ESPON

GREECO
Territorial Potentials for a Greener Economy

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This report presents a more detailed overview of the analytical approach to be applied by the project. This Applied Research Project is conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

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This basic report exists only in an electronic version.

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1. GREECO Project: The General Approach

This project seeks to identify the territorially relevant aspects of a green economy to highlight particular opportunities for European regions through implementation of strategic territorial development and cohesion policy actions. Based on this objective, three sequential aims are fundamental to this project specification:

- The need for a deeper understanding of the territorial dimensions of the green economy to elaborate knowledge that is dependent on characteristics that are inherently diverse throughout Europe.
- Assessment of the current state and future perspectives of the green economy in European regions. Based on the selection and development of relevant indicators, regions that share common development opportunities and challenges will be identified.
- The characterisation of efficient policy actions to strengthen the economy and competitiveness of the European territory, as well as help move further towards an environmental sustainable society.

All the way from a conceptual approach to the nature of data availability and processing, the GREECO project is at the forefront of research trends in its field: A clear definition of the green economy remains as an open and debateable concept, while a characterization of which specific activities fall under the umbrella of green economy is less certain. Likewise, regionalized analysis of economic and territorial dimensions of the green economy is virtually non-existent within the broader context of Sustainable Development; and not least, the analysis of regional *potential* of the green economy an entirely new dimension of analysis. Each of these conditions make the GREECO project a challenging endeavour; however, these same challenges provide the opportunity to establish impactful results and guidance for future work.

The green economy concept has evolved from the policy principles of Sustainable Development emphasising that the concept of 'economic growth' is much too narrow for measuring social progress. Scientific research has taken up the challenge of operationalising the broad concepts of sustainability and Green Economy is now a widely accepted agenda for economic reform to achieve sustainability. As such, it shall be viewed as a subset of sustainable development; one which is aligned with a notion of strong sustainability where different types of capital (natural, social, economic) are seen as complimentary and should be independently maintained. Natural resources are therefore essential inputs in economic production, consumption or welfare. These cannot be substituted and are bounded territorially as central inputs into a green economy.

Transition to a greener economy can be considered now the underlying agenda of the UN, the OECD, the EU and the individual governments of the EU member states. However, this transition might be endangered to some extent by the financial and political crisis that Europe is presently facing. We may get to a situation where regions might desperately need 'any economy' versus a 'greener economy'. Under this situation, it becomes even more important to test the green economy's underpinning theory in times of crisis.

While guidance is being envisioned from national and international institutions, it is being understood that the necessary transformations will take place in the realm of concrete geographical contexts where regional and local administrative and political bodies in concert with the EU structural and cohesion funds and

national legislation provide the framework and drivers for the transition. The GREECO project aims to support this approach by substantiating the territorial perspective and developing tools for the planning and political processes to contribute to a greener economy.

Within this project, green economy is understood as an approach to transform **production and consumption processes and patterns**, including economic, environmental and social values, in order to ensure a more sustainable use of natural resources with lower carbon emissions while at the same time stimulate growth based on the natural, human and economic investments. Taken from a slightly different perspective, a 'greener economy' uses the current state of the European economy as a point of departure to conceptualize a shifting economic paradigm; from socio-economic growth linked inextricably to environmental degradation and resource depletion toward growth that enhances 'genuine' investment, aggregate levels of inclusive capital assets - including economic, natural, human and social asset bases - without compromising rights to prosperity and the sustainability of other regions or generations in the future.

However, a comprehensive characterization of the environmental implications of green economy is beyond the scope of this project. This is due to the fact that it would entail an assessment of the environmental impacts of the transitions that are included in the analysis. Here, it would be difficult to measure the 'cleanliness' of a certain activity, particularly in contrast to other development alternatives. Therefore, the focus will be placed on territorial and economic dimensions, the latter of which will be investigated through a multi-sectoral approach. It will be taken for granted that the interventions suggested will have a positive – but un-quantified though this project– impact on the environment.

The aims of GREECO suggest that at least three outputs can be expected.

1. **A regional profile of green activities** at the NUTS 2 level. This is a secondary or intermediary objective of the project and is based on the aim to understand the current state of the green economy in European regions. The comprehensiveness of this pioneering characterization will be based on and conditioned by data availability, but will provide a point of departure for assessment of green economy potential, as well as the suggestion for directions of future research.
2. **A *qualitative* analysis on the potential of green economies at the regional level**. This will be the second main output of the project and will combine the relevant perspectives from Output 1 with regional attributes on green economy drivers and enabling conditions. These will be based on the sectoral and territorial dimensions of the green economy that will be developed within the project.
3. The presentation of **green economy policy opportunities** from both territorial and non-territorial perspectives. These will be based on the identification of green economy barriers, drivers and enablers, as well as the assessment on the implications of green economic development.

2. Methodology and hypothesis for further investigation

This chapter has been elaborated following the project structure by tasks and subtasks. The following figure illustrates the links between the different tasks foreseen by GREECO project.

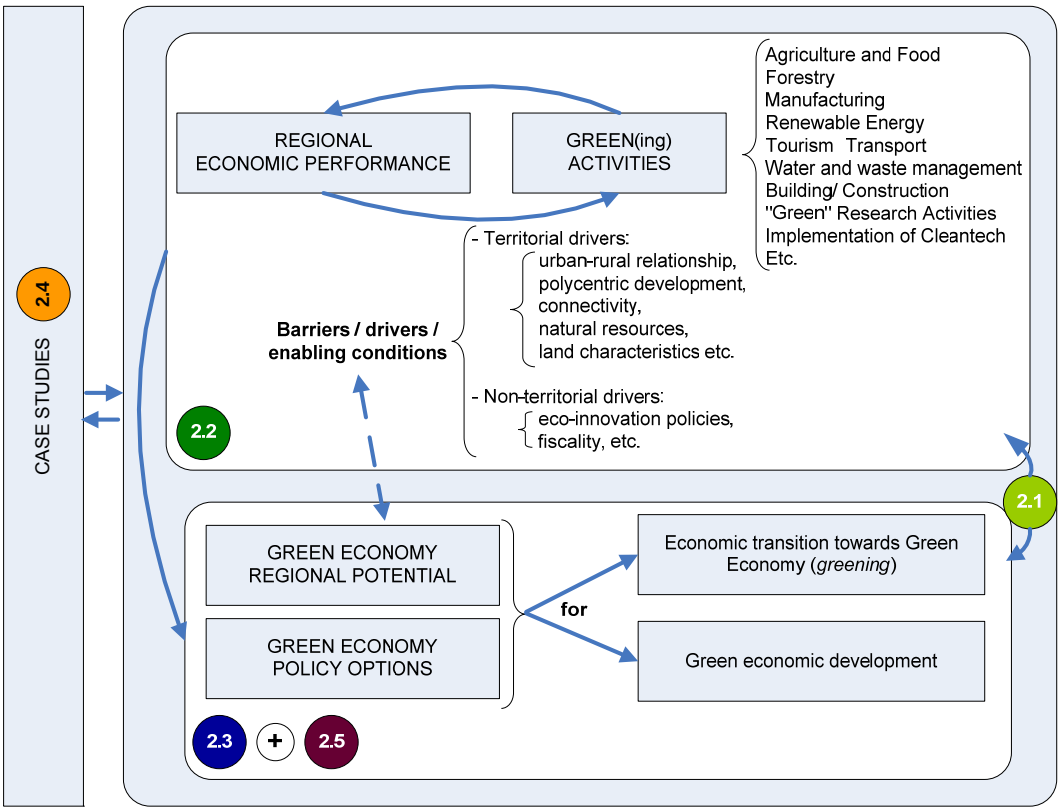

Figure 1. GREECO project conceptual framework

2.1. Data Assessment and Management (Task 2.1)

Task 2.1 is central for the successful development of GREECO, since it will explore the data sources to be used during the lifetime of the project.

The methodological approach chosen is, first, to define conceptually what characterises a green economy as opposed to the typical 20th century economy. Second, the analytical tools developed by the UN, OECD, EEA, EUROSTAT and ESPON describing the features of a green economy will be assessed as to their usefulness for the analysis of regional transitions towards a green economy. All the above is included within the research **Task 2.1.1 Literature review and identification of data sources**.

The review will in addition to the scientific literature comprise the work on indicators taking place in international organisations such as the UN Commission on Sustainable development (United Nations 2007), the OECD Better Life Initiative (OECD 2011), various initiatives of the EEA, including the Annual Indicator Report - 2012 edition (work in progress at the EEA), the Sustainable Development Indicators used by EUROSTAT for monitoring the EU

Sustainable Development Strategy (EC, 2010), the outputs of scientific collaboration centres such as Socioeconomic Data and Applications Center (SEDAC), as well as the International Institute for Sustainable Development (IISD).

The aim of the research **Task 2.1.2 Inventory of indicators** is to derive relevant indicators at the regional level from this background and to suggest data collection on issues where the primary data basis is too thin for regionalisation. Even in these cases, however, knowledge of the environmental properties of the individual industries at national level can be useful for estimating the *challenges and potentials* for greening the regional economies (assuming that the environmental properties of the individual industries are identical to the properties at the national level). For the monitoring of *actual* changes in the regional economies towards a green economy, however, primary data and statistics are required.

The green economy and transitions to the green economy will be described for the main national accounts aggregates. From a preliminary review of the available data it appears that data on the Gross Value Added (GVA), wages and employment in a 2 sector NACE classification is available at the NUTS2 territorial level. However, more digits are required for defining environmental goods and services according to the prevailing definitions.

In parallel, the territorial indicators that will be handed to other tasks through this reflection will mainly cover those produced by previous ESPON projects dealing with the following topics:

- Polycentric development and settlement models.
- Patterns of urban-rural relationship and rural characteristics.
- Regional levels of accessibility & connectivity.
- Transport: flows and infrastructures.
- Energy consumption and production patterns.
- Land use and land cover types.
- Social affairs and living conditions.
- Integrative indices and typologies.
- Complete territorial economic profiles.
- Territorial performance indicators in relation to the revised Lisbon/Europe 2020.
- Regional performance indicators related to various objectives of the Gothenburg Strategy and other additional environmental dimensions.

A preliminary list of territorial indicators to be analysed by GREECO project can be found in Annex 1.

2.2. Characterization of the regional dimension of Green Economy (Task 2.2)

The green economy characterises a new economic paradigm that is different from the economic paradigm prevailing in the 20th century. It involves greening of entire vertical structures with spatial as well as economic dimensions – and

they are not necessarily contained in their entirety in a single region. In this perspective, the notion of pursuing smart specialization - based on regional socio-economic and natural assets - vis-à-vis a balanced, diverse, and secure economy is a central component that emphasizes the territorial dimension of a green economy.

This is a challenge for the analytical approaches of economic geography as, in principle, interactions within a sector and between sectors and regions are multi-dimensional and complex. They include links between value chains and throughput chains (including energy chains as well as materials chains) that are based on trade-offs as a balancing agent. For instance, the electric car will be a central process in the transition to a green economy, especially in relation to the prospective achievements of the transport sector. However, the electric car as a viable (environmentally and economically efficient) alternative to the combustion engine relies on the appropriate supply of R&D services, policy, manufactured outputs, and not least, the adequate supply of electricity from renewables. These interventions imply activities across multiple sectors and across territories in both time and space.

To appease the inherent challenges, the task of characterizing the regional dimension will be broken down into four interdependent steps with multiple connections to other work packages. The first two steps, definitions of the territorial and sectoral dimensions of the green economy, will develop as an iterative process, both between the two subtasks themselves and in relation to Task 2.1.

Subtask 2.2.1 and 2.2.2 – Definition of the territorial and sectoral dimensions of the Green Economy:

A first scoping based on internal expertise and reviews of the most up to date literature (Task 2.1) will identify the main territorial and sectoral characteristics of the green economy. For example, both the OECD and UNEP have recently developed comprehensive policy documents covering the green economy enabling conditions within key economic sectors. Likewise, contributions from other on-going and recently completed ESPON projects (i.e. ReRisk, EU-LUPA, EDORA, etc.) will also be used to establish the territorial elements of the green economy. These results will then be used to determine the indicators collected in Subtask 2.1.2, which in turn will serve to characterize regional performance related to the green economy (Subtask 2.2.3).

The main sectors that have been selected on a preliminary basis are characterized by sector specific dynamics as well as common features that create inter-relationships. The sectors include: Agriculture and Food, Forestry, Manufacturing, Renewable Energy, Tourism and Transport. These will be supported by the investigation of at least four additional sectors that are viewed as cross-cutting the main sectors: Water and Waste Management, Building and Construction, Green Research Activities and Implementation of Clean Tech. As shown by the available figures collected by EUROSTAT during 2009 Environmental Goods and Services Sector (EGSS) survey[1], these stand-alone sectors and cross-cutting activities account for the vast majority of what may be labelled green economy in Europe. A preliminary characterisation of

[1] EUROSTAT Annual statistics on EGSS (env_ac_egss2).

such sectors at a NACE 2 digit level can be found in Annex 2. The project will explore the opportunities for using the EGSS data as a means to identify the economic activities that will grow towards a green economy and those that will decline.

In addition to the transformations of outputs, the transitions to the green economy include transformations of consumption, investment and land-use and flowingly of the inputs to production. These transformations have to take place in parallel for the economy to be greener. Switching from oil based to electrified transport, for instance, only contributes to a decarbonised economy if the production of electricity is also transformed from traditional combustion of brown coal to renewable electricity.

Thus, some additional sectors and cross-cutting activities, or subsets of the abovementioned ones, might be considered in the light of the literature review conducted in Task 2.1 and the green economy territorial perspectives introduced in Subtask 2.2.1. For instance, the objective of increasing the share of renewables in total electricity consumption is as much about the development of renewable technologies as it is about deploying a pan-European smart grid infrastructure, creating a common and liberalized European energy market and increasing energy efficiency across all sectors. Seen from this perspective, energy efficiency might be considered a cross-sector theme, and it provides a rationale that can explain various interrelationships between sectors. For example, the development of public transport and energy efficiency of buildings are linked to territorial dimensions through the planning and development of transit-oriented, mixed-use urban neighbourhoods.

In addition to the preliminary scoping, identification of the best indicators relating to Subtasks 2.1.2 and 2.2.3 will be undertaken through parallel investigations:

- Initial screening of which specific economic activities within each sector relate to the concept of the green economy. This entails proposing a list of the most relevant green economic activities to be analysed within each sector under examination (i.e. those activities showing a larger share of GVA/employment over the total economic sector to which they belong). This step will be taken mainly following the criteria proposed by EUROSTAT to define the EGSS.
- Identification of the key interrelationships (cross-dependencies, potential conflicts, mutual benefits, etc.) between the sectors with a specific focus on water and waste management, building/construction and green research clean tech and potentially energy efficiency.
- As extension of the above, an elaboration of the territorial dimension of green economies, particularly establishing the components and interrelationships between sectors through options of mono- and multifunctionalities in land use. This will have a specific focus on sectors with key land consuming activities such as agriculture, forestry, biomass-based renewable energy, building/construction, tourism, etc.
- The case studies in Task 2.4 will be advantageous (i) to further understand and illustrate green activities in different sectors, especially where coverage by the indicators is insufficient, (ii) to identify possibly discreet cross-cutting aspects between different sectors, (iii) to identify and examine key interrelationships (and impacts) between different sectors and land use functions/ performance from a green economy

perspective, and (iv) to shed more light on the functioning of drivers and enablers.

A number of emerging approaches to the scientific analysis of the links between economy and nature in general and value chains and throughput chains in particular will be examined. They include, in particular,

- environmentally extended input-output-models
- material and energy flow analysis and
- the eco-system service approach
- horizontal scanning for the analysis of industrial and urban ecology, eco-innovation clusters etc.

These approaches will be important analytical approaches in the OECD and EU statistical frameworks for analyzing the transition to a green economy. Thus, their applicability at the regional level will be addressed in this subtask (potentially through case studies, as stated in Section 2.6 (Hypothesis for further investigation) below).

Subtask 2.2.3 – Characterization of regional performance related to the green economy

The main output from this task will take place through the identification of relevant green economy indicators in Task 2.1.2 (as identified in Subtasks 2.2.1 and 2.2.2). Here, a quantitative profile of Green Economy at the regional level in Europe could be completed. Depending on data quality, those countries with available EGSS data at the national level could be downscaled to the NUTS2 level through statistical regression models, correlating national EGSS figures with a selection of potential drivers for which data both at the national and regional levels can be obtained (population, selected regional environment statistics, ESPON data, etc.) Next, in countries lacking EGSS data, one could assume that the same type of statistical correlation found in previous step holds wherever in Europe the model is applied.

