: barriers to international PPP for large investments*

How important are these problems?

In a second stage, each problem has been scored, based on an evaluation of two dimensions:

- The relevance of the problem with respect to the Single Market functioning, irrespective of sector or country: the more the issue 'disturbs' doing business in the European Single Market, the higher the problem relevance score;
- The scope of the problem across the sub-sectors of the EU eco-industries: the more eco-industry sub-sectors are affected, the higher the sector relevance score.

Although all issues that have been identified are important, the scoring of the problems allows for a prioritisation, which is useful for policy making.

The highest average problem scores were obtained for output related problems, followed by the factor market related ones. The lack of legal clarity, the lack of uniform implementation and enforcement of EU directives, and national differences in the regulatory framework across Member States are the three most important problems on the output side which affect the functioning of the Single Market for environmental goods and services most fundamentally. In the factor markets, the complex national labour market regulations scores relatively high, especially in relation to the mobility of high-skilled workers. Also the EU wide recognition of environmental qualifications and skills is an important problem.

On the technology side, the problems seem to be more related to particular sub-sectors, except the EU-wide sharing of information, and best practices. For particular high-tech eco-industry sub-sectors the insufficient protection of intellectual property rights at EU level is very important.

What can be done?

For each of the problems identified, policy recommendations have been formulated. In terms of policy priorities, they can be ranked in descending order according to their problem relevance score. Although all issues are important, going from the most important ones to the least, the following potential policies can be listed:

1. Extremely important [score 5]
 - o Improving the legal clarity by ex ante regulatory assessments for new directives and on the base of evidence of malfunctioning for existing directives, as well as efforts for improving a correct transposition of new directives in the Member States.
 - o Improve the uniform implementation and enforcement of directives by reducing further the backlog in the transposition of

environmental directives, developing national action plans for streamlining the existing implementations, and the development of an information platform for companies that want to operate across Europe in the environmental goods and services market.

- Reduce the market fragmentation for environmental services through the implementation of the Services Directive.
- Introduce a common EU-wide approach for subsidizing new environmental technology applications or for environmental goods and services, and remedy the existing bias in favour of electricity production, compared to heat and gas; and further develop uniform green procurement rules.
- Reduce the complexity of the EU labour market especially in the area of transferability of social security rights and the portability of supplementary pension rights across Member States.

2. Very important [score 3 to 4]

- Promote common EU standards, certification and testing procedures where necessary.
- Improve the compatibility of relevant EU policies through a systematic screening of the relevant directives in the field of environmental goods and services, augmented by a systematic consultation of the various stakeholders.
- Improve the EU-wide sharing of knowledge and technology through the organisation of sector specific information platforms.
- Promote an EU-wide recognition of qualifications and skills in eco-industry. The European Qualification Framework can be used as a vehicle in this respect.

3. Moderately important [score 1 to 2]

- Alleviate language barriers to the degree possible by providing (technical) guidance documents in all official EU-27 languages.
- Streamline the national policy instruments for promoting environmental technology innovation, through coordinating national action plans.
- Promote the development of an EU patent.
- Reduce the fragmentation in education and training of environmental skills.
- Promote a uniform EU wide environmental technology language and concepts.
- Relief the barriers for multi-national public private partnership investments.

Who should do what?

Bearing in mind the principle of subsidiarity, the EU has a lead responsibility in improving the legal clarity in the relevant directives, improving the compatibility of the EU policies, alleviating language barriers to the degree possible, relieving barriers to multi-national PPP investments as well as promoting the development of an EU patent. Concerning the harmonisation of national framework conditions for environmental subsidies and green procurement, and in the area of reducing the complexity of the EU labour market, the EU shares a leading responsibility together with the Member States.

The Member States bear the main responsibility for improving a uniform implementation and enforcement of the EU directives, and the implementation of

the Services Directive. Also in the area of EU-wide common standards, certification and testing procedures, the adjustment of national policy instruments for supporting environmental technology innovation and the implementation of a more homogeneous environmental education the Member States can be designated a leading role.

The EU eco-industry should take a leading role in the setting-up of information platforms and sharing of good practices for the transfer of know-how and technology, although the EU can act here as a catalyst. Also in the enhancement of the EU-wide recognition of environmental qualifications and skills and the promotion of EU-wide environmental technology concepts the eco-industry has an important role to play.

What are the future perceived risks if nothing will be done?

It can be envisaged that if nothing will be done, the Single Market for environmental goods and services will be sub-optimal, rendering a less mature and smaller EU eco-industry, with more competitive strain on the global eco-markets. We identified a number of particular risks in case of a status quo situation:

- A fragmented 'home market' with relatively more companies operating under the minimum scale that is necessary for moving on to the global market.
- Less variety of potential environmental solutions for the EU customers, consumers and businesses alike.
- A hindrance in the further development and commercialisation of new environmental goods, services and technological solutions on the EU market.
- A slack in the momentum of reaching the 20-20-20 environmental goals, formulated in the Spring European Council of 2007, might occur.

What should be investigated further?

On the base of the insights of the study we identified a number of areas for further research, the results of which would be very helpful in the further development and improvement of the EU policy. The suggestions for further research are:

- Incidences of environmental dumping related to the Services Directive
- The potential of the Services Directive for the promotion of the EU Single Market for environmental goods and services,
- The framework conditions for relatively new and small environmental markets such as eco-tourism, bio-diversity conservation, sustainable forestry and land restoration.
- A further elaboration of the country dimension for a set of pre-defined problems through stratified stakeholder interviews across the EU27.

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List of abbreviations

BAT	Best Available Techniques
BREF	Best available REFerence document
ELV	Emission Limit Value
EGS	Environmental Goods and Services
ERA	European Research Area
EPBD	Energy Performance of Buildings Directive
EPE	Environmental Protection Expenditures
EQF	European Qualification Framework
IPPC	Integrated Pollution Prevention and Control (Directive)
IPR	Intellectual Property Rights
PBB	Plastics: polybrominated biphenyls
PBDE	Plastics: Polybrominated diphenyl ethers
PPP	Public Private Partnership
NMS	New Member State
R&D	Research and Development
REACH	Registration Evaluation and Authorisation of Chemicals (Regulation)
REBI	Relative Environmental Backlog Index
RoHS	Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (Directive)
VAT	Value Added Tax
WEEE	Waste Electrical and Electronic Equipment (Directive)

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1 INTRODUCTION

1.1 Context of the study

The Spring European Council 2007 set three ambitious targets to be attained by 2020:

- A reduction of at least 20% in greenhouse gasses;
- A share of 20% renewable energies in the total EU energy consumption; and
- 20% energy efficiency savings.

It is evident that environmental goods and services play a pivotal role in the realisation of these targets. Moreover, the EU eco-industry is instrumental in reaching the goals of the Lisbon Agenda for growth and jobs. Recently, their importance for economic growth and job creation in the EU has been reconfirmed in the Europe 2020 Strategy¹.

Therefore, it is essential that the eco-industry develops in the most optimal way and that the right incentives for the development of competitive environmental products, services and technologies are present. A well functioning European Single Market is an important driver in this context for different reasons:

- In many eco-industries the value chain is spread across Europe or even beyond (see Box 1). This implies that cross-border business is a necessary aspect in the production of environmental goods and services. The EU eco-industry competitiveness study (Bilsen et al. (2009)) indicated that although the EU eco-industry companies have a relatively strong competitive position on the global market, the presence of a strong European home market provides an additional advantage for the competitiveness and growth of the EU eco companies. It is evident that there is a substantial variation across sub-sectors in the relative competitive performance on a global scale. Yet irrespective of this, it can be expected that a well functioning internal market provides for all sub-sectors additional opportunities for business development and implementation of environmentally friendly solutions. Intra-EU cross-border barriers should be reduced to a minimum to stimulate intra-EU trade and co-operation, and to allow for the most optimal organisation of the value chain.
- The EU eco-industries are strongly interlinked with other industries. Companies of other industries situate either upstream in the supply chain, as suppliers to the eco-industry, or further downstream as clients. It can be envisaged that an improved functioning of the single market for environmental goods, technologies and services, as well as for labour and capital, augments the creation of value added in other industries.
- Several sub-sectors in environmental goods and services demand large investments to (further) develop activities. Examples of capital intensive investments in eco-industries are the construction of waste recovery processing sites or the development and manufacturing of windmill components. The home markets of individual European Member States are far too small for business opportunities to be fully exploited. The existence of a European Single Market creates the necessary scale for such capital demanding activities to develop within Europe.

¹ "Europe 2020: a strategy for smart, sustainable and inclusive growth", EC Communication COM(2010) 2020, March 2010

Box 1: De-industrialisation in Europe makes the recycling industry value chain more global

Recycling involves the processing of used materials into new products in order to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution (from incineration) and water pollution (from land filling) by reducing the need for "conventional" waste disposal.



Recycling is a key component of modern waste management and is the third component of the "Reduce, Reuse, Recycle" waste hierarchy. Recyclable materials include many kinds of glass, paper, metal, plastic, textiles and electronics (e.g., cell phones and computers).

The European market is a 'big consumers' market and it is expected that this will not change in the near future. Therefore, there will always remain a recycling industry in Europe. However, whereas until now the whole 'value chain' of recycling (from collection to processing and delivery) could be found within Europe, the type of activities and level of specialisation to be found in Europe is expected to change in the future. As many European manufacturing (the most important customers for the recycling industry) relocate (all or part of their) activities outside Europe (process of de-industrialisation), this affects the organisation of the recycling business' value chain. Whereas the collection and sorting of waste remains locally organised, there is a tendency that the processing and delivery of recycled materials is moving outside of Europe, to stronger growth markets (e.g. BRIC), especially in manufacturing.

- SMEs play an important role in the development and growth of eco-industries. This group of companies is especially sensitive to any type of trade barrier to international business, due to their limited organisation scale and limited resources. Differences in languages and culture for example are an important barrier for SMEs. In international collaborations (e.g. for innovation projects) it demands a lot of extra effort and time to discuss differences across countries and find solutions of mutual interest. Such differences in language and culture will always remain within Europe and need to be overcome by the SMEs. But with the creation of an efficiently functioning Single Market at least the regulatory, administrative and financial barriers to international collaboration and trade should be reduced to a minimum.
- The ultimate goal behind the development and introduction of environmental goods and services is a reduction of the environmental impact of human activities worldwide. The EU cannot reach this goal on its own. But by combining the resources, markets and possibilities of 27 countries into one

single bloc, an important economic entity is created that has more bargaining power to weigh on the global environment agenda than 27 countries operating independently.

It is only in a well functioning EU Single Market that a European industry for environmental goods and services can reach its full potential and increase its competitiveness vis-à-vis its counterparts in other regions in the world. From this point of view it is important to strive for a well functioning European Single Market, stimulate the development of a single labour market in the EU, and improve the access to capital, especially for the capital intensive sub-sectors such as renewable energy, and waste (water) management. Across sub-sectors, SMEs in particular deserve specific attention due to their limited financial and human resources and their relative sensitivity to administrative burdens, language differences, information gaps and market risks.

1.2 Defining eco-industries

A first step in the analysis of the single market functioning for environmental goods and services, is a clear definition of the environmental goods and services sector itself - also called 'eco-industries'.

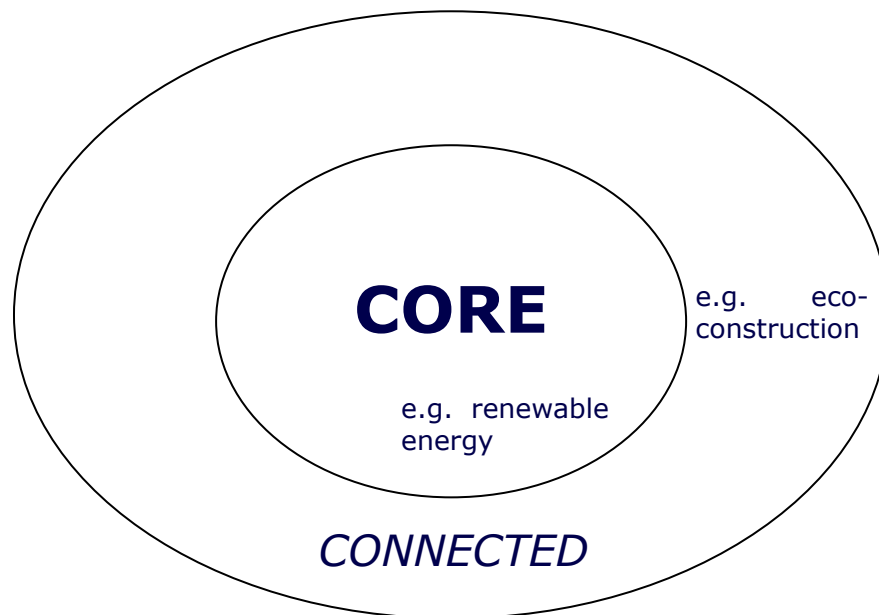
A particular characteristic of the EU eco-industry is its diversity. Important work with respect to the statistical identification of this sector has been done by the OECD and Eurostat². Last year Eurostat launched the Data Collection Handbook on Environmental Goods and Services Sector³. This work has been very important in conceptualising the eco-industry sector and activities. Although serious improvements have been made, and are being made, e.g. under the impulse of Eurostat, detailed data are still relatively scarce.

In order to derive a workable and practical definition, Bilsen et al. (2009) started from the OECD and Eurostat classifications and introduced a distinction between the core eco-industry and the connected ones. Eco-industries have been defined as *"those [identifiable] sectors within which the main – or a substantial part of – activities are undertaken with the primary purpose of the development of technologies and the production of goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems."* The core sub-sectors consist of two broad groups: on one hand the sub-sectors focused on pollution management, and on the other hand the sub-sectors focused on resource management. The former are: air pollution control, waste water management, solid waste management, soil and groundwater remediation and noise and vibration control. The latter group consists of recycling, renewable energy production, water supply and nature protection/biodiversity. The environmental technologies sub-sector focuses both on pollution and resource management. Examples of the connected eco-industry are eco-construction, automobile industry, paper and pulp industry, building chemicals, and ICT.

² See OECD and Eurostat (1999) The Environmental Goods and Services Industry, Manual for Data Collection and Analysis, Paris, 1999, 65pp.

³ European Commission – Eurostat (2009) Data Collection Handbook on Environmental Goods and Services Sector, Final Draft, Eurostat Unit E3 – Environment Statistics, March 2009, ENV/EXP/WG/07 (2009), 201pp.

