GREECO
Territorial Potentials for a Greener Economy

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1. Executive summary

The concept of a "green economy", originally introduced by Pearce et al. (1989) in their book *Blueprint for a Green Economy* has been recently mainstreamed by the UN in preparation of the United Nations Conference on Sustainable Development (the Rio+20 summit), with a focus on two themes: (i) a green economy in the context of sustainable development poverty eradication; and (ii) the institutional framework for sustainable development. In this context, the green economy has been described in the *Final Report* of the Rio+20 conference as "one of the important tools available for achieving SD" (UN 2012, p.10).

Other relevant international initiatives by the OECD (Green Growth Strategy and Better Life initiatives), UNEP (The Green Economy Initiative), the EU (The EU2020 strategy and related initiatives, the Rio+20 communication[1], the iGrowGreen assessment framework, etc.), plus a series of country-based reports have contributed to the momentum of the green economy and set the basis for a broad but compatible interpretation of the concept.

Within this context, the GREECO project targets the territorially relevant aspects of a green economy, and in doing so highlight the opportunities for a green economy transition of European regions through the implementation of strategic territorial development and cohesion policy actions.

In this vein and given that the notion of green economy is far from being unambiguous, GREECO's research started by elaborating a working concept on how the green economy was to be understood within the project, paying special attention to its territorial dimension. As a result of this task, it was decided to align GREECO interpretation of the green economy concept with much of the international consensus:

> *Within GREECO project, the green economy comprises 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 2011a; OECD 2011b; UNEP 2011; UNEP 2012)*. 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 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, especially in a context of interplay between different levels of multi-level governance. This means that the European territories differ in their pre-conditions for a transition towards a green economy and differ also in the magnitude of possible effects, i.e. the green economy will be clearly differentiated in space. Accordingly, GREECO elaborates 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 a more socially inclusive and resource efficient economy, paying especial attention to the environmentally friendly or environmentally enhancing goods and services and related jobs.

This process has enabled to propose a combined top-down and bottom-up methodological framework to assess both the current state of green economy within the European regions and the potential for a green economy transition. This measurement framework systematises the different components that define the green economy and proposes a straightforward approach to analyse such components through a panel of indicators derived from GREECO research and other measuring frameworks, e.g. OECD, UNEP, EU, etc., ensuring that each dimension of the green economy is covered by at least one research task of the project in a coherent way. Special attention is given to the way in which the factors of green economy are

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[1] COM(2011) 363.

understood and handled by both the top-down and bottom-up analytical approaches foreseen in the project, both of which provide the project research with a deeper insight of the particularities of green economy.

Figure 1 below illustrates GREECO's research approach (i.e. the overall logical sequence of tasks) to achieve a thorough understanding of the territorial potentials with regard to green economy.
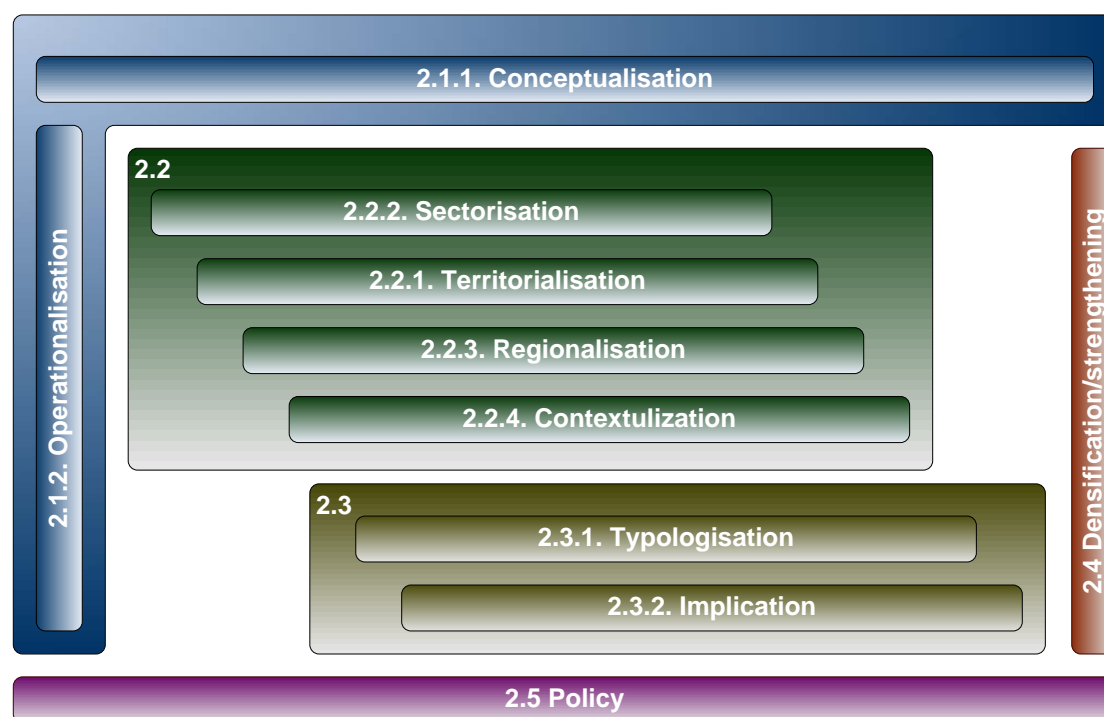
Figure 1   GREECO project approach – simplified structure

The tasks foreseen in the project for a successful assessment of green economy potentials are listed below:

Data Assessment and Management (Conceptualisation and Operationalisation): The elaboration of a working concept on how the green economy was to be understood within the project, making explicit the territorial dimension, is central to GREECO. This working concept has shaped the project's conceptual framework, as well as produced the panel of indicators underpinning the analysis.

Green economic sectors analysis (Sectorisation): The project focuses on nine sectors (some of which are cross-cutting), considered to have a significant green dimension, while also being the recipient of a large share of cohesion policy investment, namely: Bioeconomy, Building and construction, Energy production, Green research and eco-innovation, Manufacturing, Tourism, Transport, Water management, and Waste management. These sectors will be analysed with a bottom-up approach, to identify key territorial dimensions, as well as key factors to facilitate the green transition. This will support the top-down approach that will predominate in other tasks, providing sector-based evidence.

Territorial dimension of Green Economy (Territorialisation): This dimension relates to the fact the green economy is ultimately a physical concept that should be contextualised within a concrete geographic space that conditions itself the way in which the economy develops locally and behaves in relation to external territories. The role of the territorial dimension is therefore not static but changes under the influence of technological changes, scientific advances and societal foci and aspirations, whereby different aspects of the territorial dimension becomes actualised or de-actualised in the development process. This analysis serves to support two of the main aims of GREECO: (i) to determine what territorial

concept(s) are most important for achieving the goals set by Europe 2020 strategy; particularly the goal for sustainable, greener growth. Put another way, what are the assets and handicaps of territories (administrative but also functional regions, cities and rural areas) for creating a green economy (Böhme et al. 2011). And (ii), how is the green economy best understood from a territorial perspective.

Regional green economic performance analysis (Regionalisation): The on-going analysis aims at the provision of a profile of green economy at the regional level in Europe. Thus, it will be attempted to give an answer to the question on how far we have already progressed towards a green economy in different parts of Europe. Coherently with the conceptual framework of the project, the analysis will be done for the five "core features of the green economy" as classified in Figure 3 below (see Section 3.2). For each of the five core features, namely Economy (including its production and consumption aspects), Environment, Econosphere, Society and Territory, mixed qualitative / quantitative profiles with relation to state and process towards regional green economic performance will be provided.

Factors of green economy development (Contextualisation): The factors behind the progress towards a greener economy include a number of issues such as the environmental assets that a given region has or changes in technologies and international commodity prices that are beyond the direct control of regional as well as national policies. On the contrary, other forces include the use of policy instruments by government, comprising technical prescriptions and prohibitions, tax and subsidy incentives (and disincentives), information about green solutions and support of citizen and corporate environmental responsibility. This complex picture includes a number of potential feedbacks between all the factors driving or hindering green growth, all of which have strong policy implications. The joint action of all these internal and external forces results in different regional competitive advantages with regard to a green economy transition that GREECO aims at assessing.

Assessment of the regional potential for green economy (Typologisation and Implication): GREECO understands the regional potential for a green economy as the combination of driving forces, barriers and enabling conditions that regions and territories hold to successfully start a transition to a green economy. In other words, the regional potential for green economy development is defined by the *presence* within regions of the factors of green economy development. These are the components that define the *potentials* that each territory holds to actually start a *successful transition* to a green(er) economy. This analysis is concerned with (i) regional typologies of green economy potentials based on previous tasks and; (ii) the implications of green economy in socio-economic terms for each type of regions across Europe.