The GREECO project will analyse the soundness and viability of implementing the abovementioned approach to countries with no data on green activities, in order to be fully implemented if valuable output is foreseen, or to limit the analysis to countries with existing data, analysing in the rest of the ESPON area only the presence of variables related to green economy potential (conditions, barriers and enables). See Section 3.2 (Data availability) for further details on the proposed methods.

The output from previous step will be a regional characterisation of green economies across Europe in terms of Gross Value Added (GVA), employment and exports, which will eventually be compared to the regional performance of each specific region. The result will be the identification of regional typologies relating to green economic performance. Accordingly, the work done in Subtasks 2.2.1 and 2.2.2 will allow for the sectoral and territorial interpretation of the results of this analysis. However, it should be mentioned that the classification of green activities based on EGSS figure will produce an analysis with an explicit focus on the supply side of the economy. Therefore, a qualitative interpretation of the results in relation to demand-side consumer activities with a green dimension, and any other activities not characterized through the EGSS data should be completed. Validation of additional indicators not covered through the EGSS classification, as well as methods of down-

scaling and gap-filling proposed above will therefore be important elements taken up during each of the case studies.

Subtask 2.2.4 – Identification of drivers and enablers

Sectoral and territorial perspectives viewed in relation to the regional typologies of Subtask 2.2.3 will motivate the identification of barriers, drivers and enabling conditions of the green economy. Both territorial and non-territorial perspectives will be considered. As such, Subtask 2.2.4 brings together the achievements of the previous three subtasks to provide a detailed inventory, description and examination of the drivers linked to each of the sectors under scrutiny. The objective is to explore a number of hypotheses about the drivers and enablers or the policy instruments that are critical to the transition towards a green economy. Special attention will be paid to those drivers with a greatest potential impact on EGSS development, like the following ones:

1. Demand side drivers:

- Market size:
    - Domestic market: the larger the domestic market is in a given region, the larger potential a greener economy has to develop and grow.
    - External markets: the more export -oriented a region is in economic terms, the more potential for green exports that region has.
- Economic structure and current development of EGSS:
    - Economic structure: trade-offs between brown and green activities, alongside specific sectoral combinations of the green sectors and associated ancillary activities might contribute fostering EGSS development.
    - Level of present share of green economies over the total: the more developed the EGSS is, the more potential for further development it could have. However, this is a statement to be validated by GREECO project, as the opposite might hold true from a given threshold of EGSS development. For instance, it is widely accepted that in the long run some green sectors, like the renewable energy sector, become less labour intensive than the brown alternatives, leading to a net loss of jobs.
- Environmental protection expenditure: the more a region invests in environmental protection, the more potential for EGS development within that region.
- Nature of the environmental problems faced under present conditions and in future scenarios (e.g. climate change effects on EGSS development)
- Regulatory framework and political will: stricter environmental regulatory schemes and ad-hoc policies of different natures (e.g. taxation, subsidies, international agreements, etc.) tend to favour the expansion of a number of green activities linked both to environmental management and to environmental protection. Many of the regional differences concerning drivers are due to national differences between regulations and laws. The analysis will take appropriate account of this.

- Territorial drivers. For instance, enhanced regional connectivity might bond a given region to external territorial dynamics that could eventually boost green activities within that specific territory even in the absence of relevant internal driving forces.

2. Supply side drivers:

- Territorial drivers, such as:
    - Natural resources linked to specific green sectors: for instance, renewable energy production is mainly driven by the physical conditions inherent to each territory.
    - Physical features of the urban network (e.g. types of settlement and connectivity networks impacting transport schemes)
    - Urban-rural relationships that might determine the degree to which the rural setting can complement and support the growth of specific green economic sectors (e.g. biofuel production supporting the development of specific green activities elsewhere.)
    - Etc.
- Eco-innovation: development potentials of a number of green activities are conditioned by the technological potential of relevant sectors, either related or ancillary, which to a larger extent derive from the resources invested on research and innovation within those specific sectors.

2.3. Assessment of the regional potential of Green Economy (Task 2.3)

Task 2.3 is the cornerstone of GREECO project. Building on the results obtained from Task 2.2, this task deals with the characterisation of ESPON NUTS2 regions into a number of typologies reflecting the different potentials that diverse territories hold for green economy development (Subtask 2.3.1). Additionally, this task seeks to assess the economic, environmental and social implications of green economy for each one of the regional typologies identified on previous step (Subtask 2.3.2).

Within this framework and in close collaboration with Task 2.2, GREECO will analyse the potentials of the green economy with an overarching approach, considering on the one hand the territorial and non territorial drivers that might contribute boosting green activities, and on the other hand the internal trade-offs between different territories and traditional brown and green economies. The variations in targeted transitions and potentials between different types of regions will be analysed too. Thus, it will be considered whether it is possible to identify the main conflicts of interest involved in transitions towards greener economies.

Within **Subtask 2.3.1 Definition of regional typologies with regard to green economy potentials**, the typologies will be constructed mainly on the basis of selected regional features derived from the nature of ongoing green economic activities and the drivers indentified within Subtask 2.2.4.

The proposed typologies will also take into account previous ESPON regional classifications. Particularly, the project will make use of the nine standard

ESPON Territorial Typologies: (i) urban-rural; (ii) metropolitan regions; (iii) border regions; (iv) islands regions; (v) sparsely populated regions; (vi) outermost regions; (vii) mountainous regions; (viii) coastal regions, and; (ix) regions in industrial transition.

Eventually, all the resulting typologies will be validated on case studies, in collaboration with Task 2.4, and will be characterised according to their inner specificities. The main objective of this duty is to produce a coherent storyline for each typology on which some specific conclusions can be drawn. The ultimate goal of this strategy is to base the policy recommendations of Task 2.5 on the specific features shown by each typology, paying special attention to the different types of territories included in the standard ESPON regional typologies and putting special emphasis on remote regions.

Subtask 2.3.2 Assessment of economic, environmental and social implications of Green Economy deals with the characterisation of fundamental territorial potentials of the different regional typologies generated by previous subtask. The foreseen methodology for this activity will be mainly based on qualitative multi-criteria approach conducted under a traditional SWOT analysis or equivalent methods. This analysis will take into account specific regional performance contexts, such as (i) performance regions involved in transitions towards a greener economy, and (ii) backwarded regions in the need of a (greener) growth for catching-up with the more developed territories.

An additional output of this subtask could be a quantitative analysis on the potential share that EGSS might have in regional economies. If relevant, this could be achieved basing on a classification of the green products that will grow and those which will decline in the transition to a green economy by subtracting the EGSS list. Subsequently, the PRODCOM database could be used to calculate shares of these products by industrial GVA/employment at the member state/NACE 2 digit level. Finally, the Structural Business Statistics (SBS) database on NACE2 digit could be used to calculate the potential share of these growth/decline groups in the regional economy, provided that the regional industries have the same capacity to produce those goods as the industries at Member state level.

This method would allow for discussing alternative calculations of the potential according to the regions with highest/lowest share in each industry, but it will be implemented only under specific and concurrent circumstances, namely: (i) the previous qualitative analysis was considered to be insufficient for producing a comprehensive characterisation of green economy potentials at the regional level, and; (ii) the data needed to perform the analysis are accessible and have the necessary degree of quality in terms of coverage and comparability.

2.4. Case studies (Task 2.4)

The case studies should paint a full and integrated picture of green economy in the selected regions reflecting its complexity. They should also test hypothesis and validate different typologies. More specifically, case studies will provide feedback on Tasks 2.1, 2.2.2, 2.2.4, 2.3.1 and 2.3.2.

The case studies will also provide a narrative of how green economy actually works in a region. They will analyse all those factors, drivers and conditions which provide a regional dimension to the green economy (link to Task 2.1).

This narrative will try to capture complex sectoral interrelations through concrete territorial examples (link to Task 2.2.2).

The case studies will also analyse the territorial and non-territorial drivers and enablers and assess how they worked and interacted in the particular regions (link to Task 2.2.4). Assuming that green economy is driven by a complex system of drivers and enablers the authors of the case studies will attempt to assign efficiency criteria to those drivers and enablers. They will also try to build a storyline on how drivers and enablers interact and interfere with each other.

The case studies will also be the main instrument to test the definition of regional typologies. In fact, territorial diversity will be one of the criteria for case study selection.

Finally, the case studies will be closely linked to Task 2.3.2 Assessment of economic, environmental and social implications of green economy. The authors will analyse the size of the different sectors and subsectors, their current economic role as well as potential for growth. The analysis will also attempt to estimate the positive environmental impact from current green economy development and growth perspectives.

The following table shows the criteria for case studies selection:

Criteria	Comment
Geographical diversity	The team will try to have a diverse mixture of Case Study regions in terms of East-West and North-South.
Drivers and enabling strategies	Case Study regions will represent a mixture of different leading drivers and enabling strategies.
Territorial diversity	Territorial diversity will be an additional selection criterion. This will ensure that most of the regional typologies in terms of regional potential for green economy to be produced in a latter phase of the project are covered by our Case Study regions.
Data availability	Case Study regions will be selected taking into account data availability. In this respect, a compromise between the requirements of this criterion and the previous ones will be sought.

Table 1. Criteria for Case Study selection

2.5. Policy analysis (Task 2.5)

From the policy perspective, the actual number of directives and regulations at the different spatial levels that are potentially linked to the greening of the economy in any given European territory is by far too large to allow for detailed analysis. Accordingly, GREECO project will focus mainly on those relevant policies implemented at the European level with a direct impact on green activities in general and on any of the economic sectors under analysis in particular.

As a first approach (to be confirmed at the Interim Report), GREECO's strategy on policy analysis focuses on the development of non-binding set of policy options and recommendations to be used by decision-makers, based on available information and experts' judgement on different policy options already in place and the research to be carried out in relation to the territorial dimension of green economy. From a methodological point of view, the policy alternatives will be produced according to a number of consecutive steps shown in Figure 2.

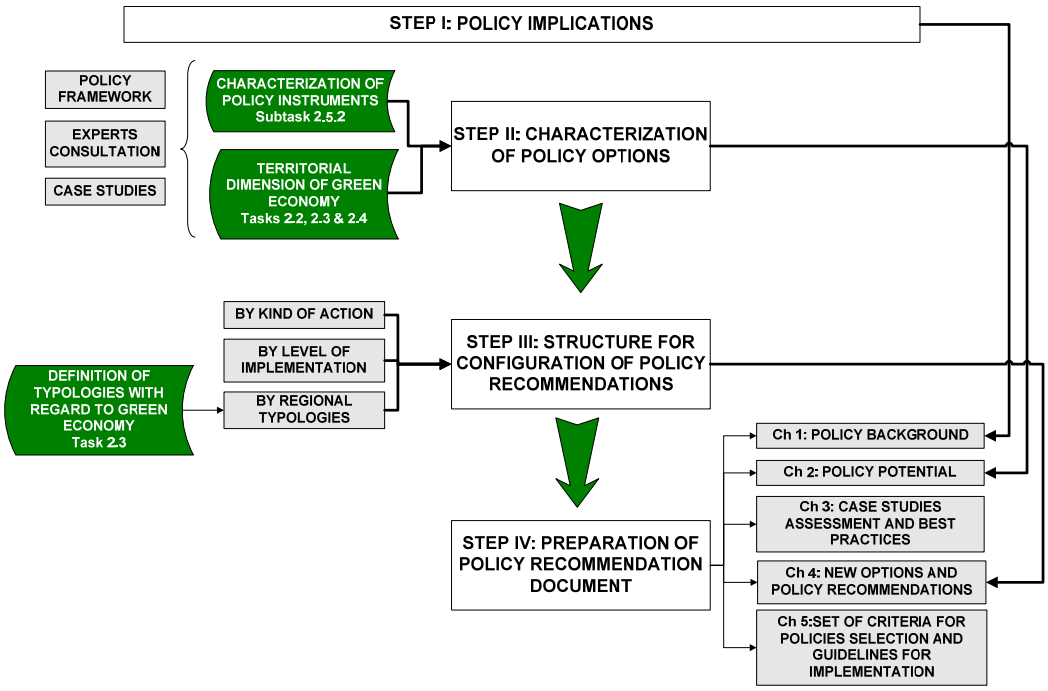

Figure 2. GREECO strategy towards the formulation of policy options

In this context, **Subtask 2.5.1** deals with the **Identification of green economy policy implications** and it will cover the first step of the methodological framework. The second step will be the **Characterization of policy instruments/tools** (**Subtask 2.5.2**), which will be done by a catalogue of policy instruments and options that are in use or planned in the EU member states, as well as a collection of suitable indicators and data related to them. A third step will produce a framework for the definition of policy recommendations (**Subtask 2.5.3. Policy recommendations**) tailored to each typology defined in Task 2.3. Policies will be structured around three aspects:

- By regional typologies.
- By level of implementation.
- By type of action.

All the recommended policies will be jointly discussed both with ESPON programme and policy makers coming from different territorial contexts during the entire project development. In this line, a formal consultation with policy makers during the first year of the project implementation will be planned in order to check if the selected sectors and the envisaged project outputs are in line with the recent policy framework and the needs expressed by policy makers. Policy alternatives will be eventually validated at regional level at a workshop with regional and local authorities during the conclusive phase of the project.

The last step will deal with the preparation of a policy recommendation document that will include a number of policy options and recommendations focusing mainly on key policy questions such as:

- Priority investing and spending in territories and sectors.
- Taxation and market-based instruments.

- Preliminary qualitative analysis of the policy effectiveness of several alternatives.
- Regulatory frameworks at different spatial levels.
- Multi-level governance mechanisms that might contribute fostering green economies.

In addition, this document will (i) give guidance on policy options and recommendations at the European level for boosting green development, and (ii) make inputs to further design a methodology to allow policy makers to implement recommendations and options at regional level.

2.6. Hypothesis for further investigation

Included in the project are – to the extend data availability allows – a number of issues enabling a more in-depth understanding of new research approaches towards the analysis of the green economy. These could provide additional value both to this project as well as future ESPON projects. This include issues such as environmentally extended input-output-models, material flow analysis and the eco-system service approaches as well as assessing the environmental dimension of green economies. The possibility of developing some of these elements in the report during completion of one of the case studies is under consideration, taking into account that these issues are out of the scope and can not be considered objectives of the project. Alongside indicative results to be presented in this project this could also serve as background for the reflection on those topics in future projects.

A number of emerging approaches to the scientific analysis of the linkages between economy and nature in general, and value chains and intermediate production chains in particular, will be examined based on a literature review and a possible exploratory inclusion into one of the case studies. They include, in particular (i) environmentally extended input-output-models; (ii) material and energy flow analysis; (iii) Life cycle analysis; (iv) eco-system service approaches, and; (v) ecological footprint and impact assessment. These approaches are important analytical approaches in the OECD and EU statistical frameworks for analyzing the transition to a green economy. Thus, their applicability at the regional level will be addressed in an exploratory way in the project. In particular, it is part of the task to consider their usefulness in the GREECO case studies, and to consider the potentials for future ESPON-projects on the provision of primary data and statistics for such analysis.

There are different analytical approaches which could be applied to study the wider impacts on the environment (as well as the economy and society) from production and consumption activities in society, and on a regional level. Standard general equilibrium models can be extended to take into consideration the environmental impacts of consumption and production patterns. These models are in their simplest and most available form known as input-output models which build directly on the national accounts. These models can be extended in the sense that they are combined with environmental accounts and detailed data on emissions, waste and resource use.

Specific approaches have also been developed to trace out the impacts in a wider environmental perspective of our overall consumption and of specific products. For instance, life cycle analysis (LCA) focuses on a specific product

and investigates the full effect from the cradle to the grave (or possibly ending with recycling of the product).

An ecological footprint on the other hand focuses on the overall consumption of a person, city or country and maps that consumption in relation to land use or some other measure related to resources, waste, other emission absorption, etc. The ecological footprint takes into account imports and exports, but not the indirect effects through the whole supply chain like the input-output analysis.

In comparison, LCAs are suitable when it comes to determine the environmental impact of some specific product, since the analyses are extremely detailed. However, it is practically impossible to extend the LCA to the overall general equilibrium perspective of an input-output table, since the data demands become basically to high. The input-output analysis, on the other hand, cannot be used as a substitution for LCA, since the IO only gives an average value of the pressure caused by a whole product group, whereas a LCA analyses a specific product.