Figure 1: Eco-industry - schematic overview



Source: Bilsen et al., 2009a

This study will build further on the definition which has been used in the EU eco-industry competitiveness study and thus primarily focuses the analysis on the so-called core eco-industries: environmental technologies, air pollution control, waste water management, solid waste management, soil and groundwater remediation, noise and vibration control, recycling, renewable energy production, nature protection and water supply. Apart from these core eco-industries, this study will also consider the sub-sector of eco-construction to evaluate the functioning of the single market.

In summary, the following sectors have been the focus of analysis in this study:

- environmental technologies
- air pollution control
- waste water management
- solid waste management
- soil and groundwater remediation
- noise and vibration control
- recycling
- renewable energy production
- water supply
- nature protection/biodiversity
- eco-construction

The EU eco-industries are strongly interlinked with other industries. Furthermore, for these other industries the 'greening' of the supply chain starts becoming an important aspect of corporate strategies. This is not only limited to the EU, yet it equally, if not more, prevails in other important developed countries such as the US and Japan. However, the way in which 'green' business outside the above mentioned sub-sectors is influenced by Single Market issues is not included in this study.

1.3 The European Single Market

The European Single Market is about bringing down trade barriers and simplifying existing rules to enable everyone in the EU - individuals, consumers and businesses - to make the most of the opportunities offered to them by having direct access to 27 countries and 480 million people without cross-border barriers. The cornerstones of the EU Single Market are often said to be the 'four freedoms': the **free movement of people, goods, services and capital**.

The freedom of establishment, set out in Article 49 (ex Article 43 TEC) of the Treaty and the freedom to provide cross border services, set out in Article 56 (ex Article 49 TEC), are two of the "fundamental freedoms" which are central to the effective functioning of the EU Internal Market.

The principle of freedom of establishment enables an economic operator (whether a person or a company) to carry on an economic activity in a stable and continuous way in one or more Member States. The principle of the freedom to provide services enables an economic operator providing services in one Member State to offer services on a temporary basis in another Member State, without having to be established.

These provisions have direct effect. This means, in practice, that Member States must modify national laws that restrict freedom of establishment, or the freedom to provide services, and are therefore incompatible with these principles. Member States may only maintain such restrictions in specific circumstances where these are justified by overriding reasons of general interest, for instance on grounds of public policy, public security or public health; and where they are proportionate.

Creating a European Single Market is one of the EU's most important and continuing priorities. Despite its achievements so far, the Single Market is not complete. Indeed, creating a genuinely integrated market is not a finite task, but rather an ongoing process, requiring constant effort, vigilance and updating. Technological and political developments imply that the environment in which the Single Market functions is changing constantly. In the context of this study, one of the major changes over the last few years is the growing awareness of environmental and climate-change challenges and the political will to move to a greener economy. This is a relatively new element that the Single Market has to deal with.

The above mentioned changes and transformations in the European economy imply that **important gaps remain in the EU Single Market that directly affect eco-industries**. This has also been indicated in the recent Monti report on the Single Market, where eco-industries were described as "one of the missing pieces in the current single market"⁴.

An important missing link is a Single Market for services. Until now different national regulations have made it difficult for service providers to establish operations in other Member States or provide their services across borders. The recently adopted Services Directive aims to create a legal framework for ensuring that both service providers and recipients benefit more easily from the fundamental freedoms guaranteed in Articles 49 and 56 of the Treaty. Also with respect to the free movement of capital, barriers remain that affect eco-industries. Free movement of capital is critical to allow for a better allocation of financial resources within the EU, favours workers mobility, makes it easier for businesses to raise the money they need to start and grow, and facilitates trade across borders and thus the financing of large international infrastructure projects

⁴ See Monti (2010)

which are critical for developing 'greener' European economy such as e.g. a smart EU electricity grid.

Objectives of the study

The purpose of this study is to investigate what is needed in the EU Single Market to improve its functioning with respect to trade of the goods, services and technologies produced by the EU eco-industries. Additionally, the study should also indicate how institutional actors can stimulate the Single Market to foster the growth of the eco-industries.

The study consists of three tasks. The first is the identification of the problems with respect to the Single Market functioning in the various sub-sectors of the EU eco-industry. Secondly, the importance of the problems will be assessed and evaluated to allow for a prioritisation of the problems and thus a prioritisation of potential policy actions. Finally, a scoping of potential policy actions that can be undertaken will be done, as well as proposals will be formulated for further research to substantiate the necessary answers and policy responses.

2 SINGLE MARKET MALFUNCTIONING FOR ENVIRONMENTAL GOODS AND SERVICES: PROBLEM ASSESSMENT

2.1 Introduction

The first step in the evaluation is the identification of possible problems with respect to environmental goods and services, and Single Market functioning. In assessing the scope of the problem, we elaborated the results that have been obtained in the EU eco-industry competitiveness study (Bilsen et al. 2009). Two chapters in this study were of particular interest: chapter eight on the framework conditions, and chapter nine on the outlook and suggestions for industrial policy. The latter chapter also contains the results of the dynamic SWOT analysis of the EU eco-industry. The former chapter contains a systematic review of the various framework conditions in which the EU eco-industry operates.

2.2 A second step in the assessment is to get an indication of intensity of the problem, which at a later stage will be helpful in identifying the key questions and key issues to be resolved. Quantifying the magnitude of the single market issues helps also prioritizing policy actions. Problem identification

In the problem identification process we have made a distinction between the output dimension of the Single Market on the one hand, which focuses on environmental goods and services, and the input dimension on the other hand, which comprises the labour and capital market issues. From an endogenous growth point of view, technology is to be considered as an input factor as well. Yet, from a national accounting point of view, one can easily imagine that technological solutions can be perceived as part of the output. Therefore we have treated technology, eco-innovation and R&D as a separate category. As such we distinguish three main clusters of problems:

1. Single Market problems affecting the output of eco-industries;
2. Single Market problems affecting research in and the development of environmental technologies;
3. Single Market problems influencing the input factors of eco-industries, nl. labour and capital.

In a first stage we made an overview of potential Single Market issues in each of these three domains, based on literature study. This overview was presented to the European Commission for feedback and discussion. Taking into account the Commission's comments, we came to a validated list of 14 issues.

Table 1: List of Single Market issues

Single Market problems affecting the output of eco-industries	
1	Lack of legal clarity
2	Lack of uniform implementation and enforcement of EU Directives
3	National differences in (regulatory) framework
4	Lack of EU wide common standards in certification and testing procedures
5	Language barriers
6	Lack of 'compatibility' of different policies at EU level
Single Market problems affecting research and development in environmental technologies	
7	Lack of EU wide sharing of information, knowledge, good practices and technology transfer
8	Differences in national policy instruments hampering technological innovation
9	Insufficient protection of IPR at EU level
Single Market problems influencing the input factors of eco-industries	
10	Labour: fragmentation in education and training
11	Labour: lack of EU wide recognition of qualifications and skills
12	Labour: lack of uniform EU wide sector-specific technical language
13	Labour: complex national labour market regulations
14	Capital: barriers to international PPP for large investments

The following paragraphs describe each of the 14 issues in more detail and contain a qualitative assessment of the problems.

2.2.1 Single Market problems affecting the output of eco-industries

2.2.1.1 Lack of legal clarity at EU level

Some directives and regulations at EU level that affect the eco-industries contain formulations and definitions, that leave room for own interpretations by the Member States. The lack of legal clarity causes in reality the translation into national laws to be different in the various Member States. This results in legal uncertainty for companies involved in international trading and business, while it creates an unlevel playing field across the EU.

One example of an EU directive that has been under discussion for its lack of legal clarity is the Waste Framework Directive (European Directive 75/442/EC). We refer to Box 2 for an illustration on the interpretation of the Waste Shipment Regulation concerning polybrominated biphenyls (PBBs) compounds. Under the Waste Framework Directive the European Union defines waste as "an object the holder discards, intends to discard or is required to discard". For cross-border shipments it is important to know whether one transports waste or products. The costs and administrative burden related to shipment of waste or products are very different. Shipments of waste are regulated by the new Regulation (EC) No 1013/2006 on shipments of waste. However, whether some material is considered as waste or not, is not always clear. Especially since more and more materials are being recycled for re-use, questions arise whether and when a

waste may cease to be a waste. In general, some Member States consider materials obtained from a recycling process as a waste or by-product and not as a product. In this way, it is impossible to sell these recycled products in the same conditions as their substitutes. In other countries the interpretation is different. This creates unequal business conditions across Europe that also lead to missed opportunities for some businesses.

Based on two studies carried out by JRC/IPTS on the development of end-of-waste criteria⁵, the EC currently organises working group discussions with experts from Member States and stakeholders to tackle this issue. Such criteria for establishing the "end of waste" are expected to bring welcome harmonisation and legal certainty for the entire EU recycling industry, while at the same time reducing its administrative burden.

Box 2: Legal uncertainty in the Waste Shipment Regulation concerning PBB's

In May 2008 the European Federation of Waste Management and Environmental Services brought the following discussion on the different interpretation of paragraph A3180 of Annex V of the Waste Shipment Regulation 1013/20066 across Member States to the attention of the EU authorities:

In most of the EU-Member States, plastics from E-Waste can be exported as green listed wastes, as these plastics do not contain any of the compounds of the family of the polybrominated biphenyls (PBBs). However, this is not the case in Flanders (Belgium). The interpretation of paragraph A3180 of the Waste Shipment regulation as given by the Flemish authorities is that not only PBB, but also PBDE (Polybrominated diphenyl ethers) is meant, referring to the additional wording 'PBB or any other polybrominated analogues of these compounds'. The wording '...or any other polybrominated analogues of these compounds' in the article clearly creates legal uncertainty and leaves room for own interpretations.

Source: FEAD, May 2008

Another example of terminology and formulation leading to different interpretations can be found in the VAT Directive (Directive 2006/112/EC on the common system of value added tax). The Directive states that activities or transactions of public entities are not subject to VAT "as long as public entities engage in these actions or transactions as public authorities, and provided that this does not lead to significant distortions of competition". It is left to the Member States to define and declare actions and transactions of a public entity "as a part of a public authority". Consequently, in a number of Member States public sector waste management companies are exempt from paying value added tax (VAT) for their services (while their private counterparts are not), whereas this is not the case in other Member States. As an example more detail is provided for Germany, the largest economy of the EU, in the next box.

⁵ JCR/IPTS (2009), "Study on the selection of waste streams for End of Waste assessment" and JCR/IPTS (2009), "End-of-waste criteria: methodology and case studies".

⁶ 'Wastes, substances and articles containing, consisting of or contaminated with polychlorinated biphenyl (PCB), polychlorinated terphenyl (PCT), polychlorinated naphthalene (PCN) or polybrominated biphenyl (PBB), or any other polybrominated analogues of these compounds, at a concentration level of 50 mg/kg or more'.

Box 3: Unfair competition between public and private waste management companies in Germany with regard to the application of the VAT Directive

The current VAT percentage for private waste management services in Germany is 19%. Yet public sector waste management companies are exempt from charging VAT for the treatment of waste they collect in private households. This creates a distortion of competition in the German waste management market, since ceteris paribus, the price of public waste management services will be lower for the client than that of private ones.

The German Closed Substance Cycle Waste Management Act (Kreislaufwirtschafts- und Abfallgesetz KrW-/AbfG) stipulates that the collection, treatment and disposal of household waste is a public task. It is FEAD's and the BDE's view that article 16 of chapter II of the European Waste Framework Directive (2008/98/EC) implies that only the management of mixed municipal waste from private households can be considered as a public task, and not e.g. the separately collected wastes such as paper, plastics, metals, and bio waste. The treatment of all other wastes is therefore to be considered as open for commercial action. FEAD and BDE argue that at least to the degree those public companies manage separately collected waste from private households they should also be subject to the same VAT rates as private companies do.

It is also argued that since several public waste management networks have invested heavily in incinerators for energy recovery, little or no incentive is left to collect waste streams separately in order to provide a minimum waste flow input for reaching a minimum scale of efficiency in the incineration process. This is not in line with article 4 of the Directive on waste hierarchy which specifies that preparation for re-use and recycling dominates over energy recovery.

Furthermore public sector operators of waste incineration facilities are eager to cooperate with other municipalities in order to get access to sufficient amounts of waste to run the incinerators cost-effectively. Both the public waste incineration companies and the municipal waste management services are exempt from asking VAT, giving them a cost-advantage compared to private players. As a consequence there is no incentive to outsource waste management services through public procurement procedures which reduces the opportunities for private players in waste management.

Additionally, private households have virtually no choice in deciding who will do their waste management services for mixed household waste.

On a population of more than 80 million people, the BDE estimates that municipal public waste management covers approximately 35 million people in residual and bulky waste, 31 million people in bio waste and 28,4 million people in recovered and used paper. These numbers provide an indication about the significance of the unequal VAT-treatment problematic in the largest EU economy.

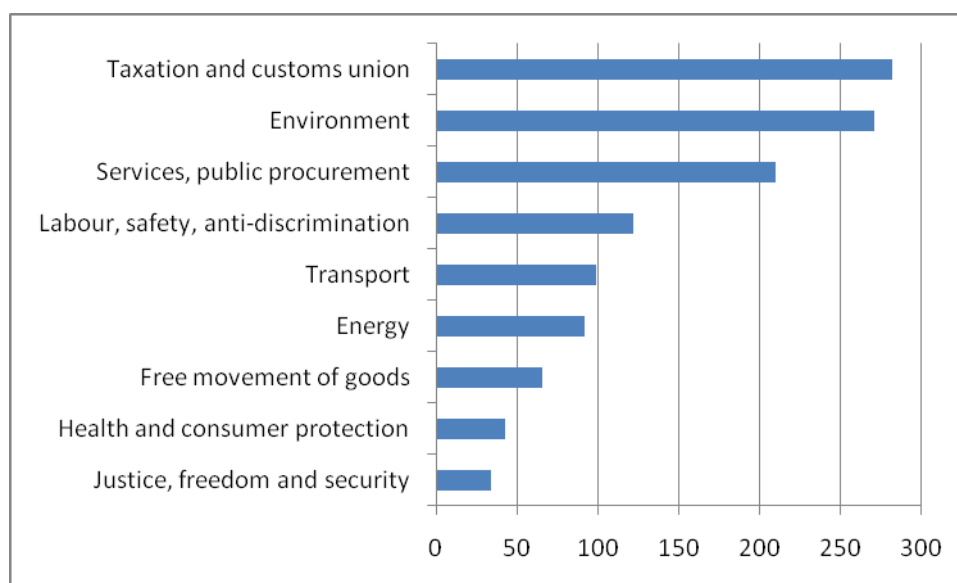
Source: FEAD, BDE, June 2010

One of the consequences of the lack of legal clarity is the **incorrect transposition of EU directives** into the rules and regulations of the Member States. While one of the goals of the directives is precisely to bring more harmony in the myriad of national regulations and interpretations, the erroneous transposition of the directives does not bring the desired degree of internal consistency and harmonisation. Furthermore they may even add to the complexity and variety of the legal landscape in the EU market.