Case studies (Densification / Strengthening): The development of case studies has been proposed as one of the activities within the GREECO project in order to give real life dimension to the theoretical concepts and hypothesis developed within the other tasks. The objectives of the task are: (i) identification of good practices at regional level to develop a greener economy; (ii) analysis of key policy areas with an impact on environmental, economic and social behaviours, (iii) identification of financial instruments and investments with an impact on green economies; analysis of transferability of good practices to other territorial contexts. At this interim stage of project development, GREECO has developed the guidelines / criteria for case study selection and analysis and accordingly it has selected the following case study regions: Navarre, Puglia, Jamtland, Louna Eesti, Ruhr Area, Zealand, Cornwall, Southern Transdanubia, Malta.

Policy Analysis: Within all previous tasks, GREECO will identify relevant policy issues that have special interest for contributing to a greener economy through successful territorial development and cohesion policy actions. Qualitative and quantitative assessments of regional progress towards the abovementioned objectives is valuable for the further governmental policies and the GREECO project is concerned with the provision of an improved basis for decisions on these investment support programmes, particularly with regard to territorial policies. Special attention is being paid to the following policy areas:

- Sustainable development strategies
- Policies dealing with territorial development
- Regional and cohesion policy
- Sectoral policies for the eight sectors under study within GREECO.

- The link between sectoral policies and sustainability (taking into account that GREECO understands Green Economy as an operationalisation of sustainability).

2. Overall methodological approach of GREECO

The concept of a green economy is far from unambiguous. For this reason, the first step for GREECO has been to elaborate a working concept of how is "the green economy transition" to be understood within the project with a special focus on its territorial dimension. This working concept of "green economy" frames (and conditions) on-going research in many respects. Against this backdrop, the project aims at further characterising the territorial dimension of green economy (Task 2.2), and at assessing the potential for a green economy transition of the regions (Task 2.3). This research will be supported by 10 case studies (Task 2.4), which will deepen the understanding of the territorial dimension of the green economy. Additionally, GREECO will also identify the most suitable policy options that can promote the transition to a greener economy (Task 2.5).

Within this general framework, and in order to capture the twofold issue included in the territorial dimension of green growth (i.e. what are the implications of green growth for regions, and what is the territorial impact on green growth), the project will adopt a twofold and complementary research perspective:

- A **top-down** approach devoted to guiding the research by defining the core concepts related to the green economy, framing the context of the "territorialisation", and "sectorisation" of the green economy, and produce regional typologies.

- A **bottom-up** research will reinforce the top-down approach by means of the sector analyses and the case studies, which will shed light on concepts more difficult to grasp at a higher level, such as the specific implications of green with for the different sectors and the "spatial behaviour" of green economies observed within different areas.
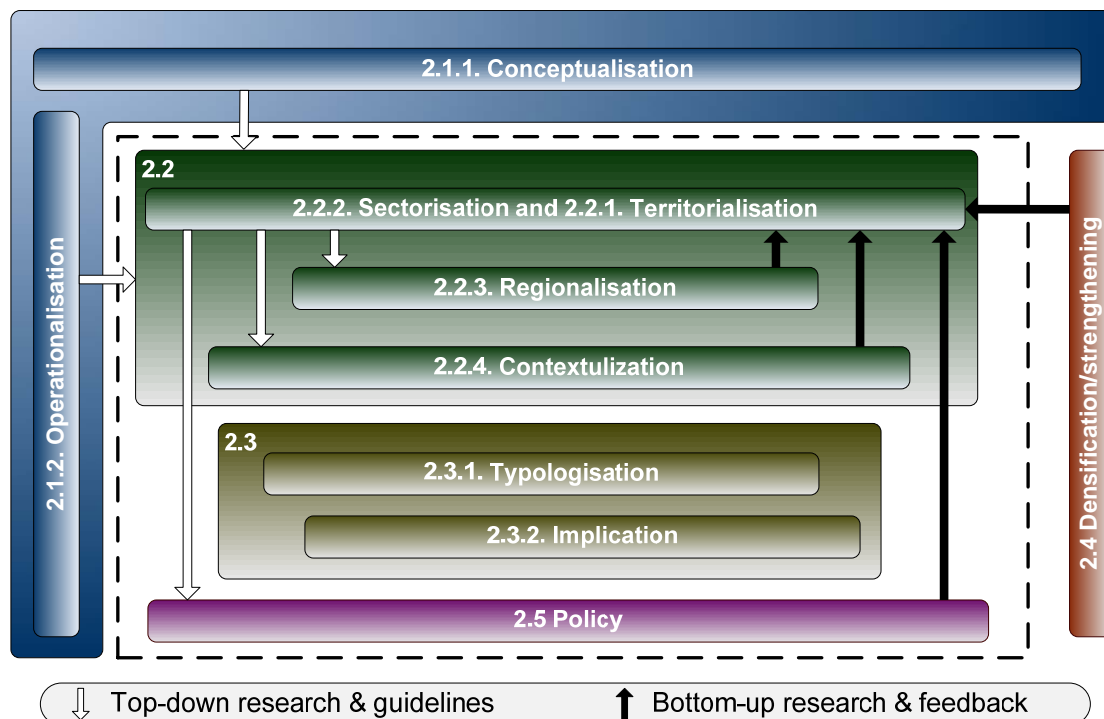
Figure 2   GREECO research approach

The focus of all project tasks will be on nine economic sectors that have clear territorial dimensions and are expected to be positively influenced by the development of a greener economy, namely Bioeconomy (forestry, fish, agriculture), Building and construction, Energy production, Green research and eco-innovation, Manufacturing, Tourism, Transport (mobility and trade), Water management, and Waste management.

From a methodological perspective, the sector analysis is made up of a combination of desk-based research (literature reviews), indicator and policy assessment, as well as ad hoc methods applied for the analysis of each of the sectors (or thematic groups of activities) analysed within the project. Within this context, the territorial dimension will become explicit primarily in the use of regional data and in trying to understand the green growth process within each sector embedded in a national, regional or territorially heterogeneous context. This implies going beyond administrative boundaries and focusing also on functional regions based on natural, economic and social conditions.

The Figure 2 above shows how this sector analysis will be carried out taking into account both research dimensions. The top-down research provides the scenario and guidelines to frame the research. The bottom-up research seeks relevant inputs from some project tasks / tasks in accordance to the framework set by the top-down guidelines.

The regional green economic performance analysis (Regionalisation) aims at the provision of a quantitative profile of green economy at the regional level in Europe, i.e. it will be attempted to give an answer to the question on how far we have already progressed towards a green economy in different parts of Europe. The analysis will be done for the five "Core features of the green economy" as classified in Figure 3 below (see Section 3.2). For each of the five core features, namely Economy (including its production and consumption aspects), Environment, Econosphere, Society, and Territoriy, quantitative profiles with relation to state and process towards regional green economic performance will be provided. Table 1 below lists the interlinkages of the analysis of regional green economic performance with other tasks of GREECO.

The transformation of the European economy to a green economy represents different opportunities for different regions. Their geo-physical and economic potentials are different, e.g. specialisation in industries and trade, urban networks, agglomeration economies, innovation clusters, land availability for various purposes, accessibility, temperature and soil conditions for biomass production, or socio-structural conditions which can be considered to be static in the short run, etc. Other factors that differ by region include historical patterns that are unsustainable and have to be changed. They include, for instance, urban sprawl, loss of environmental values, isolation of remote regions, some migration patterns, and current settlement development, among others.

All these factors will be characterised and documented in the GREECO task "Driving forces, barriers and enabling conditions (Contextualisation)" as indicative of regional potentials for green growth. But potentials are only valuable to the extent they are realised. Thus, the most important research question to the GREECO project is how the regions perform in realising the potentials and making progress towards a green economy, which will be achieved through the regional typologies. For that scope, the project develops progress indicators and explores their linkage with driving forces, barriers and enabling conditions.

Understanding the territorial variation in these conditions is key to understanding the progress towards a green economy in Europe. There are many aspects which should be considered from a territorial perspective and accordingly should be analysed using indicators. Such indicators will be used in the sector analysis mentioned above, but also within the context of each case study region. This process includes an analysis of spatial heterogeneous data using tables, maps and other visualisation techniques. To the extent that indicators can be collected at a national and sub-national level, and if they can also be related to territorially specific indicators, they will allow for an understanding of the territorial dimension of green growth.