From the above one may conclude that if the intention is to study the impact of sectors in the economy, and to extend this to the regional level, the most accessible approach which can be applied in most European countries is probably the extended IO approach. This approach is further elaborated upon in an appendix (Annex 3) to this inception report.

3. Analysis of the relevant information and data availability

The methodological approach adopted by GREECO in respect to data collection will be as straightforward as possible. The project will rely mainly on already available figures and will adopt a flexible quantitative/qualitative strategy for data management and interpretation. Along this line, GREECO will contribute to enhance the state of the art with regard to the interpretation of the territorial implications of green economy through the production of specific indicators and regional typologies. These outputs could be included at the upper level of the information pyramid for environment statistics represented in Figure 3.

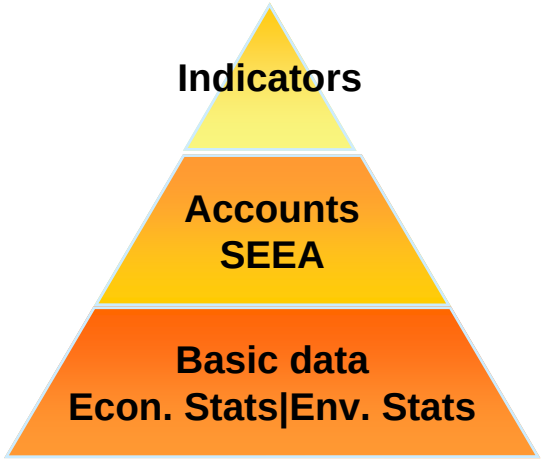

Figure 3. The information pyramid for environment statistics

3.1. Analysis of relevant information

The most important task with regard to data collection will be to identify relevant primary data at NUTS2+ levels, that is, NUTS2-3 (≈TL2-3 in the OECD classification) and, to a limited extent LAU1-2 (previously NUTS4-5). Also

continuous datasets might be considered, if relevant. For instance, the European Pollutant Release and Transfer Register European (E-PRTRE) are available at 5x5km grid and NUTS3 levels and other CORINE datasets are available at similar territorial levels. Other spatial information as to greenhouse gas emissions is available from the Covenant of Mayors and similar programmes. The INSPIRE framework for spatial data will in a few years provide continuously updated pan-European datasets on environmental issues.

Table 2 shows a preliminary list of the indicators and data sources that will be taken into account in the analysis conducted by GREECO. For further details, please see Annex 1 to this Inception Report.

Economic activities	**Green/other goods and services**	**Concepts and indicators**	**Economic data at NUTS2/NACE 6**	**Environmental data at NUTS2 levels**
Inputs	Labour	Productivity and capacity, composition	EUROSTAT	CEDEFOP?
	Fixed capital		EUROSTAT	EUROSTAT (vehicles, infrastr)
	Land and resources	Rent and intensity, HANPP, resource potentials/use	EUROSTAT, CORINE	CORINE (->INSPIRE)
	Energy and materials	Eco- and resource efficiency	EUROSTAT	Emissions and waste, E-PETR
Production process		(Green) NVA	(NVA, knowledge)	
Outputs	For consumption	Potential and challenge, NVA/value of production, footprints	EGS classified by CEPA and CReMA activities (EUROSTAT Environment database and SBS)	Organic agriculture, aquaculture etc
	For investment			Cleantech, waste and wastewater treatment,...
Products		Shares of green products at the industrial GVA/employment	PRODCOM OECD, EUROSTAT OECD, EUROSTAT	Programmes and roadmaps CORINE
Consumption & well-being	Economic	Subjective well-being, composite indices		
	Environmental			
Investment and thresholds	Economic	Investment needs		
	Environmental	Critical natural capital		

Table 2. Tentative list of possible sources of regional data on economic and geophysical data relating to economic activities, goods and services at regional levels.

The usefulness of these data sources for the purposes of the GREECO project depends on the territorial level of the primary data on which they are based and the opportunities for deriving estimates of indicators of regional statistics. The task will include an assessment of the opportunities for extra- or interpolation of data to more detailed territorial levels while maintaining their information content as to regional disparities, as detailed in the following section.

3.2. Data availability

As evidenced by the direct contacts held so far with different official data suppliers and producers across Europe (i.e. EUROSTAT, EEA) and the UN level (UNEP), usable data allowing for a proper characterisation of green economy is a rather scarce resource. On the contrary, data issues are recurrent under a three-fold appearance:

- Firstly, comparable data at the European level allowing for a complete sectoral characterisation of green activities at the national level is virtually non-existing. The only data source that could be listed here is the survey of EGSS that EUROSTAT has launched in January 2011 (to be issued later this year). This database will provide a classification of EGS by NACEs codes up to 2 digits (division) for NACE A-F and mixed digits (sections and sometimes divisions) for NACE G–U, with a limited geographical coverage. According to the EUROSTAT experts, the dataset will allegedly be available for 9 to 15 European countries. Therefore, this dataset, despite being detailed enough for delivering a broad description of the EGSS in Europe, does not provide enough information as to perform a detailed characterisation of the green economy from a sectoral perspective.
- Secondly, to the best of our knowledge only a few countries (e.g. Sweden, the Netherlands and Austria) have produced regional (NUTS2+) databases focusing on green activities, though using non comparable surveying and statistical techniques. This makes virtually impossible for GREECO's Task 2.2 – Characterisation of the regional dimension of the green economy – to hinge on already existing regional classifications of green activities.
- Thirdly, all the available data seem to have been collected in the last few years, thus within a very restricted time frame, which in the majority of cases prevents GREECO from analysing those datasets from a cross-temporal perspective, even at the national level. Again, this drawback makes virtually impossible for GREECO project to include this dimension in the analysis but from a quite limited and indirect perspective.

The abovementioned limitations call for an innovative approach to data collection/production that could be partly based on indirect assessment methods. According to this principle, GREECO's TPG is currently discussing a preliminary approach for data acquisition/production at the regional level that foresees a two-step strategy depending on data availability at upper geographical scales:

- For those countries with available figures for EGSS at the national level, the available datasets could be downscaled to the regional level (NUTS2) by means of statistical regression models, correlating national EGSS figures with a selection of potential drivers for which data both at the national and regional levels are available (i.e. the potential drivers identified in Subtask 2.2.4) It should be noted, however that this method assumes that spatial effects are not relevant within the national boundaries of each country (i.e. diverging regional behaviours of -green-economic sectors in the presence of similar enabling conditions), which might be a fair assumption given the circumstances but it is also a quite venturous one.
- For those countries lacking EGSS data, one could assume that the same type of statistical correlation found in the previous case holds true

wherever in Europe the model is applied. Again, this assumes the presence of spatial structural stability across Europe (i.e. spatial heteroskedasticity is not present in the coefficients of the regression model) which is again a bold assumption, but the strategy could be useful as a way to deal with data availability (or the lack thereof).

As it has been said before, the GREECO project will analyse the soundness and viability of implementing this method to countries with no data about green economy, in order to be fully implemented, if relevant, or to limit the analysis to countries with existing data, analysing in the rest of the ESPON area only the presence of variables related to green economy potential (conditions, barriers and enables).

In any case, as shown in Figure 4, case studies would contribute to the fine-tuning of the proposed models within the two data scenarios described above, either through validation of the modelling exercise or through provision of raw data, if needed.

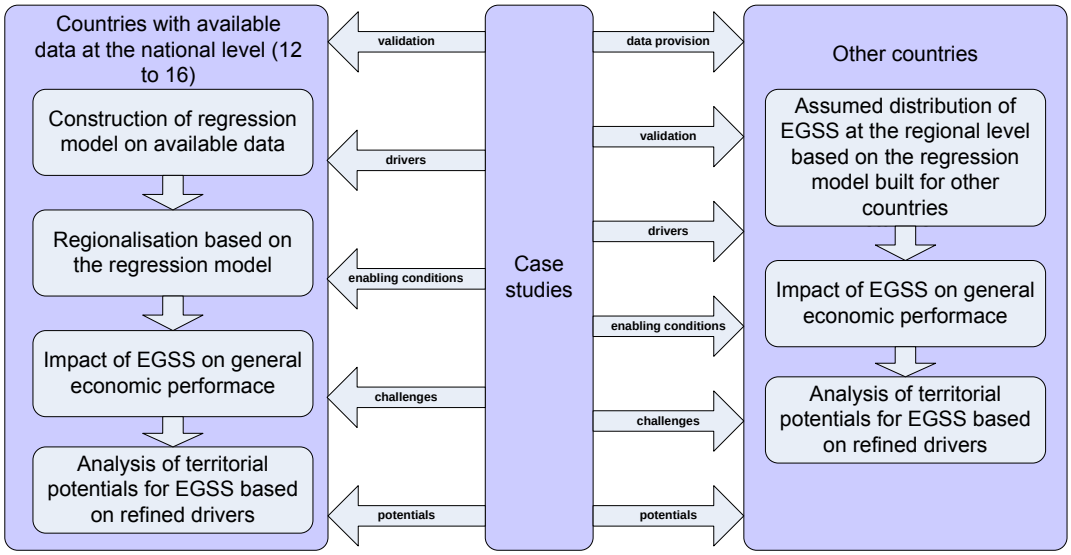

Figure 4. Preliminary approach for data acquisition at the regional level

All this methodological outline for data collection/regionalisation/extrapolation could be potentially applied to most EU-27 Member states as well as to those ESPON countries not included in the EU for which comparable datasets exist (essentially, those areas covered by EUROSTAT and ESPON statistical datasets). According to the preliminary data assessment conducted, on the EU candidate countries, the Western Balkans and Turkey non comparable datasets could be found, so those areas will fall outside the geographical coverage of GREECO.

Anyhow, the production of a simplified regional database of green activities at the EU-27/ESPON levels is seen within GREECO as a desirable intermediate output of the project but not as an unavoidable step towards a sound assessment of regional potentials for a greener economy, which remains the main objective of GREECO project and should not rely on EGSS data availability.

In principle, and as far as the temporal dimension is concerned, GREECO will avoid projecting available data, as this would mainly imply extrapolating figures that are mostly assumed, even if this entails relying mainly on a snapshot of the current state of green economy within regions. To avoid this biased approach, GREECO will capture the time dimension of the green economy at the national/EU level whenever possible and assume that the dynamic behaviour of specific sectors at the regional level for which temporal series are available is coherent with the green activities included in them.

4. Overview of the plan, expected deliverables and outputs envisaged by the project

4.1. Work plan

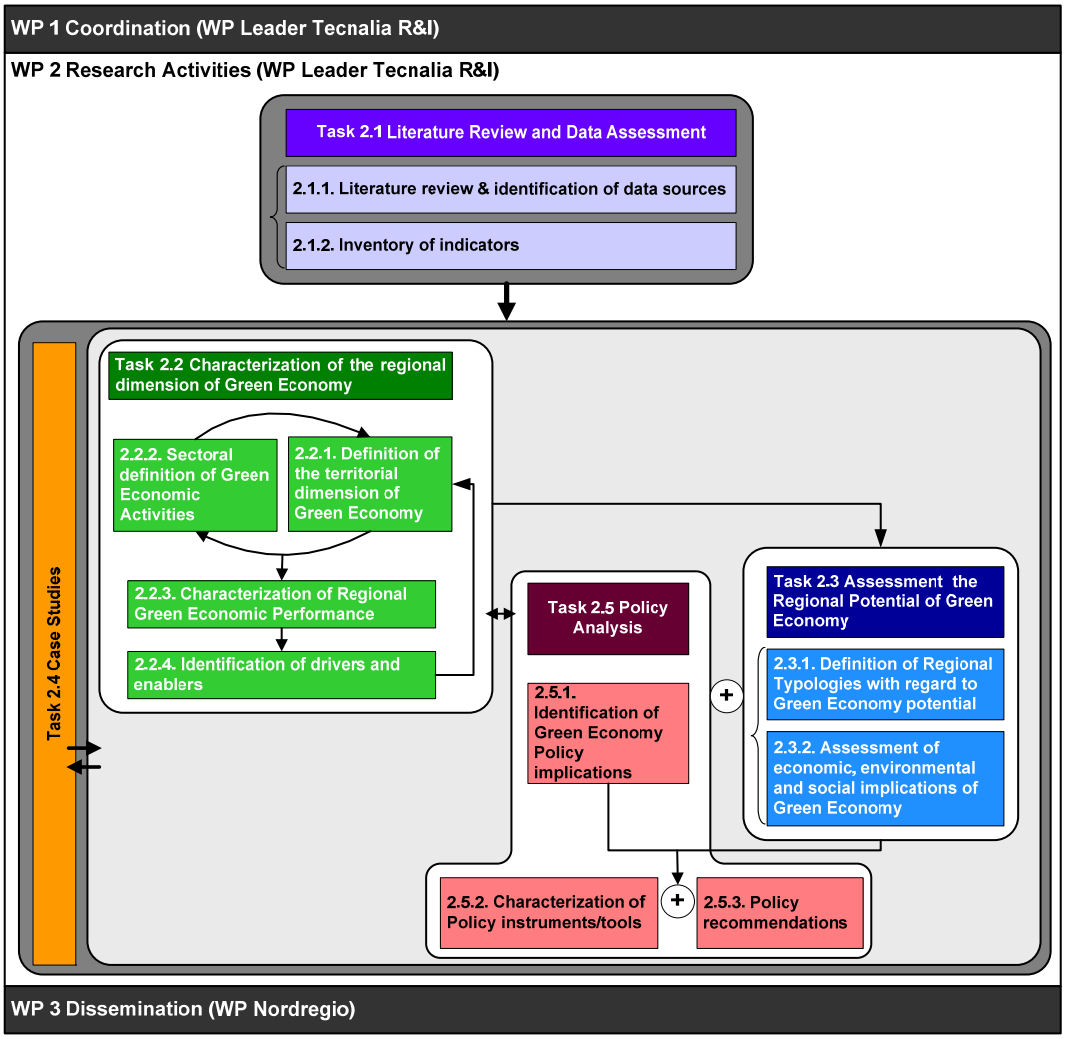

Figure 5. GREECO project structure

	Start date	End date	Duration
WP 1 Coordination	**September 2011**	**November 2014**	**39 months**
WP2 Activities	**September 2011**	**October 2013**	**26 months**
Task 2.1 Literature review and data assessment	September 2011	February 2012	6 months
Task 2.2 Characterization of the regional dimension of GE	January 2012	December 2012	12 months
Task 2.3 Assessment of the regional potential of GE	September 2012	May 2013	9 months
Task 2.4 Case studies	October 2012	May 2013	8 months
Task 2.5 Policy Analysis	September 2011	September 2013	11 months
WP 3 Dissemination	**November 2013**	**April 2014**	**6 months**