To get an idea about the seriousness of the problem, statistics on infringements can be consulted, and for this study especially the ones on environmental infringements. Infringements are to be understood as representing all cases where the transposition is presumed by the Commission⁷ not to be in conformity with the directive it transposes or cases where Internal Market rules (both rules contained in the Treaty on the Functioning of the European Union and in Internal Market directives) are presumed to be incorrectly applied and where a letter of formal notice has been sent to the Member State concerned.

The following figure indicates the number of open infringement cases by sector as observed the 1st of November 2009. It is clear that environment related infringement proceedings constitute the second largest sector, with 22,2% of all open infringement cases at the end of 2009.

Figure 2: Number of infringement proceedings – breakdown by sector



Source: European Commission (2010a), Internal Market Scoreboard, p20.

Note: cases of non-communication, i.e. concerning directives counted in the transposition deficit, are excluded from this table in order to avoid double-counting.

The majority of the infringements occur in the environmental sectors of nature, water and waste, as indicated in the following figure⁸. The relatively high share of infringements in the area of nature protection legislation can be explained by the fact that many infrastructure developments that are proposed in the Member States which lead to complaints are often those affecting in one way or another Natura 2000 sites or EU protected species. The impact assessment cases are often driven by NIMBY⁹ motivations. A significant number of cases in the water, waste and air fields are frequently related to the bad transposition of definitions

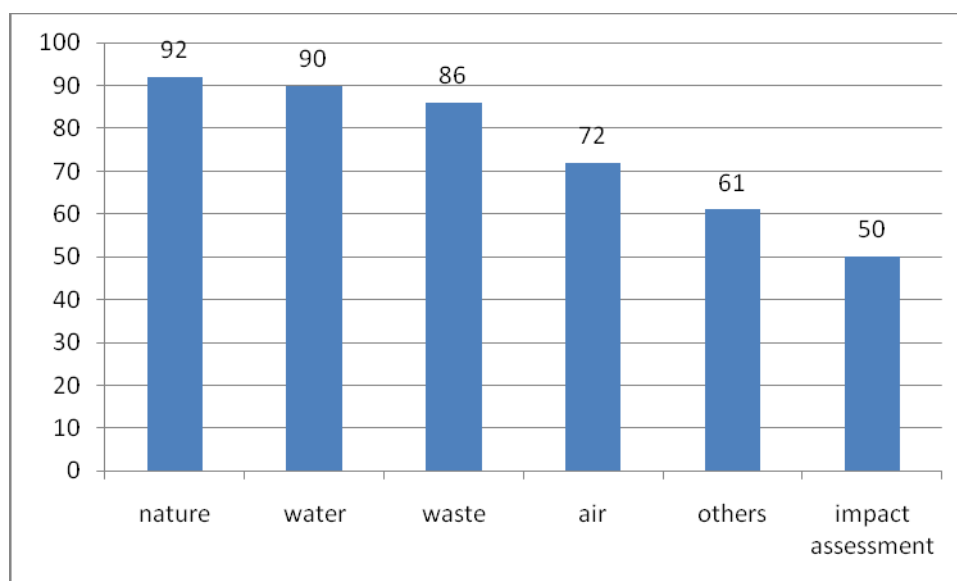
⁷ Note that, as is indicated in the Internal Market Scoreboard, the infringement procedure envisages a dialogue between the Commission and the Member State concerned. Initiating an infringement procedure merely reflects the Commission's view that the Member State is failing to fulfil its obligations under the Treaty. Only the Court of Justice can rule definitively that a breach of the EU law has occurred. This should be kept in mind when interpreting statistics on infringement procedures.

⁸ No separate data were available about the environmental sector distribution for each of the various infringement types (non-communication, non-conformity, bad application, other).

⁹ Not In My Back Yard

and standards. Furthermore implementation is lagging in some Member States, which creates an unequal level playing field in the internal market.

Figure 3: Infringements by environmental sector (end of 2009)



Source: European Commission (2010b)

Note: Infringements include 'non-conformity', 'bad applications' and 'not classified'

2.2.1.2 Lack of uniform implementation and enforcement of directives

Different EU directives have an impact on the eco-industries in a direct (e.g. Waste framework Directive, IPPC Directive, End-of-life vehicles Directive) or indirect way (e.g. VAT Directive, Public Procurement Directive, ...). An EU directive requires Member States to achieve a particular result without dictating the means of achieving that result, thus leaving Member States with a certain degree of freedom as to the exact rules to be adopted. Often Member States use different types of instruments to comply with European environmental regulation. The potential divergence in consequences of using different instruments might disturb the level playing field for companies operating in several Member States to some extent. Moreover, companies with facilities in several Member States need to become acquainted with the different instruments (e.g. a trading system, or a bubble permit system) in a particular country, which potentially leads to additional costs.

The lack of uniform implementation and enforcement in environmental regulation was also one of the major problems leading to market distortions in the European market identified by Jacob et al. (2009). In the different case studies that have been analysed¹⁰, it was found that it is difficult to identify the European standard, as the directives only describe procedures, or remain vague regarding the objectives. These are results of political compromises and gives leeway to different interpretations and, accordingly, implementation of the directive.

Differences in implementation and enforcement of various EU directives in the different Member States creates an uncertain and non-transparent EU business

¹⁰ In the study four different cases were analysed: 1) the European Noise Directive (2002/49/EC) and Its Effects on Major Airports, 2) the End-of Life Vehicles Directive and the European Single Market, 3) the EU Emission Trading Scheme (ETS) and its impact on the Cement Industry and 4) the WEEE Directive and the European Single Market

environment and leads to differences in (administrative) costs between Member States.

Box 4: Self-sufficiency principle for household waste in Baden-Württemberg and the use of waste disposal plants in other regions

According to the federation of German waste water and raw material management industry (BDE), stipulated the environmental ministry of Baden-Württemberg that for the processing of household waste only waste disposal plants can be used that are located in the region. This implies that it becomes impossible (illegal) for private waste management companies to transport the waste to neighbouring regions in cases where it might be more economically advantageous to do so. Furthermore, the waste disposal plants of Baden-Württemberg operate on a national and international scale and may process waste from other Länder as well. The BDE argues that this does not only implies unequal competition in the market of waste disposal services (waste processing companies outside Baden-Württemberg have no access to the latter region's household waste), but also constitutes an incorrect interpretation of art. 16 of the Waste Framework Directive 2008/98/EC on the principle of self-sufficiency and proximity.

Source: FEAD, BDE, June 2010

Box 5: Implementation of the IPPC Directive

The IPPC Directive (Directive 2008/1/EC concerning integrated pollution prevention and control) is about minimising pollution from various industrial sources throughout the European Union. Operators of specific industrial installations are required to obtain an environmental permit from the authorities in the EU countries. About 52.000 installations are covered by the IPPC Directive. The permit conditions including emission limit values (ELVs) must be based on "Best Available Techniques" (BAT). BAT is defined as the "most effective and advance stage in the development of an activity and its methods of operation, which indicate the practical suitability of particular techniques for providing, in principle, the basis for emission limit values designed to prevent or eliminate or, where that is not practicable, generally to reduce an emission and its impact on the environment as a whole". But the provisions of the IPPC allow for certain flexibility for Member States to set permit conditions and to apply the concept of BAT. The IPPC Directive allows the licensing authorities, in determining permit conditions, to take into account:

- (a) the technical characteristics of the installation,*
- (b) its geographical location and*
- (c) the local environmental conditions.*

This leads to cost differences between the environmental performance of the top and bottom range of BAT.

Source: IDEA Consult based on European Commission DG Environment

A specific problem concerning the enforcement of EU legislation across Member States is the **backlog of non-transposed directives**. The Internal Market Scoreboard (European Commission 2010a) indicated that virtually one fifth of the outstanding directives are in the area of environment, which is the second highest percentage after transport. As the Internal Market Scoreboard indicates "*In the*

sectors most concerned, the Internal Market is not yet a reality: Member States need to take action to reduce this legal gap”.

One has to take into account that the transposition process may differ across countries, irrespective of the directive’s area of application. Certain countries have a significant larger backlog than others. In order to investigate to which degree the environmental backlog is due to specific environmental related issues rather than the broader institutional characteristic of transposing directives in a certain speed, we developed a relative environmental backlog index. It relates on the one hand a country’s number of environmental backlog cases to its total number of backlog cases over all areas, and on the other hand the number of environmental backlog cases to all backlog cases for all Member States. The relative environmental backlog index for country 1 can be written as:

$$REBI_1 = \frac{B_{e1}/B_1}{B_e/B_n}$$

Where:

B: the number of backlog cases

Subscript e: the area of environment

Subscript 1: country 1

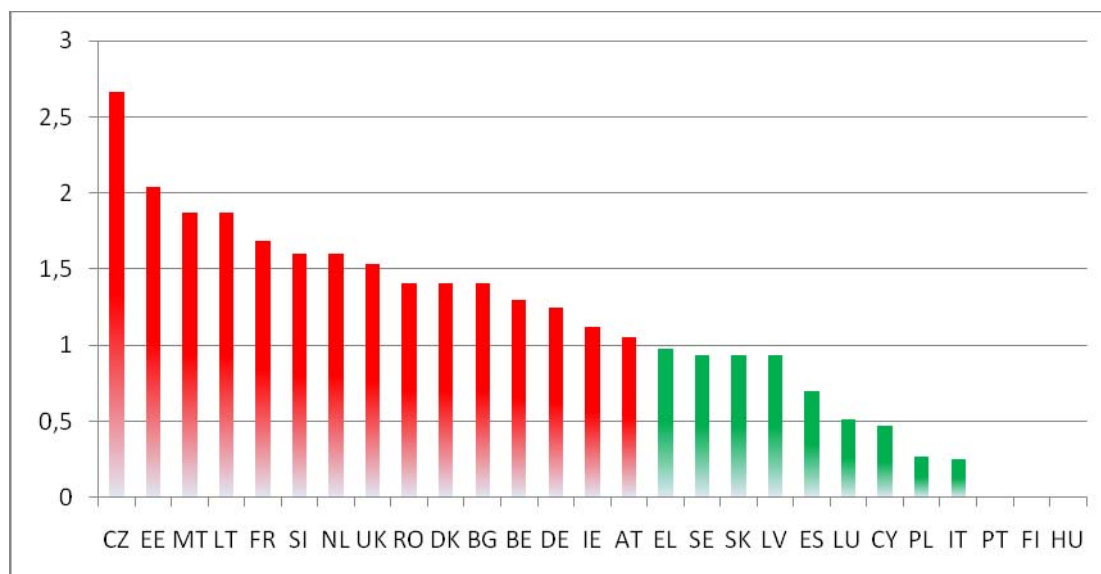
Subscript .: the sum over all areas (environment, transport, financial services....), or countries

A value higher than one indicates a relative larger disposition of that country towards environmental outstanding directives than what might be expected on the base of the overall average for all countries, and vice versa. A value equal to 0 indicates that no backlog in the transposition of environmental directives was reported.

The next figure shows the REBI scores for all EU Member States ordered from high to low. It indicates that 15 of the 27 Member States show a relative higher disposition towards a backlog in transposing environmental directives, taking into account the institutional characteristic of a country’s transposition speed. These are indicated in red. The countries indicated in green do relatively better in the area of environment directives.

There is no particular grouping to be found across old or new Member States. The highest scores are obtained by four New Member states. Yet quite a number of new Member States have a good relatively environmental transposition score. Equally old Member States can be found in both the red and green group as well.

Figure 4: Relative environmental backlog index scores (data 2009)



Source: own calculations based on European Commission (2010a)

It is interesting to observe that while Greece has the second highest number of outstanding directives in the area of environment it has a relatively good REBI score. This indicates that the backlog has more to do with its overall transposition mechanism than specific issues with the environment. The Czech Republic and Estonia are examples where environmental issues weight relatively heavier than the overall institutional transposition process.

2.2.1.3 National differences in (regulatory) framework

The national institutional context in which companies operate is far from harmonized across the EU. Differing (regulatory) conditions and requirements from country to country may give rise to competitive distortions. A major “missing link” in this context is a European single market for services, resulting in a strongly fragmented services market within Europe.

Apart from a number of missing pieces in the European regulatory framework that enhance fragmentation (such as a lack of implementation of the Services Directive), several specific policy domains and policy instruments will remain under the authority of the Member States. Due to a lack of coordination among Member States, companies being active in various Member States face more costs because of the non-transparent information about different national instruments (fiscal stimuli, tax regulation, etc...). National differences in the regulatory framework may also come from introducing additional national requirements on top of the EU ones, see Box 6. Two important instruments that specifically stimulate demand for environmental goods, services and environmental technologies are national (regional) environmental subsidies and public procurement.

Box 6: Additional certification in France on top of European standards for heat pumps and renewable energy equipment and the practice of tacit refusal

A recent study investigating the non-cost barriers to renewable energy growth found that for heat pumps and other renewable energy equipment for building integration in France additional certificates are requested before the equipment can be installed, even if the equipment was already validly certified according to the European standards.

Furthermore due to the legal system of tacit refusal, permission delays may become very long. Tacit refusal means that if the administrative authorities do not reply to a (building) permit request within the given delay period of five months, the permit request is implicitly rejected. However in practice project developers of renewable energy will usually not request a motivation for the refusal, but rather prefer to wait for the final written notice, which might even be positive. It was indicated that some projects had a response delay of five years after having filed the permit request, while in other European countries for similar type and size of projects the delay ranged from 10 to 18 months.

Source Ecorys Netherlands (2010), work in progress

National subsidies

Environmental subsidies and incentives have been and are still an often used market-based instrument to stimulate development of new technologies, to help create new markets for environmental goods and services including technologies and to encourage changes in consumer behaviour through support to green purchasing schemes. The use of environmental subsidies as a market-based instrument mostly happens at the national level, but increasingly we can see this instrument being applied at regional (e.g. subsidies for the installation of solar panels in Flanders (Belgium)) and cities' levels as well. Box 7 provides some findings from the renewable energy sector.