Thus, the analysis of specific regions – Case studies (Densification / strengthening) –, focusing on an analysis of some or more sectors and regional specific green growth strategies, will be a large part of the territorial dimension in the project. Each of the regions chosen as case studies will provide a separate piece of the puzzle to understand the way regional specificities, territorial capital and socio-economic conditions influence the ability for

green growth and regional development. In addition, when it comes to remote[2] regions, a deeper insight into their specificities, characteristics and potential for greening economy will be ensured by devoting at least one case study to such type of regions.

Having the information from the abovementioned approaches offers the possibility to formulate hypothesis about the overall picture of green(er) growth and territorial dimensions. An important question to be answered is whether there is evidence of any systematic spatial variation in the behaviour of the identified drivers / enablers, whether at a macro-scale (core-periphery, East-West, North-South, EU15-NMS12) or at a micro-scale (urban-rural areas). This will allow GREECO to produce tailor-made policy recommendations adapted to different territorial scales and typologies of regions. These will be in any case validated with relevant stakeholders prior to effective dissemination.

The following table illustrates the feedbacks between project tasks:

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[2] According to DG Regio (Dijkstra & Poelman 2008), regions are defined as remote when at least 50% of the population of that region lives at more than 45 minutes travel by road to a city of at least 50.000 inhabitants.

TO TASK → FROM TASK ↓	2.1. Literature review and data assessment	2.2. Characterisation of the regional dimension of the green economy	2.3. Assessment of regional potential of the green economy	2.4 Case studies	2.5. Policy analysis
2.1. Literature review and data assessment	▪ Internal feedbacks within the task: The final collection of indicators will partly depend on the literature review.	▪ Clear delimitation of the notion of "green economy" ▪ Account for the current state of affairs on relevant territorial dimensions supporting the definition of the territorial dimension of the green economy. ▪ Contribution to the definition of the sectoral definition and classification. ▪ Inventory of existing relevant economic, environmental and social datasets and indicators to assess the green economy performance from a territorial perspective. ▪ Identification of the main drivers/enablers in literature.	▪ Clear delimitation of the notion of "green economy" ▪ Inventory of existing relevant economic, environmental and social datasets and indicators to assess the green economy potential from a territorial perspective.	▪ Clear delimitation of the notion of "green economy" produced in task 2.1 is instrumental in identifying the most appropriate regions to be investigated in more detail within case studies. ▪ Background datasets.	▪ Clear delimitation of the notion of "green economy"
2.2. Characterisation of the regional dimension of the green economy	▪ Demand for indicators: identification of relevant green economy indicators to be collected by Task 1.1	▪ Internal feedbacks within the task: The identification of drivers and enablers largely relies on inputs from sectoral analyses, also included in task 2.2.	▪ The characterisation of green economy regional performance. ▪ Preliminary delimitation of the main drivers and enablers that condition regional performance and thus potentials.	▪ Clear delimitation of the notion of "territorial potential" to be investigated within CS. The territorial dimensions drawn up by Task 2.2 (i.e. physical characteristics, the territorial characteristics, and governance characteristics) will be further investigated in the case studies. ▪ Preliminary identification of the drivers and enablers that condition regional performance and potentials to be investigated in more detail within case studies. ▪ Clear delimitation of green	▪ The territorial definition of the green economy provides a basis for identifying policy implications as well as the characteristics of the most relevant policy instruments/tools. ▪ The sectoral reports (together with the case studies) are the main deliverables where policy analysis will take place: the investigation of drivers and enabling conditions in each sector investigation will motivate the analysis of certain policies.

			economy sectors in terms of what are the green activities in each sector and how do they link up with other sectors and activities.	
2.3. Assessment of regional potential of the green economy	▪ Demand for indicators: outputs from this task will serve as a basis for the further identification of relevant green economy indicators	▪ Conceptual framework for defining regional potentials and producing regional typologies, necessary to develop a clear-cut delimitation of drivers and enabling conditions.	▪ Case studies develop on top of the typologies of regional potentials.	▪ Regional typologies offering a territorial basis and reference for policy recommendations. ▪ SWOT analysis for the Typologies in order to assess green economy implications supporting the production of tailor-made policies.

2.4 Case studies	▪ Provide alternatives where coverage by the indicators is insufficient.	▪ The case studies could identify new territorial dimensions to be included in the analysis or find interesting nuances within the dimensions outlined by Task 2.2.
		▪ Validation of the sectoral characterisation and the identification of drivers.
		▪ Illustrate green activities in different sectors.
		▪ Identify possibly discreet cross-cutting aspects between different sectors
		▪ Identify and examine key interrelationships (and impacts) between different sectors.
			▪ Results of case studies are transferred to Task 2.3 in order to review the typologies in the light of the input of external experts and detailed analysis	▪ The CS (together with the sectoral reports) are the main deliverables where policy analysis will take place:
				  o Insight into the processes of policy development, implementation, delimitation of policy interest, understanding outcomes, monitoring and enforcements, feedback on policy development, etc.
				  o Case studies can also provide insight as to how the regional context impact upon policy choices, functionality, outcome, etc. At a more analytical level the case studies can provide input to what aspects should be considered when analysing regional policies for green growth.

2.5. Policy analysis	-	▪ The policy analysis will identify relevant green economy drivers.	▪ The policy analysis will contribute to the definition of regional potentials though the identification of relevant green economy drivers.	▪ The policy analysis will point out interesting topics to investigate in the CS. I.e. what aspects of policy (contents, implementation, outcome, feedback, etc.) that can be investigated.	

Table 1   Links and cross-fertilisation between project tasks

3. Defining the green economy (Task 2.1.1)

3.1. Setting the scene for the green economy: the international consensus

The concept of a "green economy" was first introduced over 20 years ago by Pearce et al. in their book *Blueprint for a Green Economy* (Pearce et al. 1989). However, the concept has finally made it into mainstream policy debate following to the economic and financial crisis that convulsed stock markets in the USA and Europe in 2008. The UN has recently made a huge contribution to this process through the United Nations Conference on Sustainable Development (the Rio+20 summit) held in June 2012 with a focus on two themes: (i) a green economy in the context of sustainable development poverty eradication; and (ii) the institutional framework for sustainable development (UNCSD 2012; UNEP 2011).

The green economy has been described in the *Final Report* of the Rio+20 conference as "one of the important tools available for achieving SD" (UN 2012, p.10). According to this consensus document a green economy should "contribute to eradicating poverty as well as sustained economic growth, enhancing social inclusion, improving human welfare and creating opportunities for employment and decent work for all, while maintaining the healthy functioning of the Earth's ecosystems" (UN 2012, p.10).

Besides Rio+20 Conference, the OECD Green Growth Strategy[3] and Better Life Initiative[4], the UNEP Green Economy Initiative[5], alongside the EU plans such as the Beyond GDP Initiative (EC 2009), the Flagship initiative Resource-Efficient Europe (EC 2011c), the Roadmap to a Resource Efficient Europe (EC 2011e) and the Eco-innovation Action Plan (EC 2011j), under EU 2020 strategy (EC 2010b) are other reputed schemes world-wide connected to the development of a working concept of a green economy.

Against this background, the EC communication *Rio+20: towards the green economy and better governance* sets the scene for EU position with respect to the green economy, while presenting policy EU orientations for the Rio+20 Conference. The Communication proposes specific actions that could be implemented at the international, national and regional levels, namely ("what") investing in key resources and natural capital; ("how"): combining market and regulatory instruments, and; ("who") improving governance and encouraging private sector involvement reinforcing and streamlining the existing international governance structures (EC 2011h). Besides that, the Communication also provides a working definition of the green economy in the EU context: "an economy that can secure growth and development, while at the same time improving human well-being, providing decent jobs, reducing inequalities, tackling poverty and preserving the natural capital upon which we all depend" (EC 2011h, p.5).

As it may be concluded from the UN and EU definitions above, a green economy strategy would be entirely devoted to the pursuit of sustainable development, as the three dimensions of sustainability (i.e. environmental, social and economic) are implicit in it. Indeed, these approaches are not in any important respect different from the definition of sustainable development provided by The Brundtland Commission (WCED 1987) and the Rio Declaration of the United Nations Conference on Environment and Development (UN 1992).