Table 3. GREECO project time plan

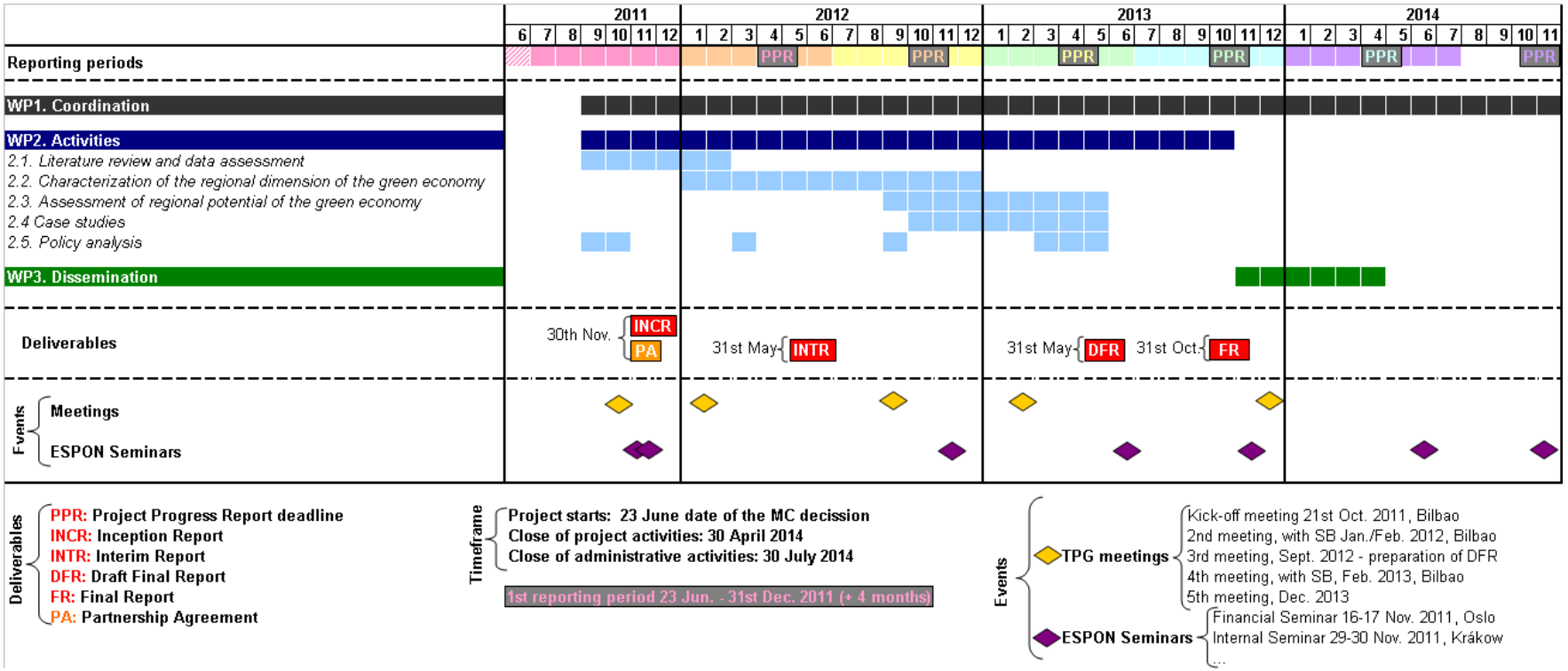

Figure 6. GREECO project chronogram4.2. Expected deliverables and main outputs of the project

4.2. Expected deliverables

Task within WP2 Activities	Inception Report 30th November 2011	Interim Report 31st May 2012	Final Report 31st October 2011
Task 2.1. Literature review and data assessment	Preliminary classification of main data and literature resources A preliminary list of territorial indicators on the green economy that will be produced and mapped within the project Description on the findings regarding the assessment of the data situation in EU candidate countries, the Western Balkans and Turkey	Comprehensive literature review Data collection achieved, including an overview on statistical and geographical data collected by EUROSTAT and national Statistical Institutes etc Preliminary results on the basis of available territorial indicators, including draft European maps	Literature and methodology/theory used Data collected and indicators used, including tables with the exact values of indicators Maps produced in support of the results, covering the territory of EU 27, Iceland, Liechtenstein, Norway and Switzerland
Task 2.2. Characterization of the regional dimension of the green economy	A selection of sectors and cross-cutting green economic activities. Preliminary characterisation of the green sectors under analysis	An overview on concepts and methodology on assessing the territorial dimension of the green economy and possible final results. Description of green economic activities that include territorial aspects based on the literature review Description of the technique/methodology/indicators/models to be used to detect and approach the territorial dimension of the green economy and pilot characterisation of green economies in Europe Preliminary identification of regional drivers and enablers of the green economy	Models and other tools used or developed In depth characterisation of green economies in Europe Final identification and preliminary assessment of regional drivers and enablers of the green economy
Task 2.3. Assessment of regional potential of the green economy	Outline on how the TPG envisages making use of existing ESPON and other results that are relevant for this project	Overview on how the TPG intends to finally assess (measure) regional potentials for a greener economy, given the nature of the outputs gathered from tasks 2.1 and 2.2	Typologies of European regions based on green economy performance and production of maps with European coverage Assessment of territorial green economic performance, in social, economic and environmental terms Evaluation of the proposed typologies through a

Task within WP2 Activities	Inception Report 30th November 2011	Interim Report 31st May 2012	Final Report 31st October 2011
			SWOT or similar analysis
Task 2.4 Case studies	Presentation of the procedure to select the case studies and the methodology to analyse them	Presentation of the selection of geographically distributed case studies that will be analysed as well as elaboration and first preliminary results	Detailed description of the case studies Good practices at the regional/local level impacting the development a greener economy Key policy areas impacting environmental, economic and social behaviours The financial instruments and investments impacting on the development of green economies Additional data on the regions or metropolitan areas that cannot be analysed with indirect methodologies
Task 2.5. Policy analysis	Preliminary characterisation of the policy framework (green papers and directives issued by the Commission) impacting on the green sectors under analysis	First indications on the conclusions and policy relevant options envisaged for the project	Roadmap for policy implementation and on the further research avenue to follow, including further data requirements and ideas of territorial indicators, concepts and typologies as well as on further developments linked to the database and mapping facilities, including: • Guidance on policy options and recommendations at European level for fostering green development • Inputs for a methodology to allow policy makers implement recommendations and options at regional level

Table 4. Project output by deliverables and tasks

4.3. Expected outputs

Research questions		Challenges	Data sources	Methods	Range and limitations
What is the state and perspectives of the green economy within European regions?	Which (types of) regions and cities attract a high amount of green economic activities and possess potential to stimulate the development of the green economy? What factors have promoted or held back green economy development in those regions?	Identifying types of territories, regions and cities that share common development challenges and are affected most (positively or negatively) by the identified structures, trends, perspectives and/or policy impacts.	EEA, EUROSTAT and Member states databases, sectoral and international reports. Data collected on case studies	Mixed quantitative and qualitative	European coverage only if statistically possible and relevant for the project. However, the analysis about the state of green economy will be developed at least in 12 countries for which EUROSTAT can provide data Only a subset of green activities (the ones contributing the most to GVA and employment within each sector under analysis) will be considered
	In which economic, environmental and social areas territorial conflicts might arise due to the development of the green economy?	Providing comparable regionalised information on territorial potentials, and possible policy options for making use of opportunities inherent in territorial structures; anticipating and counter balancing negative trends and structures, taking into account the diversity of the ESPON territory and considering institutional, instrumental and procedural aspects.			
What is the territorial dimension of the green economy?	How can the green economy be defined from a territorial point of view?	Build new evidence based on comparable information about European regions and cities, including information on dynamics and flows, and covering the entire territory of EU 27, Iceland, Liechtenstein, Norway and Switzerland.	EEA, EUROSTAT and Member states databases, sectoral and international reports. Data collected on case studies	Mixed quantitative and qualitative	Taking into account the aforementioned limitations, indicators about the territorial dimension of green economies will be produced with European coverage (ESPON area) at regional level
	What are key areas of green economic activities seen from a territorial point of view?				
	What territorially relevant quantitative economic, environmental as well as social data and indicators are available? How can green economic activities be measured from a territorial point of view (e.g. share of green economy of total economy, share in GDP, share of jobs, share of the				

Research questions		Challenges	Data sources	Methods	Range and limitations
	workforce)?				
How can regional / local territorial policy strategies and actions contribute to a greener economy?	Which key policy areas need to be considered from a territorial point of view when dealing with the green economy?	Addressing major territorial challenges and political priorities providing comparable information covering the entire European territory, its regions and cities.	Case studies, literature review, feedback from key stakeholders, output of previous tasks, etc.	Qualitative: interviews, workshops, questionnaires, etc.	Inventory of relevant policy alternatives to enhance regional transitions towards a greener economy, as far as possible targeted to each regional typology, and structured by level of implementation and type of action
	What scope is there for specifically territorial interventions (e.g. economic restructuring, land use changes, new network connections, urban-rural relations, corridor development etc) to help create and sustain a greener economy?				
	How can territorial development and territorial cohesion help the green economic sector, and vice versa?				
	Which policy instruments (financial, regulatory, communicative) within territorial cohesion and development policies are useful to support green growth?	Supporting the use of and dissemination of makers, practitioners, scientist and experts			
	What good practices of territorial development strategies supporting the green economy can be found at multiple levels, i.e. local, regional, national and European?	Contributing to the further identification of structures within the EU territory that represent options for exploring comparative advantages and provide synergy through territorial cooperation arrangements, involving regions and/or cities.			
	Into which direction should territorial development be guided in order to create favourable preconditions for the development of a greener economy?				

Table 5. Expected outputs of GREECO by research questions and range

5. Distribution of tasks among partners

		LP	P2	P3	P4	P5
WP1	Coordination	L	P			
T 1.1	Research Coordination	L	P			
T 1.2	Financial management and control	L				
WP2	Research Activities	L	P	P	P	P
T 2.1	Literature Review and Data Assessment	P	P	P		L
ST 2.1.1	Literature review and identification of data sources	P	P			L
ST 2.1.2	Inventory of indicators	P	L	P		P
T 2.2	Characterization of the Regional dimension of Green Economy	P	L	P	P	P
ST 2.2.1	Definition of the territorial dimension of Green Economy	P	L		P	P
ST 2.2.2	Sectoral definition of Green Economic Activities	P	P	P	P	L
ST 2.2.3	Characterization of Regional Green Economic Performance	P	P	L	P	P
ST 2.2.4	Identification of drivers and enablers	L	P		P	
T 2.3	Assessment of Regional Potential of Green Economy	L	P	P	P	P
ST 2.3.1	Definition of Regional Typologies with regard to Green Economy	L	P	P	P	P
ST 2.3.2	Assessment of economic, environmental and social implications of Green Economy	L	P		P	P
T 2.4	Case studies	P	P	P	L	P
T 2.5	Policy Analysis	L	P	P	P	P
ST 2.5.1	Identification of Green Economy Policy Implications	P	P		L	
ST 2.5.2	Characterization of Policy instruments/tools	L	P		P	
ST 2.5.3	Policy recommendations	L	P	P	P	P
WP3	Dissemination	P	L			

Table 6. Distribution of work packages among partners

6. Barriers for project implementation

A potential barrier for project implementation for research projects dealing with new thematic fields is always the availability of proper data at an appropriate spatial unit. This is also true for the topic of Green Economy.

As shown in Section 3, the project has made a first assessment on the availability of relevant information and in particular on the availability of appropriate data. Very important for this assessment was the establishment of a close cooperation with data providers, in particular with the EEA and EUROSTAT. The preliminary result is that there are some data sources available that could be of high potential to support the research work of GREECO, but also that in general the data situation is not so that all ESPON space is covered at sufficient regional detail with appropriate data. Section 3 contains also proposals how the project is going to deal with lack of data for certain fields and/or for certain territories.

In conclusion, it has to be recognised that data availability is a potential barrier. However, the TPG does not see this as an obstacle for the implementation of the GREECO project that cannot be overcome by appropriate and innovative approaches as indicated.

ESPON

GREECO
Territorial Potentials for a Greener Economy

Applied Research 2013/1/20

Inception Report | Version 30/11/2011

Annex 1 | Preliminary list of territorial indicators included in the analysis

EUROPEAN UNION
Part-financed by the European Regional Development Fund
INVESTING IN YOUR FUTURE

A1.1. Preliminary list of territorial indicators included in the analysis

Polycentric development and settlement models

Indicator	Geographical scale	Source	Time frame
Morphological and Functional Urban Areas	-	ESPON DB	2006
% population in FUA	-	ESPON DB	2006
% effective FUA pop change	-	ESPON DB	01-06
Compactness (MUApop/FUA pop)	-	ESPON DB	2001
Additional indicators to be defined	-	-	-

Social affairs and living conditions

Indicator	Geographical scale	Source	Time frame
Population density	NUTS 3, Lau 1/2	EUROSTAT, National Statistical Institutes	2000-2009
Net migration, natural growth, total growth	NUTS 3	EUROSTAT, ESPON DB/Demipher Project	2000-2009
Total fertility rate	NUTS 2	EUROSTAT	1997-2009
Young age dependency rate	NUTS 3	EUROSTAT	2009
Old age dependency rate	NUTS 3	EUROSTAT	2009
Ageing index	NUTS 3	EUROSTAT	2009
Beds in hospital	NUTS 3	ESPON DB	2005
Disposable income per inhabitant	NUTS 2	ESPON DB	2005
Additional living condition indexes to be defined	-	-	-

Patterns of urban-rural relationship and rural characteristics

Variable name	Geographical scale	Source	Time frame
Change urban fabric	NUTS 3	CORINE	2000-2006
Agricultural areas	NUTS 3	ESPON DB	1990; 2000; 2006
Urban-rural typology	NUTS 3	ESPON DB/ Eurostat	
Urbanization of natural areas	NUTS 3	Own production, based on the CORINE data	2000-2006
Gross value added in forestry and fishing	NUTS 3	EUROSTAT	1997-2008

Employment in forestry and fishing	NUTS 3	EUROSTAT	1997-2008
Additional indicators to be defined	-	-	-

Regional levels of accessibility & connectivity

Variable name	Geographical scale	Source	Time frame
Potential accessibility road, rail, air indexed to ESPON average	NUTS 3	ESPON DB	2001;2006
Potential accessibility road, rail, air index change 2001-2006	NUTS 3	ESPON DB	2001;2006
Households with broadband connection	NUTS 2	European Comission 5th Cohesion	2009
Composite indicator on the Internet infrastructure	NUTS 2	ESPON DB	2008
Additional indicators to be defined	-	-	-

Gothenburg and Lisbon/Europe 2020 strategy

Variable name	Geographical scale	Source	Time frame
Economy and employment			
GDP per capita	NUTS 3	EUROSTAT, ESPON (ULYSSES project)	1997-2009
Catching up analysis			
Indexed to leader			
Coefficient of deviation			
Gross value added by NACE	NUTS 3	EUROSTAT	1997-2008
Employment by NACE	NUTS 3	EUROSTAT	2000-2008
Innovation and research			
GERD, HERD, BERD	NUTS 2	EUROSTAT	2007
Employment in medium and high tech manufacturing	NUTS 2	ESPON DB (Regional Innovation Scoreboard)	2004
EPO Patents by per million of inhabitants	NUTS 2	EUROSTAT	2007
Social cohesion			
Long term unemployment	NUTS 2	EUROSTAT	2009
Unemployment rate	NUTS 3	EUROSTAT	2010
Youth unemployment rate	NUTS 3	EUROSTAT	2010
Population at risk of poverty after social transfer	NUTS 3	EUROSTAT	2008
Environment			
Share of Natura 2000 areas	NUTS 3	European Commission's 5th Cohesion Report	2009
Solar energy resources	NUTS 3	EC 5th Cohesion Report	1981-1990
Wind energy potential	NUTS 3	EC 5th Cohesion Report	2000-2005

Ozone concentration exceedances	NUTS 3	EC 5th Cohesion Report	2008
Urban waste water treatment	NUTS 2	EC 5th Cohesion Report	2007
Soil sealed area	NUTS 3	EC 5th Cohesion Report	2006
Regional sensitivity to climate change (cultural, economic, environmental, cultural)	NUTS 3	ESPON DB	1961-1990; 2071-2100

Integrative indices and typologies

Variable name	Geographical scale	Source	Time frame
ESPON CU Typology compilation	NUTS 3	ESPON DB	2006
Additional indicators to be defined	-	-	-

Land use and land cover types

Variable name	Geographical scale	Source	Time frame
Land use data	NUTS 3	ESPON DB	1990-2000-2006
Additional indicators to be defined	-	-	-

Energy production and consumption patterns

Variable name	Geographical scale	Source	Time frame
Energy : primary production and final consumption - 1 000 toe (env_rpep)	NUTS2	EUROSTAT	Annual
Photovoltaic potential	NUTS 3	ESPON DB	1990-2000-2006
Wind energy potential	NUTS 3	ESPON DB	1990-2000-2006
% of GVA depending of energy intensive industries	NUTS 2	ESPON DB	2005
% of employment in industries with high energy spending	NUTS 2	ESPON DB	2005
% of employment in industries with high energy purchases in NACE D	NUTS 2	ESPON DB	2005
Fuel costs as % of GDP	NUTS 2	ESPON DB	2005
Gross value added in energy intensive industries	NUTS 2	ESPON DB	2005
Classification of Oil-SUM values	NUTS 3	ESPON DB	2002
Additional indicators to be defined	-	-	-

Transport and flows

Variable name	Geographical scale	Source	Time frame
Traffic in commercial airports	NUTS 2	ESPON DB	2005
Passengers embarked and disembarked /total regional population	NUTS 2	ESPON DB	2005
Additional indicators to be defined	-	-	-