Differences in policy priorities across Member States however favour different types of environmental goods, services and technologies. This makes that the pricing of environmental goods, services and technologies differs across countries/regions and that companies are confronted with different market settings for a specific product/service in the different Member States, potentially leading to competitive distortions. This is for example the case in renewable energy. At Member State level, different mechanisms are set up to support the production of renewable energies, resulting in different incentives in different Member States and thus different speeds of development of renewable energy services. They range from regulatory price driven strategies to regulatory quantity driven strategies - quota based mechanisms.

Box 7: Different technology priorities in national support schemes in the EU renewable energy sub-sector

Ecorys (2010) found that national support schemes frequently are discriminating between certain renewable energy technologies, and particularly with a bias in favour of electricity production. For instance feed-in tariffs are in place for green electricity, yet they do not exist for biogas or green gas (as end-products). A transparent system of transferable certificates for green gas does not exist in every country either.

This problem is also apparent in the area of biomass, which both can be used for electricity and gas/heat production. In many EU Member States biomass electricity production benefits of strong financial incentives, whereas e.g. biomass heat supplied to district heating networks does not. This distortion is amplified by the fact that support schemes for combined heat and power usually provide an incentive for the amounts of electricity generated by these plants, yet not for other output streams such as gas or heat. This creates a distortion towards electricity production, rather than aiming at maximising energy efficiency and/or the environmental benefit. However, the Danish experience shows that strong support schemes for combined heat and power generation can be designed in a way that is compatible with a good share of renewables in applications like district heating.

Ecorys (2010), work in progress

Green procurement

Green public procurement is the approach by which public authorities integrate environmental criteria into all stages of their procurement process, thus encouraging the spread of environmental technologies and the development of environmentally sound products “by seeking and choosing outcomes and solutions that have the least possible impact on the environment throughout their whole life-cycle”. Green procurement is a very important instrument to stimulate demand for environmental goods and services.

A number of Member States are already providing incentives for development and acquiring of energy and environmental performing products and “greening” their procurement practice to foster their uptake. However, the criteria that these products have to meet to benefit from public procurement can differ substantially from one country to another. This may result in fragmenting incentives in the internal market for the products concerned. One example is the use of eco-labels in green procurement. Eco-labels can be referred to as specification of environmental friendly products if they are “scientific, approved and accessible eco-labels”. Examples of such eco-labels are the EU Flower, the Nordic Swan or the German Blaue Engel. Although it is not allowed to ask for product with a specific eco-label (thus excluding products of companies not bearing this label), referring to national eco-labels can bring extra costs and administrative burden to foreign companies that are not familiar to the system.

Since the start of the EU Single Market in 1993, continuous efforts have been made to better align the Member States’ national institutional context. But even when new EU wide regulations or directives come in place, often a transition period follows in which the business conditions are not equal across the EU, due to differences in the efforts that Member States need to make in order to comply with the new regulation. This is for example the case in air pollution control. In this sub-sector differences in cost-effectiveness of the implementation of the IPPC Directive exist between MS. These differences stem from differences in the pre-

IPPC permitting regimes. Some of the Member States had to restructure the national permit system fundamentally, whereas other Member States only had to make incremental adjustments to the existing permit system. But it can be expected that these differences are temporarily and should disappear over time.

2.2.1.4 Lack of EU wide common standards in certification and testing procedures

The production and offering of environmental goods and services often involves compliance with specific technological and technical requirements. Defining these requirements and setting up controlling systems is often organised at national level. This leads to different Member States asking for different certifications. Recognition procedures are very different, as well as the costs of testing. This creates many barriers for doing business across borders.

Box 8: Testing of environmentally friendly building materials

In the eco-construction industry (as is the case in the traditional construction industry as well) the testing of building materials (for fire safety, ...) is organised at national level. If a material is to be sold in different countries, this means that different tests need to be done. At this moment within the Lead Market Initiative on Sustainable Construction, work is being done to harmonise these testing systems and make it possible that tests are being recognised across Europe.

Source: EU eco-industry Competitiveness Study¹¹

Box 9: WEEE and (lack of) standards in producer registration

The Directive 2002/96/EC on waste electrical and electronic equipment (WEEE) addresses a particularly complex waste flow in terms of variety of products, association of different materials and components, contents in hazardous substances and growth pattern. It is based on the principle of producer responsibility to create the link between the production phase and the waste phase of a product and concerns various actors involved in the life cycle of electrical and electronic equipment (EEE), such as producers, distributors, consumers and operators of treatment plants.

Article 12 of the WEEE Directive provides requirements about the producer registers and reporting. It requires Member States to draw up national registers and to collect information on the amount of EEE put on the market as well as collected, reused, recycled and recovered within the Member State including exports. However, no standard reporting format exists. Each Member State sets its own reporting requirements and has its own national reporting format. This causes increased administrative burden and cost, at least when initially setting up internal systems to deal varying reporting formats.

Source: Ökopol report, 2007¹²

The heterogeneity in requirements, certification and testing often results at companies operating at a sub-optimal scale. This creates a competitive disadvantage not only for companies located in smaller Member States versus

¹¹ See Bilsen V. et al. (2009b)

¹² "The Producer Responsibility Principle of the WEEE Directive" (2007), report by Ökopol GmbH, iiiiee and RPA.

those located in large Member States within the EU, but also for EU companies compared to their Japanese or US counterparts.

Under the Environmental Technology Action Plan (ETAP) the European Commission has already taken first initiatives to harmonize environmental technology verification (ETV). The establishment of the ETAP networks of testing centres - Eurodemo, Promote, Testnet and Airtv - was promoted using community research funding to develop common or coordinated protocols and practices of technology assessment in water, soil or land use.

Box 10: Bio fuels and the lack of EU-wide standards

Although according to experts a lot of progress has been made in the certification and development of EU wide standards in the renewable energy sector, the situation appears to remain problematic in the area of bio fuels. The Commission's strategic energy technology plan information system indicates that one of the crucial elements for the EU bio fuel market to develop is not only a strong co-ordination between biomass suppliers and energy users, but also harmonisation of standards and administrative procedures across the EU-27¹³. It is argued among others that "an overall harmonisation of incentives and regulations across the EU as well as the set-up of sustainability certification schemes in view of avoiding market distortion and competition, and the development of resources mapping and life-cycle analysis tools are of prime importance".

According to the Ecorys (2010) report differences in technical specifications and certification procedures for equipment still constitute a barrier to trade in the EU market.

Source: European Commission, Ecorys (2010), work in progress

2.2.1.5 Language barriers

Various new documents related to policy initiatives and legislation at EU level are not available in all official EU languages. This may apply to guidelines, guidance documents and reference documents. Two examples affecting eco-industries are:

- The revision of the IPPC Directive and the BREFs: Best Available Reference Documents (BREFs) are important guidance documents and established as part of the Sevilla process. The proposed Industrial Emissions Directive (revision IPPC) foresees that BREFs should become legally binding. However, currently most full text guidance documents are only available in English. Once they become legally binding, they should be available in all official EU languages. For most BREFs only an executive summary is available in other EU languages.
- REACH: the European Commission has published a total of 23 REACH "guidance documents" that explain different aspects of REACH and should facilitate the implementation of REACH for companies. However, 16 of the 23 guidance documents are only available in English. Only 7 guidance documents are available all official EU languages.

Although statistical analysis on differences between large companies and SMEs falls outside the scope of this study, one can assume that language barriers especially (but not exclusively) affect more the SMEs. In general, large companies

¹³ See <http://setis.ec.europa.eu/mapping-overview/technology-map/technologies/biofuels>.

have more access to qualified and specialised personnel to read and analyse documents in a foreign language, while SMEs more often lack the human and/or financial resources to do so. This creates a comparative disadvantage for SMEs in terms of preparation and know-how about the legislative issues that apply to their activities.

Furthermore, the language barrier is not only pertinent to SMEs. Also local and regional authorities, who have to adjust the local and regional regulations in order to comply with the EU directives, might have difficulties with understanding and interpreting these as intended by the European legislators. The incidence of this problem tends to increase with the complexity and technicality of the matter. This might cause transposition deviations at local and regional levels, thereby increasing the variability of legislative interpretations across Europe and consequently augmenting potential administrative burdens for companies that operate across borders, even local and regional ones.

2.2.1.6 Lack of 'compatibility' of different policies at EU level

A problem that may not be typical for the single market, but certainly affects the European market functioning, relates to a (lack of) co-ordinated setting of policy priorities at the EU level.

The development and adoption of environmental goods and services is influenced by different policy priorities at EU level, such as environmental policy priorities, structural funds policy priorities or research policy priorities. The policy priorities in these different areas are not always set in a co-ordinated manner. A lack of compatibility between the various sets of priorities sometimes leads to a fragmented – mostly suboptimal – approach of specific issues.

Box 11: New water plants and old pipes in the New Member States

Veolia Environment indicated in its interview for the study on the competitiveness of the EU eco-industry that it perceived "a lack of joined-up thinking between various EU policies with respect to cohesion, energy and climate, environment and innovation." It indicated that the ties between the various policy fields were experienced as tenuous and that this has concrete ramifications in the field. An example was given of large water plants that are built in the New Member States with Cohesion Funding, while the pipe system through which the high-quality water runs to the consumer is often still obsolete and in bad condition. This reduces the environmental efficiency from an overall systems point of view.

Source: EU eco-industry Competitiveness Study¹⁴

¹⁴ See Bilsen V. et al. (2009b)

Cases have been reported where the Cogeneration Directive 2004/8/EC and the ETS Directive are not entirely compatible. Cogeneration is a process allowing the production of heat and electricity at the same time. The heat is in the form of high pressure water or hot water. The electricity/heat cogeneration plant uses gas turbines, which can export the excess electricity on the grid.

The example was given of district heating systems, which are used in e.g. the New Member States and in Scandinavian countries. In this application the cogeneration of energy and heat has a great potential in terms of security of supply, energy efficiency, CO₂ reduction, energy diversification, decentralisation and benefits for the local economies. Under ETS phase 2, the CO₂ emissions were free for cogeneration. Yet under phase 3, which begins in 2013, this is not anymore the case. Although at the beginning free CO₂ permits will be issued for the equivalent of 80% of a benchmark of the CO₂ used to produce the heat portion from the cogeneration plant, the free portion will decline to 30% of the benchmark in 2020 and 0% thereafter. It was argued that this significantly reduces the competitiveness of the gas turbine cogeneration plants compared to separate generation of heat and power.

Source: Veolia Environnement, June 2010, Marriott (2009), Cogen (2009)

2.2.2 Single Market problems affecting research in and the development of environmental technologies

2.2.2.1 Lack of EU wide sharing of information, knowledge, good practices and technology transfer

The value chain of the eco-industries is ever more organised in an international setting and co-operation across the value chain is a very important principle in sustainable development. This makes that cross-border collaboration between companies for the development of new technologies in the eco-industries will increase. As the regulatory framework, standards and requirements still differ significantly across Member States (see also par. 2.2.1), an efficient sharing of information, knowledge and good practices is very important to interact. Despite various actions to promote EU wide knowledge sharing and collaboration in research¹⁵, until now such knowledge sharing platforms at EU level have insufficiently led to an optimal transfer of knowledge and technologies.

¹⁵ E.g. the set up of different Technology Platforms related to environmental goods and services, such as the European Wind Energy Technology Platform or the Renewable Heating & Cooling Technology Platform.

Box 13: Electricity grid development and grid access

Ecorys (2010) found that access to the electricity grid is considered by experts in the field as a strong barrier to the growth of renewable energy. Article 16.2(b) of Directive 2009/28/EC demands for a guaranteed or priority access of renewable energy to the grid. Yet in at least half of the Member States access of renewable energy to the electricity grid was considered to be problematic and second in priority to conventionally produced electricity (coal, gas, nuclear).

The study indicated Germany as a best practice example where most problems concerning grid access have been solved in the so-called the Renewable Energy Act (Erneuerbare Energien Gesetz), which guarantees priority access for renewables to the grid. It has been indicated that this act was one of the factors that contributed to the successful expansion of renewable energy in Germany.

The Renewable Energy Act removed the restrictions on renewable energy production that existed before. Yet in other countries these continue to exist. Specifically disconnecting renewable installations from the grid in case of potential overcharge is experienced as a serious problem. In some countries for reasons of security, electricity generating installations are temporarily disconnected from the grid in case of overcharge. The study indicated that especially in France renewable energy installations are often disconnected from the grid before conventional installations in cases of grid overcharge. Problems have also been reported for Italy, Belgium, Latvia and Lithuania.

Source: Ecorys (2010), work in progress

2.2.2.2 Differences in national policy instruments hampering technological innovation

The development of the eco-industries in national markets (still) strongly depends on the availability of direct or indirect stimuli for customers to invest in environmental goods and services. With this policy instrument national governments often (re)direct the market to a specific technology. This makes it very difficult for other environmental technologies providers to enter that national market and thus hampers technological innovation within the country.

Moreover, as priorities differ across Member States, different technologies are being favoured in different countries. This creates a fragmented Single Market for technology development, possibly resulting in lower investments in innovation because of limited market potential.

2.2.2.3 Insufficient protection of intellectual property rights for optimal R&D collaboration

An important characteristic of many environmental goods and services is the fact that they involve integrated systems. To develop such integrated systems, multidisciplinary skills are needed. These skills are not always available within the company itself. Collaboration with other stakeholders in the value chain allows to overcome the lack of specific skills. The formation of partnerships between stakeholders (going from research institute to customers) for co-operation in research and development should therefore be stimulated.

However for open innovation to take place in the most optimal way, there is a clear need for coming to truly European IPR policies and institutions. That includes harmonized interpretation of IPR laws, harmonized court proceedings

and the introduction of legal institutions (final instance courts) which resolve cases¹⁶.

Over the last few years, numerous initiatives are being taken aiming at promoting collaboration between research institutions and businesses. Several Member States have taken initiatives to promote and facilitate knowledge transfer (for instance new laws, IPR regimes, guidelines or model contracts) and many others are planning to intensify their efforts in this direction. However, these initiatives are often designed with a national perspective, and fail to address the transnational dimension of knowledge transfer. There is, therefore, a need for a more level playing field regarding university-industry R&D interactions in Europe¹⁷.

European universities and other public research institutions should be given incentives to develop skills and resources to collaborate effectively with business and other stakeholders, both within and across borders. A major hindrance is the inconsistent, and often inadequate, rules and approaches for managing intellectual property rights (IPR) resulting from public funding.