In contrast, the OECD, the World Bank (World Bank 2012) and the Global Green Growth Institute (GGGI)[6] prefer the term "green growth", which is generally used in a similar way to the concept of green economy but with some meaningful differences. For instance, the OECD in its *Towards Green Growth* report labels green growth as one that fosters "economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies" (OECD 2011a, p.9). Remarkably, in OECD's view the shift towards a more sustainable and resilient economic growth will include "non-technological changes and innovation such as new business models, work patterns, city

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[3] http://www.oecd.org/greengrowth/
[4] http://www.oecdbetterlifeindex.org/
[5] http://www.unep.org/greeneconomy/
[6] http://www.gggi.org/

planning or transportation arrangements" (OECD 2011a, p.3) that ought to be deployed hand in hand with *ordinary* technological innovation in order to bring about the transformation. Still, to a large extent, the OECD definition – contrary to its own quantitative assessment, which in this respect does not completely follow the definition (OECD 2011b) – lacks the social equity component present in other definitions such as the EU's or UN's.

Similarly, the EEA defines the green economy as one "in which environmental, economic and social policies and innovations enable society to use resources efficiently, thereby enhancing human well-being in an inclusive manner, while maintaining the natural systems that sustain us" (EEA 2012a, p.17). This implies a twin challenge of improving resource efficiency whilst ensuring a resilient structure and functioning of ecosystems, emphasising in any case the economy-environment interface over the human dimension of sustainable development. In particular, EEA interpretation of the green economy concept stresses the importance of two specific environmentally -related goals, namely (i) ensuring ecosystem resilience of the natural systems that sustain us (thus limiting pressure on natural systems so that their ability to function is not lessened), and; (ii) improving resource efficiency (thus reducing the environmental impacts of human activities).

As it emerges from the definitions above, to a large extent the green economy concept is at the same time operational and difficult to be captured from a statistical perspective, given that its main goals are largely identical to the ones of sustainable development. Still, there is a latent need to reflect in figures the technical and operational manifestation of the "new" economic model, as the transition to a green economy aiming to enable or even induce economic growth within environmental limits has become the long-term objective of economic policy programmes at all territorial levels.

This goal, alongside the underlying idea of creating new economic opportunities through the development of brand new economic sectors, or even triggering a new wave of innovation that would eventually lead to a different economic paradigm, are the main drivers that have made some statistical offices, e.g. Austria (Wegscheider-Pichler , A. 2012) to almost equate the green economy concept with the environmental goods and service sector (EGSS), at least when it comes to its measurement in statistical terms. Others such as France are also implementing the measurement of other activities considered as "green" (Greffet, P. et al. 2012). The Netherlands (Van der Veen, G. et al. 2012) and the Czech Republic (Hák, T. & Veselá, M. 2012) have opted for the OECD approach to measure green growth. Similarly, there have been issued a number of non official reports attempting to quantify the size of the green component of the economy in terms of Gross Value Added (GVA), number of jobs and exports by identifying the business involved in the production of EGSS though standard business classifications systems based on industry codes such as the European NACE or the North America equivalent NAICS (U.S. Department of Commerce Economics and Statistics Administration 2010; Rothwell et al. 2011; Pew Charitable Trust 2009; EUROSTAT 2009).

Still, the composition of the EGSS in terms of the economic activities and types of business included in it is very much disputed and the various assessments that have aimed at measuring its economic weight even within the same spatial context have provided very different figures (Rothwell et al. 2011). Some of the difficulties of accounting for the EGSS are highlighted by Wegscheider-Pichler (2012), Livesey (2010), Hass et al. (2012) and Kottola et al. (2012). Nonetheless, the main reasons of concern with regard to the EGSS as being assimilated to the green economy as a whole in statistical terms are related to the restricted scope that EGSS have in the economy. In a 2011 document prepared for the OECD entitled *Framework and tools for assessing and understanding the green economy at the local level*, Prof. Randall W. Eberts (2011) points out a number of potential drawbacks of adopting such a restricted approach:

- In the first place, any serious attempt to assess the green economy should take into account the often complex relationships within the supply chains that are involved in the generation of final product/services. While an end product or service might be considered "green", the processes that lead to the production of such end-use product or service may or may not be green.
- In the second place, spatial relations between the different businesses units involved in any specific supply chain should be considered as well. Particularly transportation, in terms of economic and environmental costs, should be taken into account when

identifying the products and services that constitute a green economy.

- In the third place, relations and linkages between entire sectors should also be taken into account while assessing the contribution of any specific product or service to the green economy, as the greening of one sector might bring about indirect impacts over other sectors and even on the economy as a whole.
- In the fourth place, it should be acknowledged that in absence of additional criteria or control measures, the development of EGSS might be even counterproductive for the environment, given that no explicit information on resource efficiency is provided for many products and services included in standard classifications.
- Finally, business specialisation is also ignored in most green economy assessments focused on EGSS. And this is relevant issue also from the accounting perspective as most approaches either consider a business as being entirely "green" or "brown", while most business involved in the production of EGSS often produce non-green products as well.

The overall rationale underlying this argumentation is that the green economy should not be reduced to a list of new economic activities. An economy might be actually *cleaner* or *greener* following to a wider implementation of environmental and energy efficiency processes and behavioural changes rather than to the proliferation of new businesses linked to the expansion of EGSS. This interpretation is fully aligned with GREECO understanding of the concept, as introduced in Section 3.3 below.

3.2. Setting the scene for the green economy: the green economy within the EU policy framework

As argued above, the concept of the green economy has emerged as a potential remedy to some of the key market and institutional failures that characterise the conventional development model, and as a more effective pathway to advancing economic, social, and environmental goals. While broad consensus on how to define the green economy is still emerging, it is nonetheless possible to survey the current EU policy landscape and analyse its contributions towards a green(er) economy:

3.2.1. The green economy and Europe 2020 strategy

In Europe, the green growth agenda is reflected in the new growth strategy, Europe 2020. Its flagship initiative "A resource-efficient Europe" contains the strategic transformations of the European economy through its objectives:

- "boost economic performance while reducing resource use;
- identify and create new opportunities for economic growth and greater innovation and boost the EU's competitiveness;
- ensure security of supply of essential resources;
- fight against climate change and limit the environmental impacts of resource use" (EC 2011c, p.3).

The Europe 2020 strategy builds on lessons learned from the Lisbon Strategy, recognising its strengths (e.g. setting the right goals of growth and job creation) but addressing its weaknesses (e.g. poor implementation, with big differences between EU countries in the speed and depth of reform). In addition, it also focuses on the need to recover from the economic crisis, whilst becoming more resource efficient. Consequently, even if the strategy does not use the green economy term, they both share common objectives and goals: pursuing economic growth while protecting the environment and increasing social cohesion.

In light of the Europe 2020 strategy several long term roadmaps (2050) have been developed for the transition to a low carbon economy (EC 2011g), as well as for the corresponding energy (EC 2011i) and transport systems (EC 2011a) of Europe. For the medium term (2020) the integrated energy and climate policy was adopted in 2009-10 and a range of additional plans and proposals for legislation is put forward (EC 2011c), including an energy efficiency plan (EC 2011f) and a new energy efficiency directive (EU Directive 2012/27/EU), a proposal for a biodiversity strategy (EC 2011d; European Parliament 2012) and a strategy for the EU

circular economy[7].

Among the latter, probably the most relevant strand is the integrated energy and climate policy aiming at "increasing security of supply, ensuring the competitiveness of European economies and the availability of affordable energy and promoting environmental sustainability and combating climate change" (Council of the European Union 2007a). The resulting EU legislation includes the so called 20-20-20 legislation, the strategic technology action plan (SET-plan) and the nuclear safety directive (EU Directive 2009/71/EURATOM (Nuclear safety) 2009).

The "Innovation Union" is another flagship initiative under the Europe 2020 that is influential to the green economy development (EC 2010a), given that innovation is a key facilitator of the green economy transition, through knowledge, skills and more efficient technologies. The Commission has also the ambition to mainstream green economy objectives into all policy areas and has submitted proposals, reviews and plans on a long range of policy areas, including Common Agricultural Policy (CAP), the Common Fisheries Policy (CFP), cohesion policy, energy infrastructure and trans-European networks, measures addressing the world markets for commodities and raw materials, water policies and climate change adaptation policies, among others.

Taken together, it is also clear that EU development policy is tightly connected to wider notions of green growth also in line with international institutions such as the OECD. This is evident in terms of short term development policy (the priorities of Europe 2020 strategy), long term strategies (Roadmap for moving to a competitive low carbon economy in 2050) and clear targets governing the consumption of key natural resources (the 20/20/20 strategy and an 80% reduction of GHG emissions by 2050).