Complete territorial economic profiles

Variable name	Geographical scale	Source	Time frame
Gross domestic product indicators - ESA95 (nama_r_gdp)			
Gross domestic product (GDP) at current market prices	NUTS2 (nama_r_e2gdp) NUTS3 (nama_r_e3gdp)	EUROSTAT	Annual
Real growth rate of regional gross value added (GVA) at basic prices - percentage change on previous year (nama_r_e2grgdp)	NUTS 2	EUROSTAT	Annual
Dispersion of regional GDP (nama_r_e0digdp)	NUTS 2 and 3	EUROSTAT	Annual
Branch accounts - ESA95 (nama_r_brch)			
Gross fixed capital formation (nama_r_e2gfcf)	NUTS 2	EUROSTAT	Annual
Compensation of employees (nama_r_e2rem)	NUTS 2	EUROSTAT	Annual
Employment (in hours worked) (nama_r_e2emp95hw)	NUTS 2	EUROSTAT	Annual
Gross value added at basic prices (nama_r_e3vabp95)	NUTS 3	EUROSTAT	Annual
Employment (in persons) (nama_r_e3empl95)	NUTS 3	EUROSTAT	Annual
Household accounts - ESA95 (nama_r_hh)			
Allocation of primary income account of households (nama_r_ehh2p)	NUTS 2	EUROSTAT	Annual
Secondary distribution of income account of households (nama_r_ehh2s)	NUTS 2	EUROSTAT	Annual
Income of households (nama_r_ehh2inc)	NUTS 2	EUROSTAT	Annual
Regional structural business statistics (reg_sbs)			
Number of units, wages and salaries, persons employed, growth employment rate and share of employment in manufacturing: by	NUTS 2	EUROSTAT	Annual

NACE Rev. 2 division level			

Environmental protection expenditure

Variable name	Geographical scale	Source	Time frame
Environmental protection expenditure (investments + current expenditure) by Industry (NACE Rev. 1.1 C+D+E) and Public sector	The coverage of the regional data on EPE include the following countries (NUTS 2): BG, CY, CZ, LV, PL, PT, RO, SI, SK (both industry and public sector included)+ BE, IT, LU, TR (only public sector) + EE, DE, ES, LT (only industry) + HR (only EXP I reported)	EUROSTAT	Data are now in the validation procedure. For the public sector, data will be published most probably by the end of 2011, while for the industry sector, the quality of the data is not good enough to publish the figures at this point in time
Environmental protection expenditure (investments + current expenditure) by environmental domain: air, wastewater, waste, biodiversity and landscape and other domains			

EGSS - Data collection 2011

Variable name	Geographical scale	Source	Time frame
Environmental Goods and Service Sector statistics (EGSS)	NUTS 2	EUROSTAT	2011

Note:

The first official EGSS data collection has been launched in January 2011. The standard tables were distributed to EU Member States, EFTA and candidate countries, with a deadline set to 30 June 2011.

The tables included in the questionnaire were slightly modified compared to the tables that were sent to countries in 2009 when the pilot data collection took place. The rationale of the changes in the EGSS standard tables comes from the need to ensure comparability with the national accounts, and in particular with the supply-use tables.

Replies for the 2011 data collection - EGSS current reporting countries (including countries that reported for the first time; data will be published later this year): BE, FR, SE, RO, FI, DE, LV, CZ, LT, ES, AT, NL, IT, NO, PL, PT.

On website: EGSS countries that can be potentially used for the purposes of the Greeco project (data available on Eurostat data base at total NACE): AT, BE, FR, DE, NL, PT, RO, SE.

Eco-innovation

Variable name	Geographical scale	Source	Time frame
Community Innovation Survey (CIS)	NUTS 0	EUROSTAT	2008

CIS 2008 collected information about product and process innovations, organisational and marketing innovation and other key variables over the three-year period 2006 to 2008 inclusive. Most of the questions covered new or significantly improved goods or services or the use of new or significantly improved processes, logistics or distribution methods. It produced a broad set of indicators on innovation activities, innovation expenditure, public funding, and sources of information for innovation, innovation cooperation, innovation objectives, organisational and marketing innovations and innovations with environmental benefits.

CIS 2008 was carried out based on NACE Rev. 2 in all 27 Member States, plus Croatia, Turkey, Iceland and Norway. Turkey reported data based on NACE Rev. 1.1. As for previous editions, EUROSTAT devised the harmonised survey questionnaire and the survey methodology in close cooperation with the participating countries. The result is a satisfactory level of harmonisation regarding data input and data production. This questionnaire included an optional one-page module on innovations with environmental benefits. The survey tried to capture through this module of the questionnaire, the beneficiaries of the eco-innovation (enterprise and customer), what type of measures is driving eco-innovations and whether companies have in place procedures to evaluate their environmental impact.

In contrast to previous CIS surveys based on NACE Rev.1.1, CIS 2008 used the NACE Rev.2 classification of economic activities, in accordance with Annex IV of Commission Regulation No 973/2007. The latest edition of CIS also introduced a new exhaustive definition of innovation that includes organisational and marketing innovation, in line with the third edition of the Oslo Manual. The target population of the CIS 2008 was the total population of enterprises in NACE Rev. 2 sections A to M, excluding NACE Rev. 2 industries sections O to U consisting of public administration, education, health and social work, arts, entertainment and recreation; other service activities (professional organisations and personal services), households and extraterritorial bodies.

The results of this survey which have been published on Eurostat data base in November 2010 could be used at national level to help identify the producers of adapted goods and integrated technologies and build up the EGSS population:

http://epp.eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/database

Other indicators	NUTS 0	DG Environment	2008

Main activities done at DG Environment related to eco-industries are:

- Eurobarometer survey "Attitudes of European entrepreneurs towards eco-innovation" – The objective of the survey was to investigate the behaviour, attitudes and expectations of entrepreneurs towards the development and uptake of eco-innovation as a response to rising prices of resources and resource scarcity. A total of 5,222 managers of SMEs in 27 EU Member States participated. The survey shows that material prices become an increasingly important cost component. The surveyed companies increasingly turn to eco-innovation (developing more efficient technologies in-house, optimizing supply chains, introducing recycling practices, etc.) as a response to this growing challenge. The survey will be launched March 22nd at the 10th European Forum on Eco-innovation in Birmingham, UK.

- Eco-innovation Observatory (EIO) – The EIO functions as a platform for the structured collection and analysis of an extensive range of eco-innovation information, data and statistics gathered from across the European Union. The Observatory will develop country reports on eco-innovation performance and an Eco-innovation Scoreboard for the EU27. The data and composite indicators the EIO uses are based on available ESTAT databases, CIS 2008 and the Eurobarometer study mentioned above.

The website of the project is: http://www.eco-innovation.eu

- European ETAP Fora on Eco-innovation – The 10th Forum will be held in Birmingham, UK March 22nd – 23rd 2011. The title of the Forum is "Towards a Resource Efficient Economy – From policy to action". The 9th ETAP Forum was held in Brussels in November 2010 under the title "Financing the eco-innovators".

For further details: http://ec.europa.eu/environment/etap/events/ecoinnovation_en.html

- Eco-innovation Action Plan – The Eco-innovation Action Plan will be a follow-up action under the Innovation Union and will address the eco-innovation specific bottlenecks and barriers. It will seek to mainstream eco-innovation aspects into other related policies in order to achieve environmental goals through eco-innovation. Foreseen date for adoption is Q2 2011.

Green jobs

Variable name	Geographical scale	Source	Time frame
Share of EGSS employment in total employment (in FTE)	NUTS 0	Employment Committee (EMCO) and DG Employment	2010?
Annual growth rate of EGSS employment in total employment (in FTE)	NUTS 0	Employment Committee (EMCO) and DG Employment	2010?
EGSS R&D Output as a percentage of total R&D expenditure	NUTS 0	Employment Committee (EMCO) and DG Employment	2010?

Climate change and other environmental concerns have become a major issue for the EU and its Member States. Green growth is an integral element of the Commission's proposal for the Europe 2020 strategy and green jobs is one of the main priorities. Against this background and as greening the economy has a major impact on labour markets; both the Employment Committee (EMCO) and DG Employment have taken a keen interest in the employment dimension of climate change and greening the economy.

The Employment Committee through a temporary working group looked deeper into policy and measurement issues concerning the employment dimension of tackling climate change. The main aims were to conceptualize the issue for the purposes of the European Employment Strategy, to look into possible data sources and indicators, and to investigate the main employment policy implications.

The group produced in November 2010 a report called "Towards a greener labour market – The employment dimension of tackling environmental challenges" which contains recommendations and a proposal of indicators, of which the ones relevant for EGSS are those listed above.

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Annex 2 | Preliminary characterisation of the green sectors under analysis

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A2.1. Foreseen green activities included within each sector

The following table shows a preliminary characterisation of the green activities belonging to each sector with the associated NACE codes (3 digits). All activities that might be considered totally or partially green are included in the table.

Sector	NACE codes (3 digits)	Name of activities
Agriculture and Food (Sustainable farming, sustainable fishing and processing of food (incl. packaging and distribution), ecological production processes, low input farming, ecological fish farming, etc.)	01.1 (Ecological activities only)	Growing of non-perennial crops
	01.2 (Ecological activities only)	Growing of perennial crops
	01.3 (Ecological activities only)	Plant propagation
	01.4 (Ecological activities only)	Animal production
	01.5 (Ecological activities only)	Mixed farming
	01.6 (Supportive to the above)	Support activities to agriculture and post-harvest crop activities
	01.7	Hunting, trapping and related service activities
	03.1 (Sustainable)	Fishing
	03.2 (Sustainable)	Aquaculture
	10.1 (of ecological inputs)	Processing and preserving of meat and production of meat products
	10.2 (of sustainable inputs)	Processing and preserving of fish, crustaceans and molluscs
	10.3 (of ecological inputs)	Processing and preserving of fruit and vegetables
	10.4 (of ecological inputs)	Manufacture of vegetable and animal oils and fats
	10.5 (of ecological inputs)	Manufacture of dairy products
	10.6 (of ecological inputs)	Manufacture of grain mill products, starches and starch products
	10.7 (of ecological inputs)	Manufacture of bakery and farinaceous products
	10.8 (of ecological inputs)	Manufacture of other food products
	10.9 (of ecological inputs)	Manufacture of prepared animal feeds
	11.0 (of ecological inputs)	Manufacture of beverages
	12.0 (of ecological inputs)	Manufacture of tobacco products (?)

Forestry (Sustainable forestry and logging, etc.)	02.1 (Sustainable forestry)	Silviculture and other forestry activities
	02.2 (Sustainable forestry)	Logging
	02.3 (Sustainable forestry)	Gathering of wild growing non-wood products
	02.4 (Supportive to the above)	Support services to forestry
Manufacturing	24.2 (green manufacture and outputs)	Manufacture of Tubes, Pipes, Hollow Profiles and Related Fittings, of Steel
	25.3 (green manufacture and outputs)	Manufacture of Steam Generators, Except Central Heating Hot Water Boilers
	27.1 (green manufacture and outputs)	Manufacture of Electric Motors, Generators, Transformers and Electricity Distribution and Control Apparatus
	27.2 (green manufacture and outputs)	Manufacture of Batteries and Accumulators
	27.3 (green manufacture and outputs)	Manufacture of Wiring and Wiring Devices
	27.4 (green manufacture and outputs)	Manufacture of Electric Lighting Equipment
	27.5 (green manufacture and outputs)	Manufacture of Domestic Appliances
	27.9 (green manufacture and outputs)	Manufacture of Other Electrical Equipment
	28.1 (green manufacture and outputs)	Manufacture of General-Purpose Machinery
	28.2 (green manufacture and outputs)	Manufacture of Other General-Purpose Machinery
	28.3 (green manufacture and outputs)	Manufacture of Agricultural and Forestry Machinery
	28.4 (green manufacture and outputs)	Manufacture of Metal Forming Machinery and Machine Tools
	28.9 (green manufacture and outputs)	Manufacture of Other Special-Purpose Machinery
	29.1 (green manufacture and outputs)	Manufacture of Motor Vehicles
	29.2 (green manufacture and outputs)	Manufacture of Bodies (Coachwork) for Motor Vehicles; Manufacture of Trailers and Semi-Trailers
	29.3 (green manufacture and outputs)	Manufacture of Parts and Accessories for Motor Vehicles
	30.1 (green manufacture and outputs)	Building of Ships and Boats
	30.2 (green manufacture and outputs)	Manufacture of Railway Locomotives and Rolling Stock
	30.3 (green manufacture and outputs)	Manufacture of Air and Spacecraft and Related Machinery
	33.1 (energy saving)	Repair and Installation of

		Machinery and Equipment
Renewable Energy (Wind, Solar, Hydro, Waves, Biomass, Gas, etc.)	35.1 (Renewable subset)	Electric power generation, transmission and distribution
	35.2 (Renewable subset)	Manufacture of gas; distribution of gaseous fuels through mains
	35.3 (Renewable subset)	Steam and air conditioning supply
Water management	36.0	Water collection treatment and supply
	37.0	Sewerage
Waste management	38.1	Waste collection
	38.2	Waste treatment and disposal
	38.3	Materials recovery
	39.0	Remediation activities and other waste management services
Transport(collective)	49.1	Passenger rail transport, interurban
	49.3	Other passenger land transport
	50.3	Inland passenger water transport
	50.1	Sea and coastal passenger water transport
	51.1 (?)	Passenger air transport
Tourism (Accommodation, food, events, facilities, services, places, etc.)	55.1 (Green lodges)	Hotels and similar accommodation
	55.2 (Green lodges)	Holiday and other short-stay accommodation
	55.3 (Green lodges)	Camping grounds, recreational vehicle parks and trailer parks
	55.9 (Green lodges)	Other accommodation
	56.1 (Green/ecological/sustainable?)	Restaurants and mobile food service activities
	56.2 (Green/ecological/sustainable?)	Event catering and other food service activities
	56.3 (Green/ecological/sustainable?)	Beverage serving activities
Eco-innovation	72.1 (environmental R&D&I)	Research and Experimental Development on Natural Sciences and Engineering
	72.2 (environmental R&D&I)	Research and Experimental Development on Social Sciences and Humanities
Tourism (Transport, accommodation, food, events, facilities, services, places, etc.)	79.1 (Green/ecological/sustainable?)	Travel agency and tour operator activities
	79.9 (Green/ecological/sustainable?)	Other reservation service and related activities
	91.0 (Green/ecological/sustainable?)	Libraries, archives, museums and other cultural activities
	93.1 (Green/ecological/sustainable?)	Sports activities

	93.2 (Green/ecological/sustainable?)	Amusement and recreation activities
Building / construction	41.1 (Green buildings)	Development of building projects
	41.2 (Green buildings)	Construction of residential and non-residential buildings
	42.1 (Railways only?)	Construction of roads and railways
	42.2 (sewage, green energy, etc.)	Construction of utility projects
	42.9 (Green)	Construction of other civil engineering projects
	43.1 (?)	Demolition and site preparation
	43.2 (?)	Electrical, plumbing and other construction installation activities
	43.3 (?)	Building completion and finishing
	43.9 (?)	Other specialised construction activities

A2.2. Linkages between sectors

The following table contains a list of potential linkages and mutual interferences between a number of NACE activities (3 digits) or groups of activities (sectors) and other green sectors or activities.

Activity / sector	***Agriculture and Food***	***Water and waste management***	***Green Forestry***	***Green Tourism***	***Renewable Energy***	***Green Transport***	***Building Construction***	***Manufacturing***	***'Green' research activities and clean tech***
Agriculture and Food (including NACE 10, 11, 12 Manufacture of food products, beverages and tobacco)		Irrigation, drinking water, run-off, leakage, manure, other waste	Farmers are also forest owners and work extensively in the forest.	Is sometimes based on amenities, farm tourism, etc. Enables for other entrepreneurs.	Can produce many types of renewable energy. Can use renewable energy in their heating and for fuels.	Can become more green in their fuels (for tractors etc.). Much transportation to and from farms. Can produce inputs for fuels for the transport sector.	Can produce materials for isolation and building. Could become more sustainable when investing in new farm buildings and in land management.		GMO, Fast growing energy crops.
Forestry		Management of forests affect surface water and ground water. Waste management		Is sometimes based on amenities, hunting tourism, etc. Enables for other	Can produce many types of renewable energy. Can work as sinks for CO2	Timber transports are mainly by lorries and train.	Building material		Fast growing forest.