Apart from the difficulties related to collaboration in R&D across Europe due to IPR uncertainties, the lack of a European Single Market for the protection of intellectual property (e.g. lack of Community patent) makes it very costly and complicated to protect results from R&D activities efficiently. Especially for SMEs the costs and administrative burden to cope with the complicated procedures are often too high to bear¹⁸. Moreover, the transposition of EU patent applications into national ones takes a considerable amount of time, sometimes resulting in a time lag of not less than 2.5 years between the first filing and the approval of the patent. This causes a serious delay in the valorisation process of new eco-innovations.

2.2.3 Single Market problems influencing the input factors of eco-industries

2.2.3.1 Labour: fragmentation in education and training

Education and training mostly focus on (technical) knowledge creation with a strong link to the national situation and institutional context. This means that issues such as techniques, standards, certification requirements, fiscal incentives... used in the national market are being taught. With a lack of EU wide standards, certification procedures,... the content of education and training in a similar topic can be very different in the different Member States.

Moreover, due to differences in the educational system in terms of financing, review of curricula etc., also the speed of adjustment of education and training to new technologies and market developments differs across countries. This results in very different profiles of graduates of specific trainings across Europe. All these elements hinder cross-border mobility of eco-workers.

¹⁶ "Improving knowledge transfer between research institutions and industry across Europe: embracing open innovation" - COM(2007) 182.

¹⁷ See "Improving knowledge transfer between research institutes and industry across Europe: embracing open innovation", COM(2007) 182 and accompanying staff working document SEC(2007) 449.

¹⁸ See e.g. WIPO (World Intellectual Property Organization), "Managing Patent Costs: an overview", http://www.wipo.int/sme/en/documents/managing_patent_costs.htm

Between the Member States there are significant differences in education attainment level of the construction sector workforce. For instance in 2006, 91% of the construction workers in Portugal were unskilled or semi-skilled, compared to only 4% of the construction workers in Slovakia. It is mainly in the North European countries that there is a relatively high proportion of workers with a "tertiary qualification", with Finland topping at 16% in 2006; although Spain, Romania, and Cyprus in the south of Europe are all above the EU average regarding the percentage of the workforce with tertiary qualifications.

Different country policies with respect to the scope of training and lifelong learning as well as differences in contractual bargaining priorities explain some of these differences, as rights to training begin to be an important parameter in contractual bargaining in the Northern countries, also in the traditional labour intensive sectors such as construction. Furthermore lifelong learning measures are important elements in the Nordic socio- economic models of growth and equity.

Source: DTI report, 2009¹⁹

2.2.3.2 Labour: lack of EU wide recognition of qualifications and skills

Strongly related to the above mentioned issue, the very diverse education systems across Europe make comparisons based on inputs - say length of study - impracticable and give little information about the exact qualifications and skills of a worker.

Currently, a transparent system for international recognition of professional qualifications within Europe is lacking. Automatic recognition of qualifications across Europe applies only to 7 out of more than 800 professions²⁰! New sectors such as eco-industries and new professions required for eco-industries are largely missing in the existing regulatory framework.

At this moment progress is being made to the implementation of a European Qualification Framework (EQF) (by 2012) that can be used to link levels of qualifications within the national qualifications system to European Qualifications Framework levels. The EQF can function as a translation device making qualifications more readable and comparable.

2.2.3.3 Labour: lack of uniform EU wide sector-specific technical language

In the eco-sectors characterised by a fragmented market and fragmented training, often also a different technical language is in place. This not only makes it difficult for customers in one country to communicate with stakeholders in other countries, it also hampers cross-border mobility of workers and cross-border collaboration between companies.

A clear example of such fragmented market is eco-construction. The local construction markets are heavily influenced by national regulations and requirements, leading to country-specific trainings and the development of a country-specific technical language. This leads to terminologies such as 'passive house' or 'sustainable building' having a different meaning in various countries.

¹⁹ "Future qualification and skills needs in the construction sector" (2009), DTI on behalf of EC, DG ENTR.

²⁰ The professions for which automatic recognition of professional qualifications is in place are doctors, nurses, dentists, midwives, veterinary surgeons, pharmacists and architects.

Even when construction workers from one country have sufficient qualifications and skills to work in another country, the lack of a uniform sector-specific technical terminology requires additional training to adapt international workers' capabilities to the national situation.

2.2.3.4 Labour: complex national labour market regulations

Further development and growth of the eco-industries often requires attracting specific skills and knowledge that are not always available in the home country. Within Europe there is no single labour market and labour market regulation is not harmonised and very complex across Member States. This makes international hiring cumbersome. Especially SMEs do not frequently have the organisational capacity to deal with such complexity. They therefore often refrain from attracting the necessary skills internationally.

The large country differences in the European labour market also inhibit international career development due to administrative, financial, linguistic or other barriers or loss of social rights. Only very recently regulations on social security systems have been coordinated, but cross-border portability of supplementary pensions and health insurance rights is not a reality yet. This is disadvantageous for especially highly mobile workers.

However, international mobility of workers and knowledge is especially important for eco-industries, where knowledge is often specialised and the number of 'knowledgeable' workers limited.

Box 15: ERA: a European single labour market for researchers?

Today, most researchers in Europe still find their opportunities curtailed by institutional and national boundaries, poor working conditions and narrow career prospects. In practice, academic positions still remain largely reserved for national or even internal staff. Transparent competition for recruitment is the exception rather than the rule. Mobility across borders or between academia and industry tends to be penalised rather than rewarded. Examples of barriers to international mobility are a lack of coordination of social security schemes across Europe as well as a lack of regulation on the portability of supplementary pension rights. Moreover, administrations do not usually allow researchers to receive or carry research grants across borders.

Many specific EU initiatives have also been taken to foster a more attractive European area for researchers, but progress remains very limited due to the voluntary nature of most of them and, in some cases, the lack of coordination with and between similar national and regional measures.

Source: ERA Green Paper, 2007²¹

2.2.3.5 Capital: barriers to international PPP for large investments

The transition of Europe's economy into a green economy and the effective introduction of eco-innovations and environmental goods and services requires important – often cross-border - investments in new infrastructure, such as e.g. the deployment of smart grids across Europe. Many investments in large projects related to environmental goods and services involve a mix of public and private funding. Public-private partnerships (PPP) are a useful instrument in such

²¹ "The European Research Area: new perspectives", EC Green Paper, COM(2007) 161.

investment projects. Also the EC has recognised the important role of PPP for the further development of eco-industries²².

However, a lack of clarity on the EU legal framework that applies some procedural difficulties in combining structural funding with PPP makes that the full potential of PPP for the further development of eco-industries is not used at the moment. Difficulties in combining different sets of EU and national rules and practices, make PPP a complex matter. Where the EU funding is involved, it should be ensured that there is no discrimination in the allocation of funds to investments projects depending on the management of the project, be it private or public.

The Commission therefore intends to review the rules and practices to ensure that PPPs are not put at a disadvantage and issue the necessary guidance to assist the public authorities in the preparation of projects. The Commission will examine together with Member States the EU and national rules and practices and present its findings, accompanied by proposals for modifications, where appropriate, by the end of 2010²³.

Facilitating the combination of public private partnerships with the use of structural funds is only one important element to stimulate large (cross-border) investments that are essential for the further development of Europe's green economy. Another option suggested by Monti (2010) is improving the incentives for long term investors (financial institutions with a public mandate but also private investors, including pension funds) to direct their resources to long term infrastructure projects. Recent innovative experiences, such as the €1.5 billion Marguerite fund bringing together the European Investment Bank and the public financial institutions of six Member States are a good starting point. Finally, relevant resources for infrastructure investments could be freed by the development in Europe of a liquid bond market for very long maturities. This could serve to raise funds for major cross-border investments at EU level as well as to offer an adequate supply of bonds to match long term investors' investment needs. Developing such a market would require reflecting on solutions to address the current fragmentation of the government bond market in Europe (cfr. Monti report, 2010).

2.3 Problem assessment

Following the qualitative assessment of the different single market problems, the aim of this section is to come to a more quantitative assessment of the issues in order to obtain a view of the degree of the problem, which in turn provides clues for prioritisation. First the methodology will be explained and subsequently the results.

2.3.1 Methodology

To give a quantitative appreciation of the 14 issues, we have scored each of the 14 issues, based on three dimensions indicating the degree of the problem:

- Relative importance for Single Market functioning as such, irrespective of country and sub-sector
- Sub-sector coverage

²² See e.g. Press release "European Commission and industry to invest €3.2 billion in economic recovery for a stronger, greener and more competitive economy tomorrow", IP/09/1116.

²³ "Mobilising private and public investment for recovery and long term structural change: developing Public Private Partnerships", COM(2009) 615 final

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- Country coverage

In general, literature about Single Market issues related to environmental goods and services is scarce. Given the newness of the environmental industry, there is often only 'tacit' knowledge about the topic and a lot of issues are not extensively documented in the literature (yet). We did find that the literature contains some detail and variation in the information about the different topics in different sectors to make a first quantitative assessment of the first two dimensions. However, the literature review did not allow us to make a good judgement about the relevance of the issues in specific countries. Contrary to what we expected, in the literature we found descriptions of the problems mostly only in general at EU level and not specifically related to particular countries. Moreover, when a problem is mentioned in one country, this does not imply that the problem does not exist elsewhere. Finally, certain topics may be difficult to assign to a specific (set of) countries, and may affect various countries in various ways.

Box 16: Differences between the new and old Member States: lessons from the EU eco-industry competitiveness study and the uptake and financing of new environmental technologies

The potential for environmental goods and services is definitely present in the new Member States. According to the EU eco-industry competitiveness study (see Bilsen et al., 2009a) in 2008 the New Member States counted for 11.3% of the total environmental protection expenditures (EPE) in the EU24. Compared with 8.6% of the EU's GDP in that same year, the new Member States' share of environmental protection expenditure is indicating a relatively higher average EPE per GDP than in the average old Member State. In 2004 the NMS' share was 10.5%, indicating a gradual increase in relative importance for the EGS-market over time.

A number of observations point towards a convergence with the old Member States, which in turn points to a certain degree of Single Market functioning. These observations are situated in the areas of environmental technology uptake, eco-investments, revenues from environmental taxes, and the relative comparative advantage in particular sub-sectors of the eco-industry.

** The Community Innovation Survey provides, among others, information about innovation expenditure in water supply and recycling. Looking at the countries for which data are available, the EU eco-industry competitiveness study found that innovation expenditure as a percentage of total turnover is relatively higher in the new Member States compared to that for the old ones.*

** No data were found about EGS related investment flows of old Member States into the new ones. Yet several industry representatives pointed during interviews to the growing investment opportunities and market potential. These investments seem to be triggered mainly by the need to comply with the (new) regulations, which provides interesting opportunities for the established market players, which are usually situated in the old member states.*

** The EU eco-industry competitiveness study found that although environmental taxes are highest in the old Member States, the highest increases in such taxes were found in the new Member States. The harmonisation of the new Member States' regulations with EU legislation and tax systems may have contributed to this evolution.*

²⁴ Note that 58.4% of the EPE were located in the four largest economies (Germany, France, Italy and the UK).

** Contrary to what one might expect, the sectoral competitiveness study of the EU eco-industries revealed a strong comparative advantage in a number of new Member States for the Hydropower sub-sector. However, this advantage is decreasing, probably due to the fact that the growth potential in this sub-sector – despite being the biggest in terms of renewable energy production – is only limited. It may also be an indication of more diversification towards other sectors.*

In terms of intra-EU trade performance it was found that the bulk of trade in eco-industry's products still takes place within the EU-15, and that a large gap still exists between the old and new Member States. In certain sub-sectors relatively strong export growth rates could be observed for the new Member States, such as photovoltaics, and air pollution control. Yet in terms of total value these activities remained relatively small. The largest exports of environmental goods for the EU12 in 2007 were found to be from the sub-sector 'Other Environmental Equipment', which was comparable with the export performance of the EU12's pharmaceutical sector. It has to be noted that no data on services were available, which is quite relevant to bear in mind since an important part of the eco-industry's output are services²⁵.

Within Europe, the New Member States are clearly still lagging behind the EU15 in terms of development of the various eco-industry sub-sectors, but with the adoption of EU legislation, the market in the EU12 is expected to develop strongly and investment opportunities abound. The new Member States are considered as an important potential growth market, which could further enhance economies of scale within the EU if integrated properly.

Precisely this integration is of crucial importance for the further development of the Single Market for environmental goods and services. While by taking up the Acquis Communautaire, and the implementation of the EU regulations and directives a further integration on the side of regulatory framework conditions is achieved, the actual uptake of environmental technologies and solutions might still be relatively more challenging than in the old Member States. A report²⁶ produced under the Sixth Framework Programme (2002-2006) investigating barriers and drivers to innovation on environmental technologies in the new Member States on the basis of a survey with experts found that the existence of environmental risks were accepted as such, but not necessarily found to be of serious concern. Furthermore, the report indicates a more profound perception that the adoption of environmental technologies cause high economic losses, and that consumers are not willing to pay more for cleaner products. However, a number of respondents did favour the uptake of environmental technologies, especially since it was perceived as having a positive impact on the company's competitiveness. Yet although the majority of respondents saw high capabilities for the adoption of environmental solutions from a technology point of view, more than 60% thought that this would be quite unfeasible in financial terms.

²⁵ Though, one may argue that the service provision usually involves the trading of goods as well for purchase, installation, building of the hardware needed to perform the service.

²⁶ See POPA-CTDA, s.d.

A bit more recent, an article by Radonjič and Tominc, 2007, indicated a more positive company view on the implementation of environmental technologies. These authors investigated aspects of technology modernisation as a result of ISO 14001 certification in Slovene metal and chemical manufacturing companies (including pharmaceuticals, paper and plastics). The certified companies considered ISO 14001 as a very useful tool in promoting and adopting new environmental technologies, especially with respect to complying to the IPPC Directive. Companies in the chemical industry used predominantly modified technologies to diminish their environmental impacts, while firms in the steel sector used a combination of existing and new technologies after ISO 14001 certification. The authors concluded that "it seems that better environmental performance is associated with higher productivity in ISO 14001 certified companies".

Although one has to be careful for the problem of positive selection bias, (where only the highly productive, viable companies go for ISO 14001 certification and have therefore by their very nature a high productivity) it nevertheless indicates that a growing willingness exists to adopt environmental technologies. Yet given the lower GDP/capita numbers in the new Member States, especially for SMEs a need for financial means in the implementation can still be a very real problem. The latter aspect points to the importance of government and Community funding in this respect and on easing the conditions for access to finance and risk capital.