In a nutshell, while not formally acknowledged as a basis of EU policy discourse, complementarily between green growth and between smart, sustainable and inclusive growth is more or less explicit in Europe 2020 strategy. Accordingly, within the scope of smart, sustainable and inclusive growth, green growth is deeply embedded within the "smart" and "sustainable" dimensions. Thus, it can be said that Europe 2020 strategy acts as a bridging policy concept at the interface of the economy (problematised by the current crisis), the environment (problematised by climate change, energy scarcity and ecosystem degradation) and society (problematised by the need for cohesion). It is structured in the same manner as sustainable development where economy environment and society are not only viewed in parallel, but through diverse feedbacks and synergies are also considered as mutually reinforcing priorities.

A summary of other cross-cutting and sectoral policies relevant for green economy is available in Annex 6 to this report.

3.2.2.   The green economy and cohesion policy

Since 1986, the objective of cohesion policy has been to strengthen economic and social cohesion. The Treaty of Lisbon, which entered into force in 2009, introduced a third dimension, i.e. territorial cohesion, stipulating that the European Union shall promote economic, social and territorial cohesion, and solidarity among Member States (EU 2007). This way, territorial cohesion has become a legitimate component and dimension of European cohesion policy. Furthermore, social, economic and territorial challenges shall be addressed on an equal footing, which subsequently points to the need to integrate spatial and regional policies.

The Green Paper on Territorial Cohesion by the European Commission (2008b) presented territorial cohesion as a means of achieving sustainable development by transforming diversity into an asset. The Green Paper emphasised that territorial analyses and territorial instruments help to take better account of the interactions and feedback loops between different policy fields principally with a view to designing more coordinated interventions

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[7]   http://www.euractiv.com/specialreport-recycling-society/european-parliament-backs-resour-news-512965

(ibid.). Thus territorial cohesion can be understood as an inclusive principle which allows to better target policy inventions and support the effectiveness of policy-making. Territorial cohesion will be an integral part of cohesion policy from 2013.

Along these lines, in the Fifth Cohesion report the Commission emphasised that territorial cohesion reinforces the importance of sustainable development, "functional geographies" and territorial analysis (EC 2010c). The report stressed that headline targets of Europe 2020 would not be achievable by policies formulated at the EU or national level alone. In contrast, overcoming territorial disparities through the right mix of national, regional and local governing structures should play critical roles in defining and implementing policy measures based on territorial specificities (ibid.).

The Territorial Agenda 2020 aims at establishing a common policy framework for addressing territorial matters in the EU (EC 2011l), linking territorial issues to the overall objectives of Europe 2020 strategy. With regard to the green growth process, the Territorial Agenda 2020 underlines that territorial cohesion should be understood among other things as a prerequisite for making the most of territorial potentials (i.e. development should be best tailored to the specificities of an area). Accordingly, the Territorial Agenda of the European Union fosters sustainable and smart development, knowledge based economy, networks, along with economic and social cohesion, deployed through territorial strategies. It could be said then that within the overarching framework of Europe 2020 strategy, EU regional policy is even more significant in supporting the development towards green economy development.

By definition, the cohesion policy has a strong regional dimension with the goal to improve cohesion between different EU regions. Cohesion policy therefore enables local and regional participation in a proactive, place-based policy approach – one that is desperately needed to understand, account for and sustainably take advantage of territorial assets that provide green growth opportunities.

Selected themes from the EU cohesion policy that are important from a green growth perspective include, among others:

- Territorial assets/territorial capital (e.g. cultural landscapes, natural and cultural heritage, trust etc.)
- Critical green mass: i.e. green networks, ecological corridors and preservation of areas of high ecological value.
- Balanced territorial development encompassing different types of territories.
- Quality of urban nodes, dynamism and competitiveness of cities, sustainability of their structures, their integrated development.
- Functional areas including urban rural cooperation, integration of border areas, coastal zones.
- Access to knowledge and diffusion of innovation. Regional clusters of competition and innovation.
- Intermodality of transport and greening of transport.
- Developing energy resources.
- Sustainability of tourism development.
- Trans-European risk management including the impacts of climate change and preparedness to natural and manmade disasters.

The cohesion policy supports regional development with a clear investment strategy that aims to increase competitiveness, expand employment and improve well-being, and protect and enhance the environment, providing a close link to the Europe 2020 objectives of smart, inclusive and sustainable growth. To make it more clear, cohesion policy focuses on some thematic objectives, or key components, which should be kept in mind when analysing the green economy from a territorial perspective. It is clear that the thematic objectives are very much in line with the dimensions (drivers/barriers/enablers) which are introduced in the context of the green growth process. They are overlapping since many of them are a prerequisite for a growth process and for a multi-dimensional sustainability process. In particular, cohesion policy funds can provide important financial support in implementing the shift towards a green economy. The funds under the cohesion policy are:

- The European Regional Development Fund (ERDF) may facilitate the green economy transition, differentiating the support provided depending on the region: (i) by triggering green economy in the pre-transition regions, and; (ii) by supporting it in the

transition regions.

- The European Social Fund (ESF) is not explicitly addressing the green job creation and delinking issues. However, the employment opportunities and social inclusion objectives go hand in hand with the green economic transition objectives.
- The Cohesion Fund provides a strong basis to promote the economic recovery and growth in less developed regions (< 90 % of GNI/capita than community average) by means of a green economy transition.

Besides the funds under the cohesion policy, there are other funds with the potential to contribute to the development of a green economy, namely:

- The European Agricultural Fund for Rural Development (EAFRD) under the CAP.
- The European Maritime and Fisheries Fund (EMFF) under the CFP.

During the 2007-2013 program period regional policy is either directly or indirectly investing roughly 30% (EUR105 billion) of structural and cohesion funds toward the theme of sustainable growth (EC 2011b). In order to ensure that this funding is directed as efficiently as possible, as well as to help coordinate the next funding period, the European Commission released the communication, *Regional policy contributing to sustainable growth in Europe 2020* (ibid.). As such, it represents an official dialogue of the impacts and effects of cohesion policy on sustainable growth, and it highlights a number of ways in which cohesion policy can aid in the materialisation of sustainable growth within European regions.

Each of these potential impacts generally falls under the umbrella of directly providing funding for sustainable growth investment and increasing local and regional governance capabilities to facilitate the inclusion of place-based sustainable growth opportunities. However, the ultimate aim of strengthening local and regional governance for sustainable growth is to induce green investment and materialise green growth. As such, cohesion policy could have the greatest effect on interventions that:

- Are either traditionally handled by local and regional institutions (implied an existing competency or familiarity).
- Where important territorial assets/capacities dictate potential.
- Where regions make investments in public procurement.
- Where new forms of local and regional collaboration between regions and municipalities can have the most impact.
- Where new forms of local and regional collaboration between public authorities and private actors can have the most impact.

Based on these assumptions, it is foreseen that regional policy ought to focus on new opportunities for, for instance:

- Investing in green building through proactive local planning and promotion of retrofitting existing buildings – given that it represents over 40% of final energy consumption in Europe (EC 2011f), it has the greatest savings potential of any sector.
- Renewable energy – given that it is explicitly based on in-situ natural resource assets and can provide growth opportunities especially for rural and isolated regions.
- Sustainable transport – given that the sector already benefits from high levels of regional funding and that a high potential exists in terms of transitioning modes of urban transport and promoting low carbon vehicles.
- Ecosystem services – protecting the natural environment while simultaneously promoting green infrastructure and natural capital.
- Risk prevention and mitigation – given that the threats of climate change are specific to individual regions or groups of individual regions.
- Promoting eco-innovation – through emphasis on strategic public-private partnerships regional policy can facilitate the development of business clusters in the field of eco-innovation.

The green economy and the future cohesion policy

To date, cohesion policies are implemented through sectoral and regional Operational

Programmes. The Regional Operational Programmes naturally have a regional perspective. Having in mind that most of the thematic objectives have a strong green economy dimension, cohesion policy is one of the policies of the EU with the biggest impact on green economy. This is (and will be) especially relevant for Less Developed Regions[8].