Activity / sector	***Agriculture and Food***	***Water and waste management***	***Green Forestry***	***Green Tourism***	***Renewable Energy***	***Green Transport***	***Building Construction***	***Manufacturing***	***'Green' research activities and clean tech***
		can include residue (also for incineration)		entrepreneurs.	emissions				
Renewable Energy	Monoculture – biodiversity – green agriculture?	Hydro-plants and water management. 'Resudue'	Monoculture – biodiversity – green forestry?	In building and in transport.		Can facilitate a greening of the transport sector.	Can facilitate a greening of the building and construction sectors.		New fuels, new ways of producing energy.
Tourism	Facilitator for certain tourism activities…	Uses water. 'Produces waste'	Facilitator for certain tourism activities…		At facilities and in transport.	Much of the environmental impact is through transports.	Housing, ski-lifts, etc.		
Building/construction		Sewage and waste disposal systems and innovations.	Using raw material from the forests.	New lodges, eco-tourism facilities.	Making use of possible solutions (sun, wind, thermal, etc.)	Green infrastructure…			New materials
36.0 Water collection treatment and supply	Relevant water supply is crucial. Study if it is insufficient and what potential lies there.		Study the labels of the Sustainable Forest Initiative and see water implications.	GT exerts increases water consumption. Water supply systems have to be		Not an easy relation: The more public transport is used the fewer cars are produced,	Analyse most utilised building certifications and see water use implications (if any)	The link comes through efficiency of water use, i.e. water productivity. To be	- Agriculture New technologies are appearing for manure processing.

Activity / sector	***Agriculture and Food***	***Water and waste management***	***Green Forestry***	***Green Tourism***	***Renewable Energy***	***Green Transport***	***Building Construction***	***Manufacturing***	***'Green' research activities and clean tech***
	Nitrates Directive: monitoring of groundwater as a green activity. Study Good Agricultural practices for links with water, i.e. intelligent irrigation systems. Limit water input to needs, recycle water when possible. If better implemented water pricing policies (WFD) would create a more realistic demand.		Get in touch with European Forest Institute.	adequate. Waste water treatment facilities have to be in place. Securing this would generate green economy as well as decrease pressure on environment .		the less water is generated and treated. Green tyres (adapted product): they use much less water to produce than the traditional ones.	Fostering water efficient technologies and practices. The coming EU Blueprint for Water might set targets for water efficiency in the MS, on sectoral level and on basin level. In addition, the EU legislative programme for 2010 contained plans to table an EU directive on water efficiency in buildings similar to the Energy Performance	checked how water productivity gains through the implementation of Best Available Techniques (BAT) would influence water collection, treatment and supply.	- Manufacturing Study the potential of new, water saving technologies.

Activity / sector	*Agriculture and Food*	*Water and waste management*	*Green Forestry*	*Green Tourism*	*Renewable Energy*	*Green Transport*	*Building Construction*	*Manufacturing*	*'Green' research activities and clean tech*
							of Building Directive.		
37.0 Sewerage				Tourist areas have to be fully covered by sewerage. This is not always the case hence pressure on waters.			Analyse most utilised building certifications and see sewerage implications (if any)	Would smaller capacity sewerage be needed if less water is used by industry?	
38.1. Waste collection	Study Good Agricultural practices for links with waste.			Has to be in place in all tourist resorts and settlements. More frequent service in peak season.	Closely linked through renewable energy from biomass.	Not an easy relation: The more public transport is used the fewer cars are produced, the less waste is generated and treated. Clean/hybrid collection trucks would fall in the category of	Fully collecting construction and demolition waste is a potential – measure this potential. Analyse most utilised building certifications and see	Estimate impact of waste prevention and industrial ecology approach in industry on waste collection.	Study biowaste potential for producing energy.

Activity / sector	*Agriculture and Food*	*Water and waste management*	*Green Forestry*	*Green Tourism*	*Renewable Energy*	*Green Transport*	*Building Construction*	*Manufacturing*	*'Green' research activities and clean tech*
						adapted goods – less polluting and more resource efficient.	waste management implications (if any)		
38.2 Waste treatment and disposal				The potential is in securing facilities close to tourist locations as well as sanitary landfills. This should be done in parallel to developing tourism infrastructure. Avoiding of waste dumping and littering.	Incineration of biodegradable municipal waste with energy recovery is considered a renewable energy source according to Directive on the promotion of electricity produced from renewable energy sources (2001/77/EC)	Proper disposal of oil is a potential.	Use of recycled materials for construction.	This is a complex link and deserves detailed study. We could look into hazardous waste from industry here. We can look into waste treatment and disposal implications of waste prevention.	Adapted technologies for waste treatment (incineration, composting, landfilling, etc.)
38.3 Materials				Potential for separate		Relation to End-of-Life	Links through	There is an impact	Study the potential of

Activity / sector	*Agriculture and Food*	*Water and waste management*	*Green Forestry*	*Green Tourism*	*Renewable Energy*	*Green Transport*	*Building Construction*	*Manufacturing*	*'Green' research activities and clean tech*
recovery				collection and recycling at tourist locations. Gradually creating markets for more waste streams and adding collection facilities.		Directive.	recycling of Construction and Demolition (C&D) waste.	through industrial ecology and better recycling in companies. What are the potential gains?	new technologies in manufacturing, green agriculture and green forestry.
39.0 Remediation activities and other waste management services									
NACE 16, 17, 31 **Manufacture of Wood and of Products of Wood and Cork, Except Furniture;**		Resource-efficient water and waste management should be considered an unavoidable condition for	These activities depend on raw materials provided by the forestry sector						

Activity / sector	*Agriculture and Food*	*Water and waste management*	*Green Forestry*	*Green Tourism*	*Renewable Energy*	*Green Transport*	*Building Construction*	*Manufacturing*	*'Green' research activities and clean tech*
Manufacture of Articles of Straw and Plaiting Materials, manufacture of Paper and Paper Products and manufacture of furniture		all manufacturing processes to be considered 'green'							
NACE 27 **Manufacture of Electrical Equipment**					Through production of electric equipment, such as batteries and electric engines a energy supply will have to be adapted to the new demand. This holds true also for the	Transitions to a greener economy will most probably imply an electrification of a relevant share of the transport sector.			

Activity / sector	*Agriculture and Food*	*Water and waste management*	*Green Forestry*	*Green Tourism*	*Renewable Energy*	*Green Transport*	*Building Construction*	*Manufacturing*	*'Green' research activities and clean tech*
					renewable sector				
NACE 28 **Manufacture of Machinery and Equipment N.E.C.**	All other sectors will interface with the manufacturing of new green machinery and equipment		All other sectors will interface with the manufacturing of new green machinery and equipment						
NACE 29, 30 **Manufacture of Motor Vehicles, Trailers and Semi-Trailers** **Manufacture of Other Transport Equipment**					Manufacturing of motor vehicles has a direct impact both on overall energy consumption as well as on the type of energy to be consumed	Transport models will be deeply impacted by the electrification of the stock of cars			
NACE 33 **Repair and Installation of**									

Activity / sector	*Agriculture and Food*	*Water and waste management*	*Green Forestry*	*Green Tourism*	*Renewable Energy*	*Green Transport*	*Building Construction*	*Manufacturing*	*'Green' research activities and clean tech*
Machinery and Equipment									
NACE 72 Scientific Research and Development	Eco-innovation is transversal to all EGGS, being focalised on the development and implementation of green technologies. Eco-innovation will have a particular impact on sectors such as renewable energy, building and construction, as well as manufacturing								

A2.3. Legal framework

The following table provides a first glance at the legal framework at the European level (policy and regulations) connected to the development of green activities.

Sector	Regulation (EU directives)	Policy (EU communications)
Agriculture and Food	'Common Agricultural Policy' (CAP) 'Common Fisheries Policy' (CFP)	
Forestry	(UN-REDD) 'EU Forest Action Plan'	
Renewable Energy	**GENERAL** 1. Council Regulation (EU, Euratom) No 617/20101 of 24 June 2010 concerning the notification to the Commission of investment projects in energy infrastructure within the European Union and repealing Regulation (EC) No 736/96 2. Commission Regulation n°833/2010 of 21 September 2010 implementing Council Regulation n°617/2010 concerning the notification to the Commission of investment projects in energy infrastructure within the European Union 3. Directive 94/22/EC of the European Parliament and of the Council of 30 May 1994 on the conditions for granting and using authorizations for the prospection, exploration and production of hydrocarbons 4. Regulation (EC) No 663/2009 of the European Parliament and of the Council of 13 July 2009 establishing a programme to aid economic recovery by granting Community financial assistance to projects in the field of energy 5. Regulation (EU) No 1233/2010 of the European Parliament and of the Council of 15 December 2010 amending Regulation (EC) No 663/2009 establishing a programme to aid economic recovery by granting Community financial assistance to projects in the field of energy **RENEWABLE ENERGY** 33. Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC 34. Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport 35. Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market	

Sector	Regulation (EU directives)	Policy (EU communications)
Tourism	Unknown, to be determined	
Building/construction	**The Construction Products Regulation (305/2011/EU - CPR)** **Energy Efficiency in Buildings** 65. Directive 2002/91 of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings and its amendments repealed by its recast directive: 66. Directive 2010/31 of the European Parliament and of the Council of 17 May 2010 on the energy performance of buildings and its amendments (the recast Directive entered into force in July 2010, but the repeal of the current Directive will only take place on 1/02/2012) Council Directive 85/337/EEC of 27 June 1985, on the assessment of the effects of certain public and private projects on the environment. Directive 2001/42/EC of the European Parliament and of the Council of 27 of June 2001 on the assessment of the effects of certain plans and programmes on the environment.	
Manufacturing	Directive 2004/35/CE Environmental liability with regard to the prevention and remedying of environmental damage	
		Communication (2005) 670 Thematic Strategy on the sustainable use of natural resources
		Communication (2008) 397 Action Plan for sustainable consumption and production (SCP) and sustainable industrial policy (SIP)
		Communication (2007) 379 Small, clean and competitive, a programme to help small and medium-sized enterprises comply with environmental legislation
		Communication (2000) 265 Promoting sustainable development in the EU non-energy extractive industry
Eco-innovation		Communication (2004) 38 Stimulating Technologies for Sustainable Development:

Sector	Regulation (EU directives)	Policy (EU communications)
		An Environmental Technologies Action Plan for the European Union
	Directive 2009/125/EC	Establishing a framework for the setting of ecodesign requirements for energy related products
	Decision nº 1639/2006/CE Establishing a Competitiveness and Innovation Framework Programme (2007 to 2013)	
	Regulation EC nº 66/2010 EU Ecolabel	
Water		Thematic strategy on sustainable use of natural resources
	IPPC Directive (96/61/EC)	
	Water Framework Directive (2000/60/EC)	
	Drinking water directive (98/83/EC)	
	Urban waste water treatment directive (91/271/EEC)	
	Nitrates Directive (91/676/EEC)	
	Groundwater Directive (2006/118/EC)	
	Marine Strategy Framework Directive (2008/56/EC)	
		Common Agricultural Policy (CAP)
Waste		Thematic strategy on sustainable use of natural resources
		Thematic strategy on prevention and recycling of waste
	IPPC Directive (96/61/EC)	
	Waste Framework Directive (2008/98/EC)	
	Waste Landfill Directive (1999/31/EC)	
	Waste Incineration Directive (2000/76/EC)	
	Packaging and packaging waste Directive (94/62/EC)	

Sector	Regulation (EU directives)	Policy (EU communications)
	WEEE Directive (2002/96/EC)	
	End of Life Directive (2000/53/EC)	

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Annex 3 | Extended Input/Output approach

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A3.1. Extended Input/Output approach

The Input/Output (IO) table is an accounting entity that statically describes the linkages within an economy at a specific point in time (a year). The table records the various interdependencies between sectors or commodities in an economy, i.e. their integrated consumption of intermediate goods and services, with the possibility to distinguish between domestically produced and imported goods and services. The transactions within the table are described either as interactions between commodities or between sectors. The table also reports the final consumption expenditure by households, government and other institutions, including exports, as well as investments and stockpiling. For each sector, it is possible to distinguish labour payments to households, cost of capital, taxes and subsidies.

The IO model assumes that the economy can be divided into a specific number of well-defined sectors or commodities. The sector or commodity groups can be large or small, depending on the level of aggregation. These relationships are the database for transforming the table into a fixed price equilibrium model which utilises Leontief production functions, and assumes (i) fixed coefficients of production assuming a linear constant return to scale production function; (ii) homogeneity, such that each sector produces a product not produced by any other sector; and (iii) perfect supply elasticity, so that if demand changes the economy is assumed to immediately satisfy the need for extra production inputs.

Technical coefficients which are the drivers of the model show each industry's purchasing patterns, calculated from the transactions table as the ratio of each input to total output in each sector. This model has traditionally been used to study the impact or potential of one or more sectors to stimulate growth in output throughout the economy due to exogenous changes in domestic consumer or state demand, or as stipulated by increased exports.

The environmental input- output analysis extends this to cover environmental aspects, e.g. emissions, occurring upstream throughout the whole supply chain, caused by final consumption. It can be considered to be a sort of life cycle assessment, applicable to whole industries or whole countries. Consumption is defined as a vector of various product groups consumed in the economy. When a product is consumed it has to be produced in the stage just before that, leading to emissions in that stage. But for that product to be produced, the producer needs to consume other products (intermediate consumption) and the products in that stage need in turn other products from the stage before that, and so on. The total emissions occurring throughout the whole supply chain correspond to the emissions in this consumption perspective. Calculating all the emissions occurring in the whole supply chain is done with the help of the standard multipliers from the input-output model and detailed information about the environmental impacts of each product used for final consumption and intermediate stages in the production processes.

To facilitate such a process one needs the detailed environmental data in s structure such that it can be integrated with the IO table. Appended to the system of national accounts (to which the IO tables belong) are so called satellite accounts, which are not a completely integrated part of the national accounts, but developed in accordance to the same sector classification. The environmental accounts are such a satellite accounting system.

The main purpose of the environmental accounting system is to organize statistics on environmental data (e.g. resource use and emissions) in a way that make these data compatible with the national accounts. That means to classify environmental data into the same industrial categories as used by the national accounts, in order to be able to compare economic and environmental performance of the various industries of a country (e.g. calculate emission intensities). For instance, data is compiled on energy use and emissions occurring e.g. for heating of housing and transports.

Basically, all emissions are treated as resource use which is attached to the IO table as a satellite account. For instance the emissions of CO2 can be considered being a use of the carbon absorption capacity resource of the atmosphere, so in that sense it is reasonable to have all environmental parameters as inputs. E.g. the amount of CO2 emitted per dollars' worth of some type of product is calculated to facilitate an analysis in the same dimension as the input-output table. This can then be related to the economic accounts of these sectors and with multiplier approaches also to all sectors using these products as intermediate inputs to their production.

One interesting aspect of such approaches is that is can actually say something about the potential impact of a transition to greener economic activities, taking also the indirect and induced effects on the entire economy into consideration. That is, it cannot really say anything about the potential for the economy to become greener, but given scenarios about what changes in consumption and production that might take place, such models can study the overall impacts on both the economy, employment and the emissions or resource use.

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This report presents a more detailed overview of the analytical approach to be applied by the project. This Applied Research Project is conducted within the framework of the ESPON 2013 Programme, partly financed by the European Regional Development Fund.

The partnership behind the ESPON Programme consists of the EU Commission and the Member States of the EU27, plus Iceland, Liechtenstein, Norway and Switzerland. Each partner is represented in the ESPON Monitoring Committee.

This report does not necessarily reflect the opinion of the members of the Monitoring Committee.

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This basic report exists only in an electronic version.

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A1. The territorial concept of Green Economy

GREECO understands green economy as socio-economic growth that takes place vis-à-vis a more sustainable use of natural resources, preservation of environmental capital and fewer environmental risks, thus as an operationalisation of sustainable development.

From the territorial perspective, this project understands the green economy as one that results in enhanced regional competitiveness and cohesion over the long term, while not exposing territories to major environmental risks and degradation.

This is the first draft of a territorial concept of the Green Economy to be used in GREECO. The final working concept will be an output of *Task 2.1 Literature review and data assessment*. The following section aims at further clarifying this approach.

A1.1. The concept of a "green economy"

The aim of the following section is to explain in a not too technical language how the GREECO project understands the "green economy" with a view to its study of territorial potentials of the green economy.