As such, the total score of a specific issue is based on only two sub-scores:

$$\text{Total score per issue} = \text{problem relevance score} * \text{sector relevance score}$$

The **problem relevance score** goes within a range from 1 to 5, a score of 5 meaning that the problem seriously hinders the development of an efficient single market for environmental goods and services. We would like to indicate that all problems listed are relevant with respect to Single Market functioning in the environmental goods and services sector. A score equal to 1 therefore should not be interpreted as 'not relevant', but rather as having a lower expected impact on doing business in the Single Market than a problem with a higher score. The scores only indicate how the 14 issues in the list differ in terms of nature of the problem. The scores are meant to get a sense of the degree of the problem for each one of the problems and do not address the whole set of problems together.

The **sector relevance score** is a percentage score (0-100%). The percentage score indicates what percentage of the total eco-industry is mainly affected by the specific issue. When all eco-industry .sub-sectors are affected, the sector relevance score equals 100%. When the issue only affects parts of the eco-industry, the sector relevance score represents the share of total eco-industries that is affected. The calculation of the total size of the eco-industries and the size of each of the different .sub-sectors is primarily based on information from the EU eco-industry competitiveness report²⁷. We refer to annex 1 for a more extensive discussion on the calculation of the sub-sector sizes and the sector relevance scores.

Multiplying the problem relevance score with the sector relevance score provides us with a **total score per issue**. This total score ranges between 0 and 5. Based

²⁷ See Bilsen et al. (2009a).

on the total scores per issue, also a total score for each of the three clusters of problems is calculated. This cluster-score is equal to the average score of the different total scores of the issues within the cluster. All scores lie between 0 and 5.

The scores - although based on qualitative information - are a useful instrument for a more systematic assessment of the various degrees of problems for Single Market functioning in the environmental goods and services sector. The scores also help prioritising the suggested actions in the next chapter.

The assessment methodology is schematically represented in Table 2. In each row, a topic is assessed which is labelled in column 2. In total, there are 7 columns:

1. The number of the problem identified
2. Identification of the problem
3. Problem relevance score: relevance of the problem with respect to the Single Market functioning, irrespective of sector or country
4. Coverage across .sub-sectors of the identified problem; the same sub-sector classification is used as in the EU eco-industry competitiveness study.
5. Sector relevance score: relevance of the identified problem in terms of .sub-sector coverage
6. Total score: overall indication of importance for each problem that has been identified across countries and sub-sectors
7. The source of the information and problem that we identified

The first six columns will be reported in the remainder of the study. We refer to Annex 2 for the complete table with reference to the different sources that have been used.

Table 2: Problem assessment methodology

Column1	Column2	Column3	Column4	Column5	Column6	Column7
Number	Category of problem		Sub-sector coverage		Overall	References
	Problem identification	Problem Relevance Score (score 1-5)	Sub-sector identification	Sector Relevance Score (score 0-100 %)	Total Score (score 0-5)	Number refers to reference list
Single Market problems affecting the output of eco-industries						
1	Lack of legal clarity	score 1a		score 1b	total score 1	
2	Lack of uniform implementation and enforcement of EU Directives	
3	National differences in (regulatory) framework					
4	Lack of EU wide common standards in certification and testing procedures					
5	Language barriers					
6	Lack of 'compatibility' of different policies at EU level					
Total output					Output score	
Single Market problems affecting research and development in environmental technologies						
7	Lack of EU wide sharing of information, knowledge, good practices and technology transfer	score 7a		score 7b	total score 7	
8	Differences in national policy instruments hampering technological innovation	
9	Insufficient protection of IPR at EU level					
Total technologies					Technologies score	
Single Market problems influencing the input factors of eco-industries						
10	Labour: fragmentation in education and training	score 10a		score 10b	total score 10	
11	Labour: lack of EU wide recognition of qualifications and skills					
12	Labour: lack of uniform EU wide sector-specific technical language					
13	Labour: complex national labour market regulations					
14	Capital: barriers to international PPP for large investments					
Total input					Input score	

Source: IDEA Consult

2.3.2 Single Market malfunctioning and environmental goods and services: a quantitative assessment

Following the methodology explained above, each of the 14 problems with respect to the Single Market functioning for environmental goods and services has been assessed and scored. As indicated earlier, in the score two dimensions are taken into account:

- The relevance of the issue with respect to the Single Market functioning, irrespective of sector or country: the more the issue 'disturbs' doing business in the European Single Market, the higher the problem relevance score;
- The relevance of the issue for specific eco-industries: the more eco-industry .sub-sectors the issue applies to, the higher the sector relevance score.

Issues 1 (legal clarity), 2 (uniform implementation), 3 (national differences), 9 (IPR) and 13 (national labour market regulations) directly relate to the legal framework in which businesses operate. They receive the highest problem relevance score as each of these problems are "omni-present" in the EU

framework. These problems affect both large and small companies, locally operating and multinational companies and companies in all Member States.

Concerning issue 9 (IPR) it has to be noted that a correct and cost effective IPR protection system is critical for eco-innovation to flourish and for businesses to engage in (cross-border) R&D collaboration. Yet since this issue does not affect all sub-sectors but especially the high tech ones, the total score for issue 9 is 2.3.

Issues 4 (standards and certification) and 11 (qualification and skills), both relate to fragmentation of the single market due to specific "technical" barriers that impede the movement of people, goods and services. They receive a problem relevance score of 4. Changes in the regulatory framework as such are not so much necessary to tackle these issues, but rather the implementation and clear procedures for mutual recognition are.

Barriers to international PPP for large investments received a problem relevance score of 4. The further development of an energy-efficient low carbon economy demands for large (cross-border) investments to have the right infrastructure in place. The lack of an efficient financing system that allows for a smooth combination of public and private investments with structural funds has an important impact on the development of such infrastructure. As large infrastructure is specifically relevant for only a number of eco-industry sub-sectors, the total score reduces to 2.3 after weighting.

The barriers to free movement as formulated in issues 7 (information gaps), 10 (education and training) and 12 (uniform technical language) are information content related in nature. A lack of information and knowledge sharing hinders cross-border collaboration and exchange. Equally, large differences in education content and in technical language and concepts create market pockets rather than a Single Market. They received a problem relevance score of 3. Depending on the impact that they have on different sub-sectors, the total score differs.

Issues 6 (compatibility of EU policies) and 8 (national innovation policies) receive a problem relevance score of 3. Both issues have been found in the literature, although not overwhelmingly.

Finally, issue 5 (language barriers) receives a problem relevance score of 2. Companies (and administrations) that do not master the English language are still in a disadvantageous position when doing business (implementing legislation) on the European market. Solutions such as the use of translations for guidance manuals and specifications as well as using interpreters can be found, but clearly they come with a cost. Table 3 summarizes the quantitative assessment results.

Table 3: Assessment table of Single Market issues: results

Column1	Column2	Column3	Column4	Column5	Column6
Number	Category of problem		Sub-sector coverage		Overall
	Problem identification	Problem Relevance Score (score 1-5)	Sub-sector identification	Sector Relevance Score (score 0-100 %)	Total Score (score 0-5)
Single Market problems affecting the output of eco-industries					
1	Lack of legal clarity	5	All eco-industries	100%	5
2	Lack of uniform implementation and enforcement of EU Directives	5	All eco-industries	100%	5
3	National differences in (regulatory) framework	5	All eco-industries	100%	5
4	Lack of EU wide common standards in certification and testing procedures	4	Air pollution control, (recycling), renewable energy, eco-construction, environmental technologies	59.9%	2.4
5	Language barriers	2	All eco-industries	100%	2
6	Lack of 'compatibility' of different policies at EU level	3	All eco-industries	100%	3
Total output					3.73
Single Market problems affecting research and development in environmental technologies					
7	Lack of EU wide sharing of information, knowledge, good practices and technology transfer	3	All eco-industries	100%	3
8	Differences in national policy instruments hampering technological innovation	3	Renewable energy, eco-construction, environmental technologies	59.7%	1.8
9	Insufficient protection of IPR at EU level	5	High tech subsectors	46.6%	2.3
Total technologies					2.37
Single Market problems influencing the input factors of eco-industries					
10	Labour: fragmentation in education and training	3	Eco-construction, renewable energy, environmental technologies	59.7%	1.8
11	Labour: lack of EU wide recognition of qualifications and skills	4	All eco-industries	100%	4
12	Labour: lack of uniform EU wide sector-specific technical language	3	Environmental technologies, eco-construction	57.6%	1.7
13	Labour: complex national labour market regulations	5	All sectors (especially important barrier for mobility of researchers and other highly skilled workers)	100%	5
14	Capital: barriers to international PPP for large investments	4	Water management, waste water management, renewable energy, environmental technologies	58.4%	2.3
Total input					2.97

Note: All 14 issues that have been identified are important for further development of the Single Market for environmental goods and services. Yet some problems by their very nature and/or sectoral scope are more important than others.

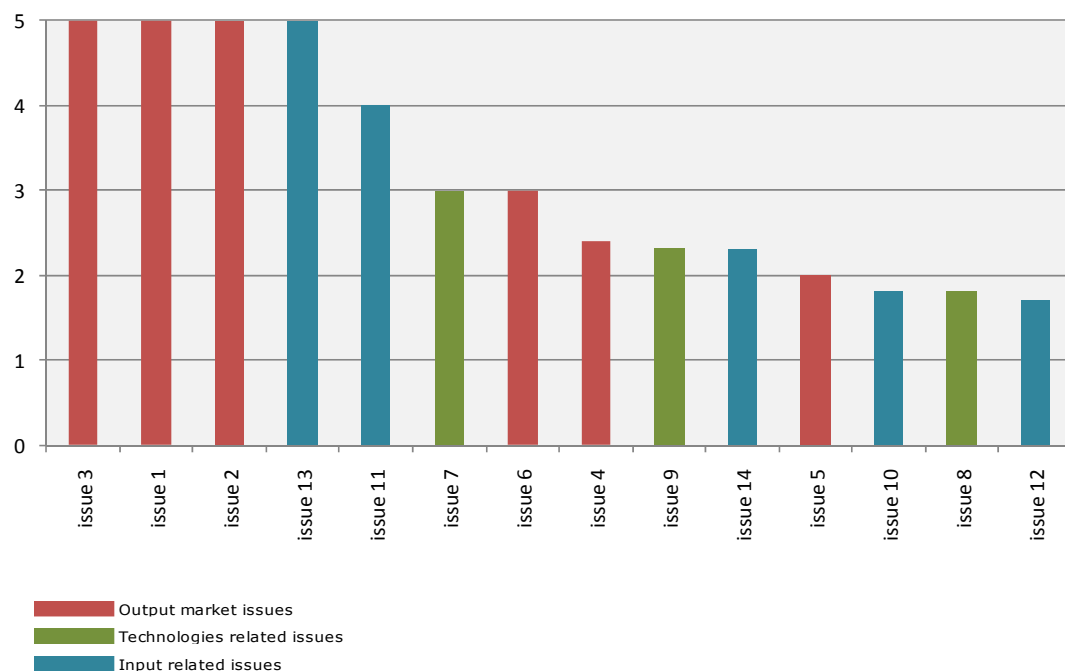
From a general point of view, one can perceive in Table 3 that the average problem score for the output related problems is the highest, with a value of virtually 4 on a scale of 1 to 5. This is also indicated in figure 5 ranking the total score for each of the issues. Factor market problems receive a slightly lower weight, close to 3 and environmental technology and R&D issues are on average close to 2.5. The main reason for the relatively high problem scores for the output side is that a number of problems affect the Single Market for environmental goods and services quite strongly due to their very nature and because these problems also occur in all sub-sectors of the EU eco-industry. The lack of legal clarity, the lack of uniform implementation and enforcement of EU directives, and national differences in the regulatory framework across Member States are the three most important problems on the output side which affect the functioning of the Single Market for environmental goods and services most fundamentally.

This is not to say that in the factor markets the Single Market functions relatively well. Also here a number of problems were identified that due to their very nature are significant impediments for the Single Market functioning and at the same time wide spread across sub-sectors. In the factor markets this is undoubtedly the complex national labour market regulations, especially in the area of the mobility of high-skilled workers. Also, albeit with a slightly lower score, the lack of a EU-wide recognition of qualifications and skills is an important problem.

On the technology side, the problems seem to be more related to particular sub-sectors, except the EU-wide sharing of information, and best practices. For particular high-tech eco-industry sub-sectors the insufficient protection of intellectual property rights at EU level is very important.

Ranking the 14 individual issues according to the degree of the problem, which results from the problem relevance score weighted by the sector relevance score, the total scores highlight that the most pressing problems related to Single Market functioning for environmental goods and services all involve regulatory issues. These problems often arise from the complex interaction of the national and EU regulatory framework and the lack of transparency caused by the different layers of regulation. The following figure provides an overview of the total scores by issue. Looking at the different clusters (output market issues, technology related issues, input related issues), the most pressing Single Market problems especially affect the output side of eco-industries: the production and trade of environmental goods and services.

Figure 5: The degree of the problems for Single Market functioning: ranking of issues



Source: Idea Consult

Note: Issues are defined in Table 3 of this report. The score is on a 1-5 scale.

Finally we do want to indicate that the above mentioned problems may apply to other sectors of the economy as well, especially in terms of the nature of the problem. For instance the lack of legal clarity, the lack of a uniform implementation and enforcement of EU directives, the relatively large variety in the Member States' regulatory framework and the complex national labour

market regulations also affect the Single Market functioning for other sectors. However in the case of environmental goods and services the regulations envisaged are in principle related to environment and can be different from the ones that are relevant for other sectors. Furthermore, many if not most of the environmental regulations affect the functioning of other sectors as well. For instance the Energy Performance of Buildings Directive (EPBD²⁸) is as important for the construction sector as it is for the eco-industry. The IPPC Directive affects especially the energy intensive industries, while the eco-industries help providing the BATs. Therefore the Single Market issues related to environmental goods and services tend to have a more horizontal character across sectors, which give it a relatively higher importance than sector-specific regulations.

One may argue that there are a number of additional reasons that make the Single Market problems weigh more for eco-industries compared to other sectors of the economy:

1. The market opportunities of the environmental goods and services sector depends relatively more on (environmental) regulations than other sectors. Therefore all problems related to this, such as issues 1,2 and 3 tend to become very important.
2. Particular parts of the eco-industry are relatively young sectors, such as renewable energy, air pollution control, and noise reduction. Eco-tourism, bio-diversity protection, and sustainable forestry are only recently gaining momentum. Some of the solutions provided, e.g. photovoltaic electricity production, are only viable in the context of appropriate support schemes and regulations. National market pockets are often too small for reaching a profitable size of operations or for reaching a better spread of market risks. The EU Single Market provides new opportunities and is therefore relatively more crucial for further development of these sectors, than for other more established sectors.
3. Even for the older sub-sectors of the eco-industry such as recycling and waste management control, the Single Market is essential for a further increase in competitiveness and market opportunities, especially in the view of increased globalisation pressures.
4. Eco-industries depend very much on being able to deliver state of the art environmental friendly solutions, and consequently on the access to adequate resources, talents, know-how, capital and specialised labour. Eco-technologies evolve at a fast speed. A well functioning EU Single Market provides certainly a bigger resource pool than a fragmented one.