Against this framework, the European Commission has recently adopted a draft legislative package that will frame cohesion policy for 2014-2020. The new proposals are designed to reinforce the strategic dimension of the policy and to ensure that EU investment is targeted on Europe's long-term goals for growth and jobs (i.e. Europe 2020 targets). The European Commission has proposed a Common Provisions Regulation (EC 2012a; EC 2012b) to achieve closer coordination between the five existing funding programmes mentioned above. The proposal foresees the adoption of "Partnership Contracts" outlining the commitments of the partners at national and regional level, based on a "Common Strategic Framework" (CSF) comprising eleven thematic objectives that will guide the support of investments from all of the various EU programs and are closely linked to the Europe 2020 strategy. Besides identifying the thematic priorities, the Common Provision Regulation also identifies a range of key actions that could be carried out together under these thematic objectives (ibid.).

Thus, the EU Commission has suggested streamlining its structural and cohesion policy funds (EUR 376 billion for 2014-2020 programming period) to investments in low-carbon economy in all sectors, climate change adaptation and risk prevention and management, environmental protection, resource efficiency, sustainable transport and adequate network infrastructures. The other thematic objectives include communication technologies, competitiveness of small and medium enterprises, employment and supporting labour mobility, social inclusion and combating poverty education, skills and lifelong learning, institutional capacity and efficient public administration (ibid.).

For concreteness, selected themes from the future EU cohesion policy that are important from a green growth perspective include:

- Strengthening research, technological development and innovation.
- Investing in education, skills and lifelong learning.
- Supporting the shift towards a low carbon economy in all sectors.
- Promoting climate change adaptation and risk prevention and management.
- Protecting the environment and promoting resource efficiency.
- Promoting sustainable transport and removing bottlenecks in key network infrastructures.
- Enhancing institutional capacity and ensuring an efficient public administration.

GREECO project will produce territorial evidence relevant for the implementation of the CSF, providing inputs to: (i) the thematic objectives mentioned in the CSF, and; (ii) to the definition of the Partnership Contracts and programmes. In particular, GREECO will:

- Produce regional potentials for a green(er) economy: This output directly links to the first element ("development potential") mentioned in the Elements for a Common Strategic Framework (EC 2012c) as key in designing the Partnership Contracts and programmes. Particularly, GREECO will attempt to assess which are the regional potentials for green growth, basing on the presence of green economy driving forces / enabling conditions within regions.

- Produce regional typologies based on green economy potentials and present situation of green economies: This output directly links to the second element ("assessment of major challenges") listed in the Elements for a Common Strategic Framework (ibid.) as key in designing the Partnership Contracts and programmes.

- Deliver a comprehensive policy analysis based on territorial evidence: This output directly links to the third and fourth elements ("horizontal and vertical coordination") mentioned in the Elements for a Common Strategic Framework (ibid.) as key in designing the Partnership Contracts and programmes. From this perspective, GREECO will try to sort out which types of actions are at the disposal to regional and local governments and green economy networks and whether they differ between

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[8] Terminology within the proposed General Regulations for the 2014-2020 programming period

countries.

- Collect and process a new set of indicators: This output directly links to the fifth element (monitoring indicators) mentioned in the Elements for a Common Strategic Framework (ibid.) as key in designing the Partnership Contracts and programmes. From this perspective, GREECO will provide additional datasets and new indicators to fill current knowledge gaps as far as possible, as shown in the following slides.

3.3. The green economy in GREECO project: a territorial interpretation

Following to the conceptual discussion introduced in previous sections, it can be inferred that the green economy can be either understood as (i) an overarching development framework aiming at the consecution of sustainable development goals including environmental, economic and social targets (UNEP 2011); (ii) as a means for achieving a more resource-efficient production model, thus mainly focusing on the environment-economy interface (EEA 2012a; OECD 2011b), or; (iii) as a number of concrete economic activities that jointly form a growing economic sector – a "new green economy" – which in the mid term is expected to bring about an implicit environmental benefit (Rothwell et al. 2011; Pew Charitable Trust 2009; EUROSTAT 2009; U.S. Department of Commerce Economics and Statistics Administration 2010).

These differentiated approaches have given place to distinct measuring frameworks and tools that emphasise the economic, social and environmental dimensions of sustainable development to different degrees. All these approaches show several differences and points of convergence. Among the latter, it could be mentioned that all of them, as GREECO project does, assume that the conceptual basis of the green economy is the notion of sustainability and sustainable development.

EU and UN-UNEP views are the ones that pay more attention to the social dimension of the green economy. Their approach includes specific sets of indicators related to broader interpretations of human well-being beyond GDP classifications – which is explicit in UNEP strategy (UNEP 2012) –. On the contrary, EEA and OECD approaches, despite implicitly including the social dimension, mainly understand it as a "background component" of the green economy. Under this interpretation the social dimension would be an element contextualising the transition towards a greener economy and illustrating the characteristics of growth, rather than a core element of the green economies themselves. Accordingly, the concept of green economy would essentially develop along a bi-dimensional space defined by the vectors of environmental and economic development.

Against this background, GREECO understands the green economy as the transition towards an economic growth that takes place vis-à-vis strengthened social cohesion and a more sustainable use of natural resources, preservation of environmental capital and fewer environmental risks (OECD 2011a; OECD 2011b; UNEP 2012).

Consequently, the concept of a green economy as understood in GREECO is the operationalisation of the concept of sustainable development rather then simply growth of green economic activities (i.e. EGSS). From our perspective, whereas policy priorities in the 20th century often indiscriminately favoured growth of economic activities – production, consumption and investment – sustainable development is a principle of selective growth. Some activities should grow fast whereas others should be eliminated. The specific capabilities of the labour force, the firms and the capital stocks are more important than the mere amount of them.

From GREECO perspective though the most outstanding characteristic of existing initiatives focused on the green economy and green growth is the fact that all of them are fundamentally a-spatial. Indeed, none of the abovementioned methods take the territorial dimension into account as a core defining component of the green economy, not even as a factor facilitating or hindering the transition towards a greener economy. This makes highly relevant the approach of GREECO project, which will put the focus on the territorial dimension in three respects:

1. Territorial factors (e.g. relevant territorial structures impacting green growth) will be scrutinised as possible driving forces boosting or barriers hindering the transition

towards a green economy.

2. Territorial outcomes, understood as the regional patterns identified when analysing the potentials related to the green economy as well as the existing or new territorial phenomenon that are accentuated by the various elements of the green economy, will also be part of the analysis.

3. And, above all, the "territorial perspective" will drive all project activities, notwithstanding which green economy component, feature, driving force or policy dimension in analysed.

Accordingly, the concept of a green economy is understood in GREECO as one that results in enhanced regional competitiveness and cohesion over the long run, 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, targeting four relevant dimensions of sustainability, namely: (i) environmental, (ii) economic, (iii) social and, last but not least, (iv) territorial.

The **economic dimension** is where production and consumption actually takes place and where most of the impacts and opportunities for society and environment are generated. The economic dimension of the green economy has often been described as a matter of "genuine savings", sufficient to warrant capital basis necessary for maintaining a certain level of consumption. This aspect is important, but it misses the development aspect and also aspects that historically have proven to be more important threats to the level of consumption, cf. the recent cascade of first financial, then sovereign debt and now austerity crisis. Thus the empirical tools addressing the economic dimension should cover the government budget sustainability aspects as well as the investments in the capital stock enabling a future green economy and the productive activities related to the shift from 20th century solutions to green solutions.

The **environmental dimension** eventually supports all economic activities as a resource base or is impacted through discharges, pollution and waste and which from the green economy perspective has to be largely characterised by a constant natural asset base. The environmental dimension of the green economy is operationalised by the substitution of unsustainable flows of energy and materials through the economy, in general changing the structure of the physical flows from a throughput economy to a circular economy, favouring the use of recyclable and naturally degradable materials and more resource efficient use of all materials and energy flows.

The **social dimension** is where the actual benefits of the green economy are to be experienced in terms of lower exposure rates to pollution, environmental amenities and better jobs and whose multiple interventions (policies, behaviour, labour, investment, etc.) largely condition how the green economy develops. Beside that, the social dimension including, in particular, poverty eradication is an integral part of sustainable development. In Europe it is operationalised in the European policies for "inclusion" focusing on employment opportunities, access to education, health and social services, support of household budgets at risk of poverty and healthy living and work environments.

The **territorial dimension** of the green economy, which is overarching all three dimensions mentioned above and is the main analytical target of GREECO, refers to the geographical distribution of the physical features in the built and natural environment and patterns and flows of human activity. But it also relates to the fact that human activities are situated and practice-based, resulting in collective, situated, and provisional nature of knowledge and experience. GREECO hypothesis in this respect is that green economy development calls for a coordinated and integrated approach to green growth, territorial development and sector policies. Thus, in GREECO the territory assumes importance because part of the natural resources that production activities transform into economic goods are sourced locally, and because a big part of the externalities of economic activity impact to a large extent the territory where the economic activity takes place, but also in close relation with the governance level.