The "green economy" as described in the reports and papers prepared recently with a view to the Rio+20 summit in June 2012 define the green economy as an operationalisation of the principles of sustainable development defined in the WCED (Brundtland) report and the Rio Summit in 1992. The zero draft resolution from Rio+20 conference views the green economy as a "means to achieve sustainable development", which must remain our overarching goal. We acknowledge that a green economy in the context of sustainable development and poverty eradication should protect and enhance the natural resource base, increase resource efficiency, promote sustainable consumption and production patterns, and move the world toward low-carbon development." United Nations (2012) (Rio+20. The Future We Want. Zero Draft.10.01.12.)

The principles of sustainable development offered a conclusion to the "Great Debate" on environment and growth, rejecting that economic growth could be the only goal for the development of a society. Within this framework, the green economy is the implementation of these principles transforming the unsustainable 20th century economy to a sustainable 21st century economy. Thus another way of defining the green economy is that it is a set of 21st century alternatives to what was unsustainable about the typical 20th century economy.

The vision of a green economy has become mainstream. Not only at the EU and UN levels, but also at national, regional and even local levels are the policies increasingly aiming at transforming the economies to low carbon and green economies. For practically any sector there are by now EU and/or national programmes for transforming its economy to a green economy. Territorial administrative units and local initiative groups and associations also increasingly make for a green economy.

Regional and local administrative units as well as the EU regional and cohesion funds increasingly address questions such as whether the regional or local economy is making progress towards a green economy. It is, for instance, of great value to know whether the endeavours of government and business have made it greener now than it was five years ago. Comparing with other economies is also important. Does the transformation towards a green economy progress in satisfactory pace when compared to other economies?

Indicators describing the progress towards a green economy are not very different from the sustainability indicators that have been computed for the EU as well as most countries and many regions. They comprise the ecological, the economic as well as the social dimension. The GREECO project stresses the potentials for creating economic values without forfeiting, but on the contrary restoring ecological values, within acceptable intergenerational and social balances.

A1.2. The physical basis of the economy

Economic activities are linked to nature through the space occupied by the economic activities and the materials and energy flows from sources to sinks provided by nature.

The land-use for economic activities following the population growth and the growth of materials and energy flows is responsible for much of the decline in biodiversity that the EU now has decided to reverse. Protection and restoration of nature areas as habitats for ecosystems and species and at the same time producing food for a still growing world population is demanding in terms of land intensification and eco-efficient food supply chains and food consumption patterns.

The flows of materials and energy through the supply chains of the economy are measured as throughputs at the individual links of the chains. The green economy enables a growth in the creation of economic value while minimising throughputs and land use for economic activities. It involves a series of transformation processes such as:

- throughput substitution
- residue recycling and
- materials and energy flow productivity.

Carbon footprints and similar life cycle related metrics and the renewable share of energy supply and use are important indicators.

Progress in these areas raises the eco-efficiency of the economy and delinks economic growth from excessive use of nature as source and sink. Delinking throughputs from economic growth has been the core principle of the EU sustainable development strategy since the 1990s.

A1.3. The territorial dimension of the green economy

The most tangible territorial dimensions of the green economy are related to – as described above - the physical components of land used for provision of resources and settlement of society. Determining resource potentials will, however, not only be based on emphasising what green resources are available, but where they are located. Indeed, the **physical conditions** – environment, natural resources, land use etc – are very location-specific and therefore, although the green economy of all regions will share the abovementioned characteristics, it will look different for each region depending on its natural endowments.

All regions are endowed with green economic potentials, but in widely varying types and amounts. As the European economies transform to green economies, these territorial differences in resource endowments will present a variety of opportunities and challenges that differ across regions. One of the aims of the project is to identify and analyse these differences.

Broadly speaking, rural, coastal and mountainous regions can be rich in renewable energy potentials, attractive nature assets and other ecosystem services and a green economy developing these resources to economic assets is on the agenda of many regions.

Regions with high potentials for primary biological production (agri-, horto-, silvi- and aqua-cultural production) will provide a source for recyclable and biodegradable materials and energy to replace the unsustainable throughputs.

Urban agglomerations with their broad technology base and accessibility are centres of technological innovation and coordination as well as residential and service supply concentration. The contributions to the progress of a green economy from technology and coordination are crucial, but difficult to measure. The transformation of the residential and transport sectors towards energy efficiency and renewable energy use are much easier, but not without problems.

From a **land use perspective**, the project aims at identifying and analysing the changes associated with the progress towards a green economy. What will be the role of dedicated nature protection areas and for multi-functional use of land taking economic as well as ecological values into account? Which are the implications for land-use from the seemingly conflicting objectives of on the one hand restoring biological diversity and on the other hand generate more economic value in Europe? These changes in land-use patterns associated with the green economy differ widely across regions.

Within this framework, a critical importance will be on **land use functions**, not just in terms of individual functions, but how a given function is positioned in relation to others. Urban and rural dimension become implicit, just as the localisation of resource throughputs are emphasised.

In this way, rural areas that were previously characterised by exclusivity and monoculture can now physically and conceptually accommodate other activities, such as clean energy production and green manufacturing plants. This not only implies increasing multi-functionality of non-urban areas, but also a higher degree of territorial dispersion of the new functions/activities put in place. This is due to the fact that many new green activities are intrinsically disperse from the spatial perspective (e.g. windmills) and/or linked to diverse agroecological conditions (e.g. biomass production).

Less tangible perspectives of the territorial dimension of a green economy should also be emphasised with regard the manner in which **decision making and policy action** is devised and mandated. For example, the on-going discourse surrounding European cohesion policy emphasises the need to further develop issue-based governance to develop solutions at the same spatial scale as the issue at hand. Development of governance institutions covering functional urban areas rather than following explicit administrative (municipal) boundaries is a notable example.

By covering such a wide range of economic sectors in terms of production, consumption, governance and policy dimensions, the concept of the green economy in the GREECO project implies a host over overlapping, intersecting and competing territorial logics that are operating across a range of spatial scales. Some seem to have a macro-scale (e.g. globalisation, core-periphery) component to them, others are much more localised, relating perhaps to rural-urban flows between towns and their rural hinterlands, or to regional, resource-based patterns of development. For instance, based on the increased importance of services from natural resources entailed by a green economy, where the urban-rural dimension is expected to be of special importance in this project. This will not only be in terms of viewing rural areas as “producers” and urban areas as “consumers” within a heightened emphasis on inputs, throughputs and outputs of natural resources, but also in terms of localising these natural resource flows through increased decentralisation of resource management.

A key issue in this connection is the evolving and changing roles of small and medium-sized towns (SMTs) in a green economy. Recent research using a combination of Social Accounting Models and econometric techniques (Mitchell et al., 2005; Mayfield et al., 2005; Courtney et al., 2007) shows that SMTs provide employment functions to rural areas and some sectors exhibit notably strong levels of local economic integration in and around such towns. These observations support notions of the European Spatial Development Perspective (ESDP) with a shift towards a polycentric system and SMT’s as hubs in a Green Growth process.

Put together, Green Economy is expected to rely on local conditions more compared to the previous economic model. Labour markets (skills and costs of the workforce), governance structures, spatial development strategies and policies, and agro-ecological conditions will increasingly influence economic productivity, and consequently territorial specialisation at a wider scale. This will in turn highlight the importance of potentiating the efficiency of land use within the conditions of environmental sustainability. This requires knowledge in the GREECO project on potential synergies and conflicts where multiple land functions are to be developed in close or overlapping proximities.

A1.4. Regional employment and growth

These transitions also transform the employment structure of the economies from employment by economic activities related to non-renewable and combustible energy to renewable and non-combustible energy. From transport, storage and processing of large flows of materials to materials effective and recycling activities. Most important, these changes involve a

reconfiguration of the infrastructures and building floor areas that are now aimed to serve a high-throughput and fossil fuel based economy.

The transformations must take place simultaneously along the supply and final use chain. Thus, in every region as well as in every sector studied, changes in investment, production and consumption are coherent. Green patterns of consumption must be accompanied by green patterns of production and investment to represent lasting progress towards a green economy.

Advancing these investments can play an important role in mitigating and shortening the European recession expected in the first years of this decade. It has been labelled a “Green New Deal” with the reference to the New Deal economic strategy of Roosevelt in the USA in 1930s, advancing government investments as a response to absence of private investments.

The jobs created in these fields may at EU and national levels very well outweigh the jobs lost in the fossil fuel related economic activities as European countries are net importers of fossil fuels. Replacing fossil fuel imports by indigenous renewable energy will also strengthen the intra European supply chains and thus the indirect employment and growth effects of demand changes.

The employment and growth potentials related to the shift from non-renewable to renewable energy are unevenly distributed across regions. Similarly, the infrastructure investments gaps for serving a green economy differ across regions.

The transformation of the economy involves changes in demand commodities and services related to the green consumption.

A1.5. Beyond growth and myopia

The green economy is furthermore characterised by the social balance as well as the balance between generations. Such balances seem to be important for citizens’ subjective well-being.

Eradication of poverty and social inclusion are the most important social aspects of a green economy. The job opportunities above offer a major contribution to these ends. Moreover, the instruments used to drive the transformation can have considerable distributional effects although they don’t have distributional objectives.

The green economy replaces myopia with intergenerational ethics. Whereas the early criteria for economic sustainability focused on the quantity of the total capital stock, the present criteria focus on the type of investments needed to develop a green economy.

A1.6 GREECO approach to the green economy concept: a summary

As it has been said before, GREECO interpretation of the green economy concept is aligned with much of the international consensus: socio-economic growth that takes place vis-à-vis a more sustainable use of natural resources, preservation of environmental capital and fewer environmental risks (OECD, 2010; UNEP, 2008, 2010, 2011). These dimensions can be synthesised by saying that the green economy concept is an operationalisation of sustainable development within the current state of European economy and society.

Analogously, GREECO understands the green economy as one that results in enhanced regional competitiveness and cohesion over the long term, while not exposing territories to significant environmental risks and degradation. This is foreseen to take place through the implementation of an economic approach that combines and enhances place-based and mutually supportive socio-economic and environmental policy.

In this framework, GREECO acknowledges (i) that territorial factors definitely condition the economic development potential based on green(er) activities, and; (ii) that the promotion of green economy based on the development of green(er) activities will have territorial effects.

Accordingly, GREECO will elaborate on the most relevant territorial aspects that can be drawn from the abovementioned green economy definition in order to identify specific regional potentials of pursuing green growth through environmentally friendly or environmentally enhancing goods and services and related jobs.

A2. Update of the literature references and indicators

The GREECO project develops a set of statistical data that can be used for identifying and analysing progress towards a green economy in regions at various territorial levels, primarily the NUTS2 level. This development takes departure in the 120 EU Sustainable Development Indicators, the Europe 2020 targets and related indicators, the European Environmental Agency (EEA) core set of indicators (CSI), the Eurostat Environmental Goods and Services Sector statistical classification and similar work carried out in the OECD and the United Nations. The dataset will be inspired by hierarchical structure of the EU Sustainable Development Indicators, but aim at a set comprising a more limited number of indicators.

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GEOSPECS - Geographic Specificities and Development Potentials in Europe

ReRisk - Regions at Risk of Energy Poverty

TRACC - TRansport ACCessibility at regional/local scale and patterns in Europe

PURR - Potential of Rural Regions

TPM - Territorial Performance Monitoring

ESPON 2006

Territorial trends of the management of the natural heritage ESPON Project 1.3.2

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A3. Methodology for the implementation of case studies

Below, an insight into the methodology to be applied for case study implementation is presented. Special attention is paid to:

- the **criteria for selection of regions**, including some thoughts on the territorial level to be covered;
- the **approach and methodology**, including also the groups of actors involved;
- the **principles** under the case study research and the **outline of case studies**, so that all case studies have similar structures.

A3.1. Objectives

The objectives of the case studies as spelled out in the proposal are the following:

- identify **good practices** at regional level to develop a greener economy,
- analyse **key policy areas** with an impact on environmental, economic and social behaviours,
- identify **financial instruments and investments** with an impact on green economies,
- analyse **transferability** of good practices to other territorial contexts within Europe, thus contributing to the policy analysis and the formulation of strategies.

Certainly, the focus of the case studies will be on good practices and approaches in a given region. However, as the authors will try to paint a **relatively comprehensive picture** of the green economy they will also have to **describe obstacles and disincentives**.

A3.2. Principles

While drafting the case studies the partners will be guided by the following principles:

- Create an **integrated narrative** of how green economy works in the selected regions – try to describe what cannot be captured by indicators;
- **Test hypothesis** and **validate typologies**;
- The case studies also have the potential to **inform the other tasks** and not only test the hypothesis and typologies but also enrich them;

- The case studies will also focus on the **analysis of factors**, drivers and conditions (policies, financial instruments, etc.) which provide a regional dimension to the green economy;
- The narrative will try to capture **complex sectoral interrelations** which are not necessarily obvious from the figures;
- The case studies will dwell on **environmental and social implication** of green economy in the given territory.

A3.3. Criteria for selection of regions for case studies

- **Different types of territories** (e.g. cross border regions, outermost regions, highly populated areas, rural areas, dynamic regions, etc.);
- **Different geographical contexts** (Western Europe, Northern Europe, Mediterranean Europe, East-Central Europe);
- Maximum **diversity of drivers** / enablers and sectoral characterisations found across Europe;
- **Sectoral:** most or all the sectors listed in the specification, together with the additional ones emerging from the literature review will be exemplified by case studies. The case studies will not focus only on one single sector as this will give a very one-sided picture of the green economy. One case study will cover several of the strong sectors for the given territory.
- Non explicit drivers of green economies development, such as **governance frameworks** and public-private collaborative schemes;
- As the selection of the case studies has to take place before the finalisation of the typologies in Task 2.3.1 the identification of case studies will be **based on the ESPON typologies**;
- **Data availability** from regional or member state sources;
- The **size** of the region – it has been agreed that the case studies should not necessarily be comparable in terms of size. GREECO may include case studies at different NUTS level if this is needed to paint a more telling picture of the green economy. Indeed, depending on the NUTS delimitation within each country, regions have a pretty different connotation: even within the same NUTS level some are much larger than others, contribute more to national economies, concentrate more urban population, and so forth. For this reason, the selection of case studies will be more oriented towards the actual elements that characterise those areas, regardless of the NUTS level in which they fall.
- **Urban-rural perspectives** – the case studies should represent diverse territories in terms of urban an rural dynamics related to green economies,
- **Economic dynamism** – case studies will include more as well as less developed regions.
- The choice of the territorial level of the case study will be closely interlinked with the **level of governance**.
- Firstly, the partners will start of the selection of **five case studies** as soon as possible which will later be complemented by additional five.

A3.4. Approach and methodology

- The drafting of the case studies will **start with desk research** and familiarisation of the authors with the territory: economy, history, geography, climate, figures, policies, etc.
- Shortly after that the desktop research will be followed by **phone interviews** with key stakeholders (bottom-up)
- The purpose of the phone interviews will be to capture the story behind the figures as well as to construct a picture of the **stakeholder's perception** of the development of green economy.
- When the case study is in the region of the partner the phone interviews can be complemented by **personal interviews** and site visits;
- The **choice of stakeholders will vary** on the sectoral focus of the case study and the territorial level. However, they will include: sectoral responsible people within the regional/local authority; management of 'green' enterprises, development agencies, representatives of the institutions managing special financial instruments, etc.
- **Standardisation**: the authors of the case studies will adhere as much as possible to the same outline and cover the same indicators for the sectors, but leaving space for the regional specificities.