In the following chapter we look at how the different issues might be tackled. Given the lack of extensive documentation we also point to gaps in the literature that might need further research to refine our assessment.

²⁸ EPBD: Directive 2002/91/EC

3 COMPLETING THE SINGLE MARKET FOR ENVIRONMENTAL GOODS AND SERVICES: PROPOSALS FOR ACTION AND FUTURE RESEARCH

3.1 Introduction

In this part of the report, a number of policy recommendations will be presented. After having identified the key problematic areas for the functioning of the Single market for environmental goods and services, and an assessment of the degree to which each of the identified problems can be perceived as a problem, a number of policy actions to improve the Single Market functioning for environmental goods and services are suggested. Moreover, for each of the actions an allocation of responsibilities of stakeholders at different levels (EU authorities, national/regional authorities and industry associations) is made, as it is clear that tackling the issues of Single Market functioning in environmental goods and services is not solely the responsibility of the European Commission. Different stakeholders are involved in the process of creating an efficient Single Market for environmental goods and services. Not only regulatory issues might create barriers, but also technological issues and non-harmonized educational systems might do so as well. In doing this, **the principle of subsidiarity has to be kept in mind**: what is the most appropriate level (EU, national, sector) to take up responsibility for specific actions?

- **EU level (EU)**: A large part of the regulatory framework affecting environmental goods and services is developed at the European level. Regulation with regard to climate change, environmental policy, registration of chemicals etc. has been developed at this level.
- **National, Regional and Local Authorities (MS)**: The Member States have the authority to regulate important issues such as taxation and fiscal incentives. Also labour market regulation and the organisation of the educational system fall under the responsibility of national authorities.
- **Industry associations (IND)**: The individual players within the eco-industries are often grouped in associations. These associations provide relevant information and defend the stakes of their members. They sometimes also play an important role in making links between the sector's needs and education and training.

This part of the report also highlights the risks that relate to not engaging in a further improvement of the Single Market functioning for environmental goods and services and concludes with a number of suggestions for further research.

3.2 Problems of Single Market functioning: recommended policy actions

In presenting the various policy recommendations, the same order as the one of the problem assessment table was followed. While some of the identified Single Market problems apply specifically to the environmental goods and services sector, others are relevant for other sectors of the economy as well. Given the subject of this study, all of the following recommendations concern the European environmental goods and services sector.

3.2.1 Improve the legal clarity in the relevant directives

From part 2.2.1.1 it is clear that 'open ended' legal terms and formulations should be defined more clearly to the degree possible. For new legislation an ex ante regulatory analysis can reveal beforehand potential unclear formulations, or formulations that have a large probability of being interpreted in various ways. Existing legislation can be altered on the base of existing evidence of malfunctioning that is not in agreement with the Single Market objective. Examples are the refinement of the definition of end of waste in the Waste Framework Directive and a uniform definition across the EU of "public entity" in the VAT Directive. Initiatives to improve the legal clarity in EU regulation should be taken at the EU level. Additionally, efforts to reduce the incorrect transposition of EU directives should be kept on pace.

3.2.2 Improve the uniform implementation and enforcement of directives

For companies that intend to operate across the border of their own country, a differentiated implementation increases the administrative burden, introduces compliance costs and increase search costs.

A first step in the good direction is speeding up the implementation of the various EU directives and regulations. Reducing the backlog in the transposition of environmental directives is key in this respect.

A potential route to streamline the various existing implementations is developing national action plans aiming 'correcting' the existing biases towards a common and compatible implementation over all of the EU 27 countries.

Additionally, or as part of the preparation of the national action plans, a screening of the existing national regulations can be made. This can serve as a basis for developing an information platform for companies that want to operate across Member States. Although the latter action does not reduce the administrative burden and the compliance costs, it may substantially reduce the information and search costs. The platform can be perceived as a 'one stop shop' on national rules, standards and legislation in a particular area of the environmental goods and services market. The Lead Market Initiative for sustainable construction might be considered as a starting point.

Although the lead responsibility for a more uniform implementation of EU directives lies with the Member States, the EU can play an important co-ordinating role and/or provide the necessary incentives for Member States to improve the implementation process and enforcement of directives.

3.2.3 Reduce market fragmentation for services through implementation of the Services Directive

Environmental business services are an important part of the eco-industries. The Services Directive 2006/123/EC aims to facilitate the freedom of establishment for providers in other Member States and the freedom of provision of services between Member States. It also intends to increase the choice offered to the demanders of services and improve the quality of the services offered, both for consumers and businesses.

Although most Member States have failed to implement it by the 28th of December 2009 deadline, the expectation is that a full implementation of the Services Directive would significantly bring down fragmentation and

administrative burden in the European market, which is necessary to stimulate environmental services towards its full internal market potential²⁹.

It is clear that the implementation of the Services Directive in the first place requires a major effort at Member States' level. But the European Commission plays an important role in watching over the process of implementation and stimulating Member States to take the necessary steps.

3.2.4 Reduce the differences in the relevant national framework conditions for subsidies and green procurement

The market for environmental goods and services has often been characterised as a market that is relatively more driven by regulations than other markets. Indeed, at least in principle, public environmental policy stepped in where the market economy failed to provide solutions. Given the change in the framework conditions, public concern about the environment and the long-term policy commitment, opportunities for private business arose and are being developed and valorised. Nevertheless in many instances public authorities still play an important role to provide the seedbed for initiatives that otherwise would fail in free market conditions. National subsidies and public green procurement play an important role in this respect.

A common EU-wide approach in subsidizing new environmental technology applications or environmental goods and services would enhance the transparency of the EU market and reduce the administrative burdens for the suppliers. Examples have been found in the renewable energy sub-sector of support packages that are biased in favour of electricity production compared to heat and gas generation.

Also uniform green public procurement rules across Member States would be a step in the good direction. Currently for water and energy, directives have been formulated (Directive 2004/17/EC and Directive 2004/18/EC) that have been amended by Commission Regulation 1177/2009 of 30-11-2009. To our knowledge this has not been done yet for other specific sub-sectors of the environmental goods and services industry. The European Commission could proceed along these lines and take the lead in initiatives to reduce the differences in the relevant national framework conditions. Evidently, results can only be achieved with active co-operation from the Member States.

3.2.5 Promote common EU standards, certification and testing procedures where necessary

In each of the various sub-sectors of the European environmental goods and services sector, the introduction of common technical standards, certification and testing procedures across the EU would contribute substantially to the Single Market functioning. Yet it has to be indicated that in this policy area a delicate balance needs to be struck between technical standards on the one hand and functional performance criteria on the other hand. It has been reported that a negative side effect of too much standardization is the locking in of R&D and technology development in a particular direction, leaving other potential opportunities unexplored. From this point of view one may argue that a minimum set of common EU standards are necessary and that functional performance criteria can be introduced if possible and meaningful.

²⁹ For a more detailed view on the progress of implementing the Services Directive across Member States, we refer to the note of the Competitiveness Council of 25-26 May 2010; <http://register.consilium.europa.eu/pdf/en/10/st09/st09475.en10.pdf>

3.2.6 Alleviate language barriers to the degree possible

The publication of (new) regulations and directives, as well as the accompanying documents in all languages of the EU 27 is a step in the right direction for alleviating language barriers. The problem is most prevalent for SMEs. Yet also for their counterparts at the local and regional authority levels that are often responsible for monitoring and implementing the various regulations 'on the field', language differences constitute a barrier towards a correct and uniform interpretation and practice.

Examples have been given of the guiding documents of the IPPC directive and REACH, of which a number of essential guiding documents are still only available in English. At EU level, continuous efforts should be made to at least provide all documents (not only regulations) that directly concern businesses in eco-industries in all official EU languages.

3.2.7 Improve compatibility of relevant policies at EU level

At EU level, for each of the eco-industry's sub-sectors a screening could be done of the EU policy areas that affect that particular sub-sector and analyse the compatibility of the relevant directives and regulations. Another approach is collecting systematically evidence from the field through a representative consultation of the various stakeholders, after which suggestions for streamlining could be formulated. An interesting field in this respect is the area of public private procurement at EU level which is instrumental for large infrastructure projects such as the development of a 'smart' European integrated electricity grid.

3.2.8 Improve knowledge sharing and environmental technology transfer

Inter-sectoral cooperation is essential in new product development. Furthermore the value chain of the eco-industries is ever more organised across Member States. The organisation of platforms where both environmental technology providers, and suppliers of environmental goods and services meet their potential clients, would help to alleviate the information barrier and encourage the absorption of environmental technology. This does not only relate to R&D, innovation and technology in the environmental field, but also to the regulatory framework conditions in which these solutions are developed. Especially SMEs would benefit from these platforms since information, search and networking costs are relatively higher than for large companies.

The creation of such information platform is organised ideally at the EU level. The EC can have a co-ordinating role in the establishment of such platform. But the lead initiative should primarily come from the industry itself.

3.2.9 Streamline national policy instruments for promoting environmental technology innovation

The streamlining of national policy instruments for promoting environmental technology innovation would make the regulatory framework conditions in which the environmental technology, R&D and innovation activities are performed more transparent. This would increase the potential for cross-border co-operation within the EU Single Market and therefore also is expected to increase the research and business opportunities within the EU. Co-ordinated national action plans can be a means to attain this goal. Note that this does not necessarily imply that no specialisation patterns will occur among Member States. It only would imply that the policy instruments among Member States are mutually compatible.

Although the lead initiative for more streamlining of national policy instruments lies with the Member States, the EC can play an important role as catalyst by providing the necessary platforms for information exchange and discussion.

3.2.10 Promote the EU Patent

The development of environmental solutions requires an adequate protection of intellectual property rights. The absence of an EU patent is a serious flaw in this respect. The problem especially situates in environmental technologies and air pollution control, as well as in renewable energy production, where access to new technologies is crucial for business development. Yet in order to maintain an incentive for innovation the potential rents should be adequately safeguarded. In comparison with the US and Asian patent systems, the EU system is perceived as more complex and costly due to fragmentation. A single EU patent system would increase the competitiveness of the EU environmental goods and services industry on the global market.

Monti (2010) points out that with the legal basis offered by the Lisbon Treaty and the Europe 2020 strategy a new momentum has been created to reach an agreement at EU level on the European Patent.

3.2.11 Reduce the fragmentation in education and training for environmental skills

Harmonisation in the education and training for environmental skills would improve the mobility of eco-talents across Member States and would help promoting the mutual recognition of environmental skills qualifications and curricula among Member States. This would result in a clearer understanding of the education content behind a particular title or curriculum and therefore would contribute to a better transparency in the EU labour market.

As education is a national authority, actions to reduce the fragmentation in education for environmental skills should be implemented at Member State level. However, both eco-industry associations and the EC play an important role in this process. Whereas the EC can take up a more co-ordinating role, the industry associations can be an active partner in the dialogue to ensure that education in environmental competences meets the demand for eco-skills.

3.2.12 Enhance the EU wide recognition of eco-industry's qualifications and skills

The European Qualification Framework can be used as a vehicle to link the levels of the Member States' environmental qualifications to each other and in this way increase comparability and transparency. It would imply that employer's screening costs decrease and that a bigger pool of talent can be accessed in Europe.

Actions that are initiated both by EU authorities and industry are necessary to ease EU wide recognition of eco-industry's qualifications. At EU level, the legal framework set out in the Directive 2005/36/EC to facilitate mutual recognition of professional qualifications between Member States should be modernised. As the former Commissioner Prof. Monti stresses in his report to President Barroso on the Single Market (2010) the scope for automatic recognition of qualifications to new professions should be expanded to new sectors such as eco-industries, to facilitate the mobility of highly skilled workers. Apart from changes in the legal framework, eco-industry associations play an important role in the development of a European Skills and Competences Taxonomy. This system should ensure that skills and competences in eco-industries are understood in the same way everywhere in the EU and are easily transferable.

3.2.13 Promote a uniform EU wide environmental technology language and concepts

A common EU environmental technology language means that a particular technological concept, procedure or standard means the same thing in all Member States. It not only contributes to a better interaction in the field of business development and R&D, also in education and training it has its ramifications. Training and the formation of capabilities are influenced by a Member State's technological language and prevailing concepts and methods.

The development of the European Skills and Competences Taxonomy for eco-industries mentioned in the previous paragraph is a first step. Industry associations should take initiatives to further expand such European taxonomy of eco-industry relevant concepts.

3.2.14 Reduce the complexity of the EU labour market

The young and innovative EU eco-industries can greatly benefit from mobility of highly skilled workers. Therefore, legal and administrative barriers to intra-EU mobility should be addressed. In particular the transferability of social security rights and an improvement of portability of supplementary pension rights is expected to contribute significantly to cross-border job mobility of researchers.

Although the authority in labour market issues lies with the Member States, discussions on further coordination of labour market issues such as social security systems cannot be established without central coordination of initiatives at EU level.

3.2.15 Relief barriers for multi-national public private partnerships (PPP) investments

From a regulatory point of view cross-border PPP in the EU are a complex matter. Providing a combination of government funding e.g. structural funds, with private funding and local public funding across different Member States remains a tedious exercise. A simplification of procedures and an increase in regulatory compatibility would mobilise more private and public funding for PPP applications which can contribute to long term structural change initiatives. In this respect, also Monti (2010) underlines the crucial role of better combining PPP with structural funds allowing for necessary and already planned infrastructure investments to accelerate the transition to a green, knowledge based economy.

In Table 4 we summarize the different policy recommendations as well as our view on how responsibilities could best be distributed, keeping in mind the principle of subsidiarity. We identify both a 'lead responsible' and 'other stakeholders'. These other stakeholders may support the lead responsible and contribute by taking accompanying measures or by playing a co-ordinating role.