GREECO understands the green economy as **the transition towards an economic growth that takes place vis-à-vis strengthened social cohesion and a more sustainable use of natural resources, preservation of environmental capital and fewer environmental risks** (UNEP 2012; OECD 2011a; EC 2011h). 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.

The following Figure illustrates the main aspects of the definition above and their interrelations:
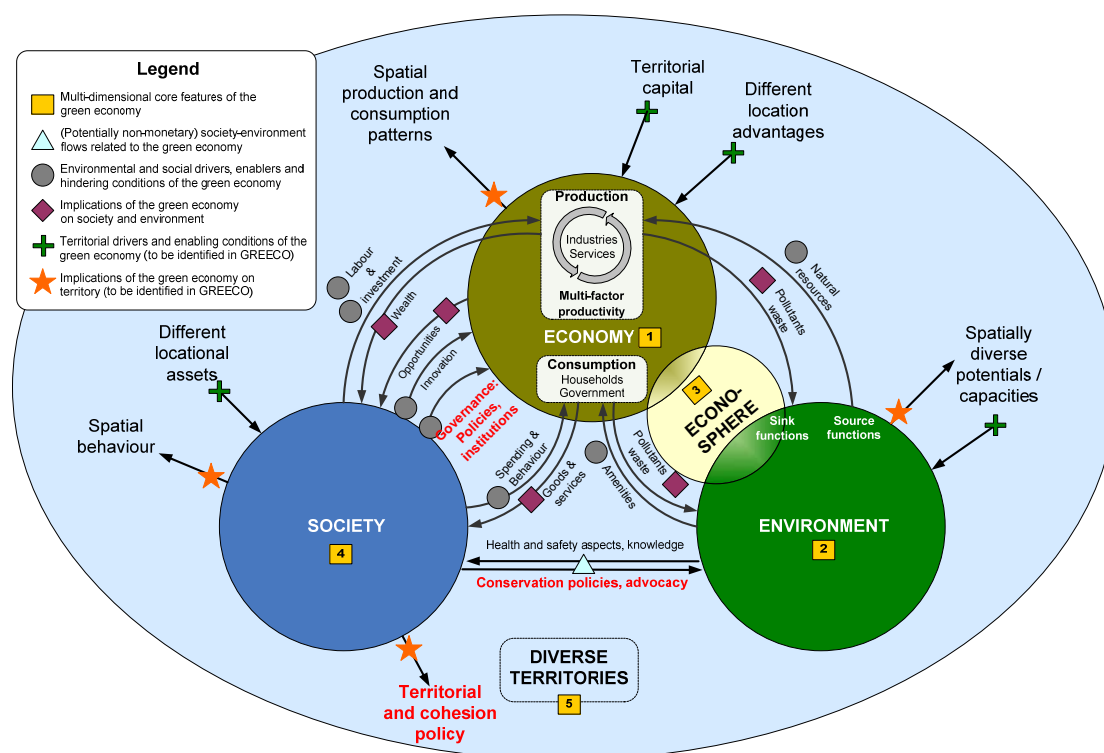
Figure 3   The green economy concept as understood in GREECO project

As shown in the diagram above, the aspects involved in the transition to the green economy can be analysed from two different perspectives:

Firstly: based on the literature can be said that the green economy is a three-dimensional concept, typically developed along three well defined dimensions: the economic, the environmental and the social. Each one of these dimensions contains key defining elements of the green economy to be considered in GREECO. But GREECO is going one step ahead by adding a fourth dimension, the territorial.

Secondly: the GREECO project will characterise the economies at various levels through quantitative indicators defining for a green economy and for progress towards a green(er) economy. These indicators allow studying the territorial and spatial patterns in economic, environmental and social terms and the progress towards a green economy. They include the interface between the economy and the environment (the so-called "Econosphere"), the social dimensions of the economy and the environment, the productive capacity of the economy and other broad categories, which can be classified as follows:

- **Core features**: by core features GREECO understands all the defining attributes of the green economy that can be considered internal to the economic, environmental, social and territorial dimensions and thus an expression of the actual level of development of the green economy. These attributes, represented as yellowish squares in the figure above, include spheres such as the economic structure, the environmental and resource productivities (Econosphere), the consumption structure, the natural asset base and functions (excluding renewable stocks), the social context, and the territorial structure. In sum, the core features capture the actual impact that the vast arrays of factors that condition green growth have over the economic, environmental, social and territorial dimensions.

- **Explanatory features**: by explanatory features GREECO understands the all the material and immaterial signals and responses – i.e. economic stimuli and economic consequences, respectivey – linking the economic sphere with the remaining domains. Depending on the orientation of the flows, these are further classified as driving forces, barriers, enabling conditions (from society, environment and territory towards the economy) or implications of the green economy (from the economic sphere to the remaining domains):

  o **Driving forces, barriers, enablers and hindering conditions**: in the figure above, the arrows identified by grey circles represent the flows from the environmental, social and territorial dimensions. As such, these flows condition and influence the economic development in many different ways and degrees. Within GREECO, special attention is being paid to key factors that foster green economic development, including the territorial and environmental capital (renewable resources and other territorial assets), innovation capabilities, policies and measures, consumption patterns, labour market, investment and financial and material in-flows, etc.

  o Green economy **implications**: the potential consequences of a transition to a green(er) economy are represented in the figure above as arrows - identified by plum-coloured diamonds - going from the economic sphere to the remaining ones. Possible implications include more opportunities (such as employment opportunities), increased wealth, fewer environmental externalities (reduced waste and residuals), and new territorial structures.

  o **Society-environment interface**: this dimension includes those links between the social and environmental dimensions that can be associated to a green economy but do not necessarily take the form of economic or material transactions. These exchanges are represented in the figure above as turquoise triangles and include components such as the environmental quality - from environment to society - and conservation and advocacy - from society to environment -.

In addition to this top-down approach, which in any case will be adapted to the "territorial evidence" collected as project evolves, regions and sectors are explored from a bottom-up perspective. These tasks will make use of perspectives from the stakeholders and agents of change based on desktop research as well as interviews and case data collection within case studies, besides the inputs received from sectoral analyses.

4. Gauging the green economy: data sources and indicators (Task 2.1.2)

The GREECO project aims at analysing territorial dimensions of the green economy in Europe. Within this context, three questions are in focus: Which *challenges* are faced by

which regions in the transition to a green economy? How do can regions accelerate *progress* towards a green economy? Which *policies*, instruments, actions, drivers, enablers etc are at work and how do they work? The project further intends to leave a set of indicators that can be useful for subsequent projects on related themes.

The datasets developed for analysing these questions are inspired by the large body of indicators developed in the EU. These sets of indicators describe challenges as well as progress and policies. Due to the irreducible complexity of the green transformations, they employ a wide variety of indicators, but select for each broader area a headline, lead or key indicator. This is even so for policy programmes measuring their success against targets assessed through these headline indicators. In the GREECO project, we take a similar approach.

In this framework, the GREECO project develops a database that will serve as a basis for interregional comparison in the analysis of the progress towards a green economy as it unfolds in the regions. The database will serve as a source for top-down analysis on the territorial patterns and disparities in the development of the indicators. It will also serve as a tool in the case studies for identifying the relevant characteristics of the regions and sectors that are being studied.

The database contains, as far as possible, a set of time series with territorial "wall-to-wall" coverage at sub-national territorial levels (NUTS-1+, LAU and gridded data) for the period of 2000-2010. This will allow studies of trends and developments though the 2000s in addition to the cross-section analysis of regional patterns at a specific point of time. Moreover, it is the intention that the data should be consistent with macroeconomic databases such as the AMECO database, thus allowing for full comparability with national and EU level macroeconomic trends and structures. It will be updated as the project proceeds.

The project has already reviewed a range of databases for describing sustainable development or the green economy that have been developed by the EU (*Sustainability indicators*)[9], the OECD (*Monitoring green growth*)[10], the European Environmental Agency (*Core Sustainability Indicators*)[11] and other ESPON projects[12]. a priority list of variables and indicators that will be developed first has been produced (see Annexes 2 and 3).

The main source of the database is the EUROSTAT database[13], which already includes a large number of variables at sub-national territorial levels on properties related to the transformation to a green economy. Many of these, however, have considerable gaps as to years and countries that must be filled out by "data mining" in the databases of national statistical institutes and other sources. Other important sources include the global emissions databases (EDGAR at JRC)[14] and E-PRTR at the EEA[15].