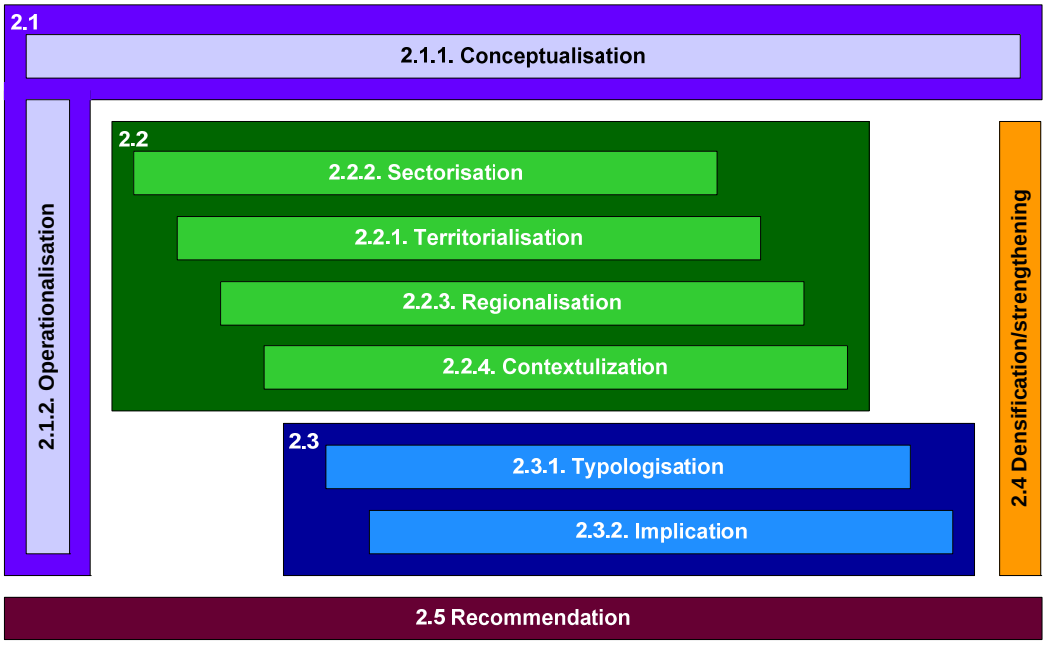
A3.5. Preliminary outline of the case studies

- **General description** of the region: geography, economy, demographics, administrative structure
- Description of **key sectors of green economy** with data sequence on selected indicators (last 20 years)
- Description of the **interrelation between the sectors**
- Analysis of the **dynamics of the indicators** and **key milestones** of the development of green economy
- Identification and description of **favouring and hindering factors** different from policy developments (i.e. demographics, history, R&D and innovation infrastructure, political leadership)
- Identification and description of **policies, economic and financial instruments** which were crucial for the development of green economy. Assessment of the efficiency of these main policies and there role as a trigger or enabler.
- Assessment of **the ambition of the regions**: driven by compliance versus proactive, ambitious and innovative
- Assessment of the **regions' potential** to develop green economy in the future. This assessment will be done differently for the different case study regions: i.e. by analysing the distance to compliance (i.e. construction of WWTPs in order to comply with the UWWTD) or by analysing the technical potential (i.e. estimation of the potential for development of off-shore wind)

A4. Approach to identify the added-value of the green economy to specific types of territories (with a specific focus on remote regions)

This section is devoted to highlight how GREECO aims to identify the added-value of the green economy to specific types of territories with a specific focus on the consideration of remote regions.

GREECO research is organised so that all types of ESPON territories are covered and taken into account in each of the Tasks/Subtasks:



This approach will ensure that the added-value of the green economy is identified for the different types of territories.

Moreover, Task 2.3 will explicitly deal with specific types of territories by building on previous results to characterise ESPON NUTS2 regions into a number of typologies reflecting the different potentials that diverse territories hold for green economy development and to assess the economic, environmental and social implications of green economy for each one of these regional typologies identified.

In addition, when it comes to remote regions, a deeper insight into their specificities, characteristics and potential for greening economy will be ensured by devoting one case study to this type of regions.

A5. Coverage and structure of the research on sectors mentioned in the Project Specification

This section has a twofold objective. On the one hand it comprises the considerations of the sectors to be covered within GREECO. On the other hand it provides a deeper insight into the structure of the methodology for research in those sectors.

A5.1. Coverage of the sectors

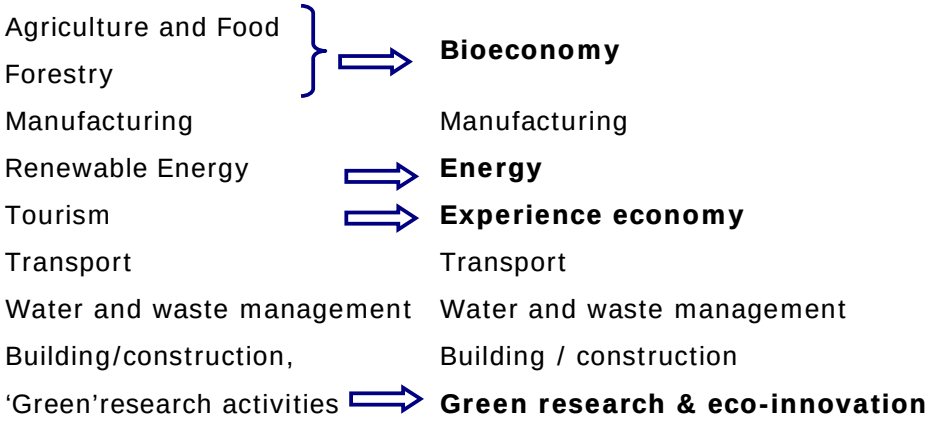
The GREECO project specification stipulates that the project should focus on six sectors that are viewed as having a significant green dimension, while also being the recipient of a large share of cohesion policy investment. This is to avoid unfocussed results due to the multitude of sectors that are impacted by the green economy concept. These sectors include Agriculture and food, Forestry, Manufacturing, Renewable Energy, Tourism and Transport. In addition to these, the integrated green economic activities of Water and Waste Management, Building/Construction, Green Research and Implementation of Clean Tech should also be considered due to their important cross-cutting, territorial and green growth perspectives. This amounts to a total of six main sectors and four cross-cutting sectors.

However, as the manner in which the different sectors are to be covered in the GREECO project is open for revision, and due to the fact that the TPG viewed many of the components of the "cross-cutting" sectors to be of high importance (both in terms of economic impact and territorial implications), it was first decided that all ten sectors shall be treated on an equal level. Therefore, all sectors included in the analysis are viewed in terms of their economic impact as well as their linkages with other sectors.

Next, some alterations have been made in terms of the classification of sectors. Agriculture and Forestry have been combined under the term "Bioeconomy" because of their explicit land-based economic components compared to the other sectors. Additionally, the ability to facilitate development of both sectors through non-traditional activities such as bioenergy production from residual material or underused land will be an important component of the research activity of GREECO. However, it shall be noted that Forestry and Agriculture will still be treated separately to accentuate the very different territorial dimensions they entail in the European territory.

In addition, the tourist sector has been broadened to include more domestic and lifestyle issues of leisure and recreation. As such, it is now labelled as the "Experience Economy". Renewable Energy has also been re-classed as Energy in order to emphasise resource consumption perspectives including increased energy efficiency, and the greening of the Energy Sector as a whole. Lastly, the sectors of Green Research and Eco-Innovation are now assessed together due to their similar thematic and policy perspectives.

Thus, the sectors and cross-cutting activities foreseen in the project specifications have been re-grouped as follows:



A5.2. Structure of the research on sectors

The following guidelines provide a structure for describing the green economy, or greening of sectors, within the framework of task 2.2.2 "sectoral definition of green economic activities". Some of the topics included within these guidelines and this work will involve concepts similar to work in mainly tasks 2.2, 2.3 and 2.5. Yet their introduction here acts as a "bottom-up up" approach, which identifies key territorial dimensions from this – more rigid – territorial dimension. For instance the territorial dimension and the policy analysis will be investigated in other tasks from a more top-down approach and covering the full territory and sector classification. Furthermore these guidelines list perspectives or topics that might be relevant (e.g. under 2.a.) whereas all of these might not be pursued (or possible to pursue) for all the sectors being investigated.

The preliminary structure for the sector analysis is as follows:

1. **Definition of the sector, problem statement and first attempt of defining the "green" component within the sector.**

    a. Describe the sector more generally to provide background.
        i. Statistical assessment (GVA, employment, production and consumption characteristics.)
        ii. Market and sector structure: differences between countries. General discussion based on OECD documents and similar documents of the type "Outlook on …". The purpose is to give a picture of the sector in Europe to understand that its green components might look different in different parts of the territory.

    b. Problem statement: what is wrong with the sector today? What are the characteristics of this sector in relation to the so called "brown economy"? Can focus on sustainability and environmental and social constraints and could link up with

environmental assessments from e.g. OECD which are at least available for some of the sectors, such as agriculture, forestry, energy production and more.

c. Patterns and trends based on literature
    i. How is the sector evolving? Moving towards sustainability? Differences between countries?
    ii. Policy targets
        - Emissions standards, binding standards, non-binding

d. Once it is clear what the sector is "about" and what are the main problems (and trends) in the sector the analysis can move on to looking into what the green economy would mean in relation to this sector. Hence the scrutiny can move onto: "Scoping" – what processes are included/not included in this sector as it is becoming greener?
    i. Sector specific reports (literature review, sustainability concepts within the sector, e.g. OECD and others sectoral break-downs)
    ii. Discussion on the availability and appropriateness to consider each sector in a statistical perspective. Where possible GVA from EGSS based on a sectoral classification using NACE codes will be used.
    iii. Also with respect to sustainability indicators (Eurostat sustainability indicators)

2. Production and consumption perspectives within the sector with an impact on green economy.

a. This section should expand on section 1.d. and explicitly consider the state of affairs within the sector with an emphasis on the aspects listed below. This is designed to identify the key components of each sector as well as its cross-cutting linkages with other sectors:

- Energy and materials/packaging
- Waste and water
- Land use
- Transport
- Resource use/types of resources
- Throughput substitution
- Residue recycling
- Material and Energy productivity
- Substitution and complements (elasticity impacts)
- Employment and skills
- Type of products/type of producers/etc.
- Investment (what type of investments, what time horizon, in what territory?) Link up with structural funds?
- Emissions
- Other (Trade/market implications?)

b. Statistical assessment using EGSS to quantify the green performance of certain components of a sector might be completed based on the appropriateness determined in in section 1d.

c. If there are specific aspects of the demand side which are important these could be considered as well (e.g. type of consumers, their behaviour in substituting to other products, their income elasticity, market structure on the demand side, etc.).

d. Some of these investigations might benefit from an approach where case study investigations are reviewed or where specific reports for the sector in a country or region are used. For instance, for the Experience Economy the approach to look for European or World investigations does not seem to be feasible and will have to be augmented by specific investigations into one or more of these topics in a narrower sense, both when it comes to sub-sets of the sector and to specific geographical areas.

e. Linkages with other sectors (requirements and conflicts in relation to other sectors)

i. Scoping of key linkages with other sectors. Can utilise also the list under 2.a.

ii. Scoping about positive and negative linkage effects and indirect employment and growth effects from green growth in the sector.

iii. Scoping about the territorial implications of those linkages.

3. Overview of European policy driving the green growth process of each sector.

a. Roadmaps, white/green papers, etc.

b. legislative/ regulatory framework

c. Policy options (feeding into Task 2.5)
   i. Command and Control regulation. Economical and incentive-based vs. behavioural/awareness, certification.
   ii. Policy differences across Europe
   iii. "Levels" of policy application/intervention (EU/National/Regional)

4. **Most relevant territorial dimensions and drivers for each sector**

    i. Governance
    ii. Territorial assets and multifunctionality (includes physical things like land and resources but also non-tangible resources within the concept of territorial capital).
    iii. Settlement models
    iv. Polycentricism
    v. Urban and rural settlement patterns
    vi. Patterns of urban-rural *relationship* and rural characteristics.
    vii. Accessibility & connectivity.
    viii. Transport: flows and infrastructures.
    ix. Energy consumption and production patterns.
    x. Land use and land cover types (more directly covered for some sectors than as a part of territorial assets, for instance in relation to agriculture, forestry and energy). Multifunctionality
    xi. Social affairs and living conditions.
    xii. Others if relevant.

5. **Potential (in relation to greening of the sector and/or in relation to policy targets/development, as relevant)**

    a. Territorial aspects of a greening of the sector, drivers and enablers.

    b. Institutional aspects.

    c. Green innovation related to sector (enablers on the production side).

    d. Employment and Investments (capabilities).

    e. Possibility to introduce policy (laws, incentives, voluntary schemes, etc.).

    f. Market perspectives of potential: e.g. certification schemes, behavioural economics, knowledge, consumer choices, involvement of businesses (public-private partnerships), and academia.

    g. Linkages to other sectors having an impact on potential?

6. **Concluding remarks**

a. Commenting on the most important aspects of the sector in relation to a greening of the economy and about what are the linkages to other sectors and potential in the future with respect to territorial aspects and policy.

A6. Policy makers involvement (during project implementation)

This section provides further information on the approach for Policy Research to be carried out by GREECO, and how policy-makers will be involved to amplify the acceptance of policy options (see table 2).

GREECO project will focus mainly on those relevant policies implemented at the European level with a direct impact on green activities in general and on any of the economic sectors under analysis in particular. In this context, sector specific regulatory framework will be explicitly dealt with within *Task 2.2 Characterisation of the regional dimension of Green Economy*, especially in *Subtask 2.2.2 Sectoral definition of Green Economy*.

Task 2.5 Policy Analysis, will be focused on the policy framework, beyond the sectoral regulatory framework, and it pursues to initiate a dialogue with policy-experts, policy-makers and regional authorities and develop and validate policy recommendations.

Within this framework, **Subtask 2.5.1** deals with the **Identification of green economy policy implications** and it will cover the first step of the methodological framework, namely capturing expert views on the present policy corpus of green economy. This will be achieved from two perspectives:

Firstly, this "identification" will consist on the surveillance of EU policies impacting on the different sectors under analysis, mainly basing on:

- Policy observatories
- Other ESPON projects
- Specific academic literature
- etc.

Secondly, this subtask also aims at identifying the green economy development objectives within each typology developed in Task 2.3. That is to say, further analyse the needs / goals identified within each typology. For instance, those regions performing better in economic terms will probably have to initiate transitions towards more sustainable development pathways, while those regions lagging behind in economic terms will probably see in the green economy a chance for growth. This differentiation calls for specific and tailor-made policies.

The perception of available tools by policy-makers at regional and local levels will be captured trough the **Characterisation of policy instruments/tools** (**Subtask 2.5.2**). Hence, this Subtask will identify the specific needs of policy-makers in relation to existing policy instruments. The final aim is to characterise available tools in relation to:

- Degree of adaptation to specific typologies (place-specific vs place-blind approaches)
- Expected impact on territorial development objectives
- Feasibility within each jurisdiction
- Economic cost

In order to amplify the acceptance of policy options to be developed, it is foreseen to arrange discussions with policy makers on recommended policies during the life time of the project. All in all, the involvement of stakeholders (policy-makers) will be ensured through:

- **Consultation within case studies**, by means of structured interviews, surveys, etc. In this respect, at least one formal consultation with policy makers will be planned during 2012 in order to check if the selected sectors (see A.5) and the envisaged project outputs are in line with both the recent policy framework and the needs expressed by policy makers.
- **Ad-hoc workshop** during second half of project (in 2013) to validate policy alternatives. For practical reasons, the target audience of this workshop will mainly comprise MC members, who will be asked to reflect on the applicability of the proposed alternatives at regional and local level.

The above can be summarised as follows:

	Target group(s)	Approach and goal	Date
Consultation	Policy-makers, regional authorities, local authorities, other relevant stakeholders identified.	Interviews and surveys are foreseen to obtain: - Feedback on sectors considered by GREECO - Validation of planned outputs for GREECO. - Insight into stakeholders' needs.	2012 (2nd semester)
Workshop	Especial focus on MC members'. They will be invited by the LP, by direct mailing and ESPON CU will be asked if this event could be advertised under the "Events" section of the ESPON website. A minimum of 20 MC members participating would be desirable.	In order to facilitate MC member's participation, the aim is to organise the workshop a day before or after, one of the following events[1]: - ESPON MC meeting. - ESPON Workshop - ESPON Seminar The workshop will present the policy alternatives developed in GREECO (see Subtask 2.5.3) by taking into account the feedback received during the consultation phase. The aim is to validate these policy recommendations with involved actors. The comments received will enable to further design a methodology to allow policy makers to implement recommendations and options at regional level.	2013 (1st semester)

Lastly, GREECO will produce a framework for the definition of policy recommendations (**Subtask 2.5.3. Policy recommendations**), structured around three main aspects:

[1] This approach will be validated or modified on the basis of feedback from the ESPON CU.

- By regional typologies:
    - Regional typologies based on green economic potential
- By level of implementation:
    - European
    - National
    - Regional
- By type of action:
    - Priority investing and spending in territories and sectors
    - Taxation and market-based instruments
    - Regulatory frameworks at different spatial levels
    - Multi-level governance mechanisms
    - etc.

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