Table 4: Division of responsibilities ('problem ownership')

Issue	Lead responsibility	Other stakeholders
1. Single Market problems affecting the output of eco-industries		
<ul style="list-style-type: none"> ▪ Improve the legal clarity in relevant directives ▪ Improve uniform implementation and enforcement of EU directives ▪ Reduce market fragmentation in services through the implementation of the Services Directive ▪ Reduce differences in relevant national framework conditions for subsidies and green procurement ▪ Promote EU wide common standards in certification and testing procedures ▪ Alleviate language barriers ▪ Improve 'compatitibility' of different policies at EU level 	<ul style="list-style-type: none"> EU MS MS EU, MS MS EU EU 	<ul style="list-style-type: none"> EU EU IND, EU*
2. Single Market problems affecting research and development of environmental technologies		
<ul style="list-style-type: none"> ▪ Improve EU wide sharing of information, knowledge, good practices and technology transfer ▪ Streamline national policy instruments for promoting environmental technological innovation ▪ Promote an EU patent 	<ul style="list-style-type: none"> IND MS EU 	<ul style="list-style-type: none"> EU* EU*
3. Single Market problems influencing the input factors of eco-industries		
<ul style="list-style-type: none"> ▪ Reduce fragmentation of education and training for environmental skills ▪ Enhance EU wide recognition of qualifications and skills in eco-industries ▪ Promote a uniform EU wide environmental technology language and concepts ▪ Reduce complexity of the EU labour market ▪ Relief barriers to international PPP investments 	<ul style="list-style-type: none"> MS EU, IND IND MS, EU EU 	<ul style="list-style-type: none"> EU, IND EU* MS

*: role as catalyst

EU = EU authorities, MS = national/regional authorities, IND = industry (associations)

3.3 Future perceived risks

It is clear that the major future perceived risk of not engaging in a further improvement process for a Single Market for environmental goods and services will be a sub-optimal development of this sector. In the practical this has many ramifications which lead to a loss of opportunities in terms of growth potential for the sector and job creation. In particular one may think of the following risks when a status quo would be retained.

- A negative pressure on the competitiveness of the EU environmental goods and services industry on the global market. A fragmented 'home market' is not exactly a strong basis for expanding outwardly into other, more risky markets. Often doing business on a global scale requires a minimum scale that cannot be attained in relatively small national markets, with the only possible exception for companies operating in the large EU economies such as Germany, France and the UK.
- Less variety of potential environmental solutions for the local customers. While a fully functional Single Market increases the access to environmental goods and services and solutions throughout all 27 Member States, in a fragmented market, the menu of solutions will, *ceteris paribus*, in a Member State be smaller. This is both from environmental and from economic efficiency point of view sub-optimal.
- A hindrance in the further development and commercialisation of new environmental goods, services and technological solutions can be expected. In this respect, a minimum size in terms of client reach, funding, access to specialised skills can be a crucial precondition for a successful and viable launch. Especially as the green industry is moving further away from its 'old' image of public services, such as waste collection, towards private market initiatives, such as renewable energy production, a well functioning European Single Market is crucial as has been shown in Bilsen et al. 2009.
- A slack in the momentum of reaching the 20-20-20 environmental goals, formulated in the Spring European Council of 2007, might occur. If the private sector development in the environmental goods and services market will stagnate and resources will be limited, one might foresee that in order to attain the 20-20-20 goals relatively more public funding will be needed.

3.4 Potential Single Market distortions: suggestions for further research

A number of suggestions for further research can be formulated based on the insight of the current scoping study. We identified the following three areas for further research that have significant policy relevance:

1. The Services Directive and the EU Single Market for environmental goods and services
2. Relatively new and small environmental markets, and
3. The country dimension

Although we systematically have looked for evidence of environmental dumping in the framework of the **Services Directive**, no evidence was found³⁰. In a number of instances reports indicated the danger of **environmental dumping** in 'one breath' with social dumping as a potential consequence of the Service Directive. Yet we could not trace reports of environmental dumping actually occurring or having occurred. A point of departure for investigating this topic in more detail could be a systematic review of infringements against environmental directives.

While the former suggestion is historic in nature, a forward looking route of research would be investigating in more detail the **potential of the Services Directive** for the promotion of the Single Market for environmental goods and services. To our current knowledge this has not been investigated yet for the environmental goods and services, while for other sectors such as financial services, pharmaceuticals, media, sport, postal services and e-commerce specific legislation has been developed and issues have been investigated in more detail. It might be envisaged that mechanisms that have been introduced by the Services Directive such as the Points of Single Contact and Internal Market Information System will have important benefits for the EU Single Market for environmental goods and services.

Another potential for further research concerns the framework conditions of relatively **small market segments for environmental goods and services** such as eco-tourism, and bio-diversity conservation. Eco-tourism can be perceived as consisting of two major types of activities:

- Climate-friendly travel, and
- Visits of nature parks, bio-diversity areas, ...

With respect to the second type of activity the issue of certification programmes in Europe is important. We did not find evidence of Single Market problems in this area, although it might be too early to detect since this activity is only starting to gain momentum recently.

Forestry and land restoration are other potential fields for further research. Forestry is very much intertwined with the paper and pulp industry, as well as with bio-diversity conservation. In the literature, we did not detect particular problems of Single Market functioning in this sub-sector.

It might be advisable to do a number of interviews in these small, and often quite new, environmental sub-sectors in order to inquire about the existence of potential Single Market problems.

Finally, we were not able to elaborate the **country dimension** in the problem assessment. This study mostly relied on a review of the literature, reports and web sites. A limited number of interviews have been done in order to capture more recent information and real life examples. However, we do realise that for having a more detailed view on certain issues in terms of country relevance further research may be needed. The question "where and to which degree is a particular issue perceived as a problem?" could not be answered to a satisfactory degree.

Yet it can be instrumental for policy development to have a better view on country differences in the perception and experience of Single Market problems for environmental goods and services. Section 2.2.1.2 indicated country differences in the backlog of non-transposed environmental directives, taking into account the country-specific institutional characteristics. This evidence primarily points to the legislative side. Yet it can be imagined that transposition is an

³⁰ This is not to say that there might not be evidence of environmental dumping in other areas such as external EU trade.

endogenous process behind which priorities and interests are working involving various actors.

One way to get a better view on these country differences is doing a systematic survey for well specified problems in the EU Single Market across the EU-27. Stratifications could be made in terms of targeted stakeholders: such as national/regional policy makers, business associations and labour organisations, as well as consumer organisations.

4 CONCLUSION

Through a systematic literature survey, supplemented with a limited number of interviews, this scoping study identified 14 important problems that hamper the development of a European Single Market for environmental goods and services. An indication of the degree of the problems was given using two dimensions: the intrinsic nature of the problem for the functioning of the Single Market for environmental goods and services and the scope of the problem across eco-industry sub-sectors. We were not able to elaborate the country dimension, due to lack of country differentiation in the information sources, yet we formulated potential research avenues to solve this problem.

Focussing on the same set of sub-sectors of the EU eco-industry as in the EU eco-industry competitiveness study, we may conclude that the most important Single Market problems affect the output of the EU eco-industry. In terms of policy priorities attention should therefore be focussed on improving the legal clarity of the relevant directives, the implementation of the Services Directive, the reduction of differences in national framework conditions for subsidies and green procurement, as well as a uniform implementation and enforcement of the EU directives. On the side of production factors, reducing the complexity of the EU labour market received also a high problem relevance score. All of the problem areas mentioned are by their very nature important hindrances to the completion of the Single Market for environmental goods and services and at the same time applied to all eco-industry sub-sectors.

Although the EU has a key role to play in solving these problems, the Member States do bear an important responsibility for most of these, with the notable exception of the issues of legal clarity of the EU directives. Eco-industry stakeholders have a leading role in problems that are more specific and practical in terms of implementation. Examples are the organisation of information platforms and forums for exchange of know-how and technology transfer, sharing best practice experiences, the development of a EU-wide common technology codes and concepts, as well as for environmental skill qualifications.

Some problems received a relatively low total problem relevance score, yet were very important for specific sub-sectors. The promotion of an EU patent is of crucial importance for the environmental technology providers, air pollution control and renewable energy sub-sectors. Here the EU plays a crucial role and has an important responsibility. Also for the compatibility of different policy areas the EU has a leading role. An example was given of the Cogeneration Directive and the ETS Directive. Also in terms of alleviating language barriers the EU may contribute significantly.

Member States do have an important responsibility in the implementation of more homogenous and mutual consistent policies for education and training for environmental curriculums and in the area of environmental technology innovation as well as in the field of standards, certifications and testing procedures. The interaction of all actors in the field is crucial for the development of a Single Market for environmental goods and services.

Given the goals of the EU2020 strategy and the problems identified in this study, doing nothing would be detrimental. It can be envisaged that in a status quo strategy, the Single Market for environmental goods and services will be sub-optimal, rendering a less mature and smaller EU eco-industry, with more competitive strain on the global eco-markets. An important opportunity for the creation of jobs and economic growth would be forfeited. Furthermore it would be harder to reach the environmental goals that the EU has set for the future.

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ANNEX 1 SIZE OF THE EU ECO-INDUSTRIES

Bilsen et al. (2009) report data on the size of eco-industries (in terms of employment in 2008) for the following .sub-sectors:

.sub-sector	Employment
waste management	1,466,673
water supply	703,758
wastewater management	302,958
recycled materials	512,337
others	193,854
renewable energy	167,283
air pollution	19,067
biodiversity	49,196
soil & groundwater	18,412
noise & vibration	7,565

Data on the size of eco-construction are not included in the study. To estimate the size of eco-construction in terms of employment, we have used the methodology of E&Y (2006)³¹ where it is estimated that eco-construction represents approx. 7.5% of the total construction sector. Accordingly, we estimate that 7.5% of the total construction employment can be categorised as employment in eco-construction. Given that approx. 14.8 million persons work in the construction sector, we estimate that around 1.1 million workers are employed in the eco-construction .sub-sector. Adding this number to the .sub-sectors that have been estimated in Bilsen et al., a total of 4.5 million persons are employed in the EU eco-industries including eco-construction. The shares of the different .sub-sectors in the total eco-industries are presented in the last column of the table.

.sub-sector	Employment	Share in eco-industries
waste management	1,466,673	32.2%
water supply	703,758	15.5%
wastewater management	302,958	6.7%
recycled materials	512,337	11.3%
others	193,854	4.3%
renewable energy	167,283	3.7%
air pollution	19,067	0.4%
biodiversity	49,196	1.1%
soil & groundwater	18,412	0.4%
noise & vibration	7,565	0.2%
eco-construction	1,109,475	24.4%
TOTAL eco-industries	4,550,578	

In this sector description of eco-industries, **environmental technologies** are not considered as a separate .sub-sector. Figures on the size of environmental

³¹ Ernst and Young (2006), "Eco-industry, its size, employment, perspectives and barriers to growth in an enlarged EU", report prepared on behalf of European Commission DG Environment

technologies are included in the figures of each of the different .sub-sectors, depending on the technology field in which the environmental technology is developed. E.g. companies active in the development of new technologies for air pollution control resort under the air pollution .sub-sector. However, for the purpose of this study an estimation of the size of the environmental technologies .sub-sector is needed to be able to allocate a sector relevance score. Based on an interview with EUCETSA in the context of the competitiveness study on EU eco-industries (Bilsen et al., 2009b), it is estimated that 2 million persons work in companies that develop environmental technologies. This corresponds to 44% of the total eco-industries. This percentage is used in the context of this study to calculate the share of environmental technologies in the total eco-industries.

A second category of activities for which we need to make an estimate of their share in the total eco-industries is **high tech eco-activities**. In this study the following eco-.sub-sectors are considered as 'high tech':

- Environmental technologies
- Renewable energy
- Air pollution
- Soil & groundwater
- Noise & vibration

As we already assume that for each of the .sub-sectors environmental technologies account for 44% of employment, we only add the remaining 56% of employment in the renewable energy, air pollution, soil & groundwater and noise & vibration .sub-sectors to the employment of environmental technologies. This results in an estimated share in total eco-industries of 46.6% for high tech eco-activities.

The following table summarizes the different shares that are used to calculate the .sub-sector relevance scores:

.sub-sector	Share in eco-industries
waste management	32.2%
water supply	15.5%
wastewater management	6.7%
recycled materials	11.3%
others	4.3%
renewable energy	3.7%
air pollution	0.4%
biodiversity	1.1%
soil & groundwater	0.4%
noise & vibration	0.2%
eco-construction	24.4%
environmental technologies	44%
high tech eco-industries	46.6%
all eco-industries	100%

ANNEX 2 ASSESSMENT TABLE WITH SOURCE

Column1	Column2	Column3	Column4	Column5	Column6	Column7
Number	Category of problem		Sub-sector coverage		Overall	References
	Problem identification	Problem Relevance Score (score 1-5)	Sub-sector identification	Sector Relevance Score (score 0-100 %)	Total Score (score 0-5)	Number refers to reference list
Single Market problems affecting the output of eco-industries						
1	Lack of legal clarity	5	All eco-industries	100%	5	1, 2, 10, 14, 17
2	Lack of uniform implementation and enforcement of EU Directives	5	All eco-industries	100%	5	1, 2, 3, 10, 14, 17
3	National differences in (regulatory) framework	5	All eco-industries	100%	5	1, 2, 10, 12, 14, 17, 19, 20, 21
4	Lack of EU wide common standards in certification and testing procedures	4	Air pollution control, (recycling), renewable energy, eco-construction, environmental technologies	59.9%	2.4	2, 17
5	Language barriers	2	All eco-industries	100%	2	2
6	Lack of 'compatibility' of different policies at EU level	3	All eco-industries	100%	3	2
Total output					3.73	
Single Market problems affecting research and development in environmental technologies						
7	Lack of EU wide sharing of information, knowledge, good practices and technology transfer	3	All eco-industries	100%	3	1, 2, 4, 6, 8, 9, 10
8	Differences in national policy instruments hampering technological innovation	3	Renewable energy, eco-construction, environmental technologies	59.7%	1.8	2, 3
9	Insufficient protection of IPR at EU level	5	High tech subsectors	46.6%	2.3	2, 4, 6, 8, 9, 10, 17
Total technologies					2.37	
Single Market problems influencing the input factors of eco-industries						
10	Labour: fragmentation in education and training	3	Eco-construction, renewable energy, environmental technologies	59.7%	1.8	2, 5
11	Labour: lack of EU wide recognition of qualifications and skills	4	All eco-industries	100%	4	2, 5, 8
12	Labour: lack of uniform EU wide sector-specific technical language	3	Environmental technologies, eco-construction	57.6%	1.7	2
13	Labour: complex national labour market regulations	5	All sectors (especially important barrier for mobility of researchers and other highly skilled workers)	100%	5	2, 8, 10
14	Capital: barriers to international PPP for large investments	4	Water management, waste water management, renewable energy, environmental technologies	58.4%	2.3	10, 11
Total input					2.97	