Thus, besides their relevance in terms of green economy performance and potentials, the main criterion for selecting usable indicators within GREECO project has been their regional specificity. This means that all the indicators identified within GREECO will have a "spatially-explicit" dimension from two different perspectives:

1. Firstly, the indicators considered in the analysis of regional performance and potentials enable the provision of a **regionally differentiated picture** (i.e. be spatially mutable), even if some kind of data disaggregation technique is required.

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[9] http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/indicators

[10] http://stats.oecd.org/Index.aspx?DataSetCode=GREEN_GROWTH

[11] http://www.eea.europa.eu/data-and-maps/indicators/

[12] http://database.espon.eu/espondb/data

[13] http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database

[14] http://edgar.jrc.ec.europa.eu/index.php

[15] http://prtr.ec.europa.eu/

2. Secondly, the indicators considered in GREECO analysis aim at **capturing spatially explicit processes or features within regions** as far as possible (e.g. land take per GDP, accessibility/connectivity to green industry clusters or natural assets, landscape issues, etc).

Box 2 Spatially-explicit versus spatially-blind indicators

The Fifth and Seventh cohesion reports by the European Commission support the Europe 2020 strategy by showing how regions and cohesion policy can contribute to achieving its objectives, understanding regional diversity across Europe as an asset for sustainable development.

The Fifth Cohesion Report was the first cohesion report to include the territorial dimension alongside social and economic dimensions within EU Cohesion Policy. In this Report the Commission proposes to further strengthen the regional and urban dimension of cohesion policy and its partnership principle. The report stresses the importance of access to services, "functional geographies" and territorial analysis, adopting a more flexible approach towards territorial cohesion issues, advocating the adoption of "flexible geographies" (EC 2010b, p.60). By doing so it also pays more attention to climate change and the environment by emphasising the ways in which territorial specificities play concrete roles in shaping green development opportunities. For example, it argues how achieving the Europe 2020 target for renewable energy production will require very different responses, ranging from a focus on solar, wind or biofuels depending on socio-economic and natural conditions in different regions. It also points to the significant potential for increased energy efficiency, especially in buildings and transport in urban areas, and it raises specific concerns in Eastern Member states; particularly in terms of waste and water management.

The Seventh Progress Report on Economic, Social and Territorial Cohesion insists on this place-based approach, stressing the urban and regional dimension of the Europe 2020 strategy by showing how cities and regions are faced with different combinations of development problems and growth potentials. This fact is presented as one of the main reasons explaining why cohesion policy actually uses an integrated approach that can be adjusted to local needs and opportunities (EC 2011e).

Thus, when it comes to collecting territorial indicators connected to the green economy regional performance and potentials, GREECO project will adopt a place-based approach that entails (i) collecting and producing indicators at the regional level whenever possible (this also implies downscaling those datasets available only at the national level, when needed) and (ii) when relevant selecting a number of indicators covering the headline spatial priorities identified in the Territorial Agenda 2020 (EC 2011), namely:

1. Promoting polycentric and balanced territorial development
2. Encouraging integrated development in cities, rural and specific regions
3. Territorial integration in cross-border and transnational functional regions
4. Ensuring global competitiveness of the regions based on strong local economies
5. Improving territorial connectivity for individuals, communities and enterprises
6. Managing and connecting ecological, landscape and cultural values of regions

This will be done both using spatial indicators directly linked to the abovementioned priorities and exploring the availability of indicators illustrating the "territorial keys" brought forward by Böhme et al. (2011) as explicit territorial components of the Europe 2020 strategy:

1. Accessibility
2. Services of general economic interest
3. Territorial capacities / endowments / assets
4. City networking
5. Functional regions

Within this framework, the GREECO project will explore top-down as well as bottom-up approaches to analyse aspects of green jobs, production, consumption, investment and exports.

One particularly relevant top-down objective of GREECO project is to disaggregate green

employment or green GVA for which sectoral data exists at national level. A starting point for this is offered by the EUROSTAT EGSS statistics (EUROSTAT 2009). First tier and full employment effects of green production and investment activities can be derived and possibly sectorised. Assuming that all regions have the potential of getting the same share of green jobs or GVA within each sector, a total regional potential could be calculated. It would make the regional potentials for green jobs or GVA differ by their industrial structure. The green performance of the sector would then be reflected in the degree to which the regions actually realise this potential. The bottom-up studies of regions and sectors are expected to generate a better understanding of regional approaches to do assess this performance.

Another key issue in green economy are renewable energy potentials. The economic value of the renewable energy potentials of the European regions, e.g., at the NUTS-2 level is not well described. Previous studies, including previous ESPON projects (e.g. Rerisk) and other assessments like the one jointly performed by the EEA, ETC-ACC and REGIO-GIS for the Fifth Cohesion Report (EC 2010c), have concentrated on theoretical and technical potentials as reflected by, e.g., wind-speed data. The GREECO project attempts to take this a step further by focusing on economic potentials, do it by NUTS-2 regions and generate estimates of regional resource rents from renewable energy resources, as illustrated by the draft exercise on wind energy potentials included in Annex 7 to this report.

5. Gauging the green economy: the territorial perspective (Task 2.2.1)

The role of this chapter is to introduce a territorial dimension to be applied in the various tasks of the GREECO project, both top-down and bottom-up. This serves to support two of the main aims of GREECO: (i) to determine what territorial concept(s) are most important for achieving the goals of Europe 2020; particularly the goal for sustainable, greener growth. Put another way, what are the assets and handicaps of territories (administrative but also functional regions, cities and rural areas) for creating a green economy (Böhme et al. 2011). And (ii), how is the green economy best understood from a territorial perspective.

Just as the conceptualisation of the green economy (Task 2.1.1) provides a top-down concept (including a scoping of potential indicators), this "territorialisation" serves to introduce an overarching territorial dimension that will direct the territorial analysis of green economy within GREECO. As such, the work undertaken in sector analyses and case studies will then feed from the bottom-up into to strengthen GREECO's understanding of the territorial dimension. Therefore, even though sectoral and territorial dimensions are represented by different research tasks in the GREECO project, their analyses are anything but individual components of the research process. This is in line with the need of a new type of policy approach, one that is neither sectoral nor territorial, but comprehensive and integrated (ibid.).

"Territorial" refers to the geographical distribution of physical and non-physical features in the built and natural environment. Physically, this could reflect localities and flows of natural capital, people and goods. Non-physically, it embraces synergies and differences in socio-economic, political and cultural aspects of development - such as distributions of wealth or health, demographic patterns, administrative boundaries or different types of governing structures for planning and decision making (Duhr et al. 2010). But it is also reflected in the fact that human activities are situated and practice-based, resulting in collective, situated, and provisional nature of knowledge and experience (Lave, J. & Wenger, E. 1990), which could be seen as a contrast to a pure rational-cognitive view of knowledge. Crucial in this practice perspective is the acknowledgement that the individual and collective actions between humans and with the environment are embedded in a broader environmental, social and structural context. With this in mind, it is essential to highlight that a clear and concise territorial dimension of a green economy shows not one, but many (literally countless) overlapping, intersecting, complimentary and even conflicting territorial dimensions that are implicated by the green economy.

GREECO working hypothesis in this respect is that green economy development calls for a coordinated and integrated approach to green growth, territorial development and sector policies. Countries and regions would need to focus on an integrated development in order to

use the capacity they have in the best way. To do so policies need to be coordinated, both towards sectors but also towards consumers and towards developing structures in society (public spending on infrastructure, public procurement, etc.). Here policies targeting labour market, enterprise and innovation, energy, transport, rural development, urban development and planning might be very important components to be integrated into green growth strategies. Individual policy strands also have to be developed in such a way that the territorial dimension (regional differences) is taken into consideration and utilised. That is, a development in line with the EU 2020 strategy of place based development.

Regions provide plenty of resources for generating growth strategies and sensible innovation policies are needed in order to implement these potentials. Local knowledge provides an excellent starting point for development of these policies. However, besides investments in social capital and educational systems with strengths in fields related to the potentials of green economy policy, green economy should be further qualified by adding a territorial dimension in support of detecting territorial strong and weaker points, as well as territorial potentials of cities and regions regarding the green economy.

5.1. Territorial factors and outcomes

As it has been argued above, the territorial dimension of the green economy shows not one, but many overlapping, intersecting, complimentary and conflicting territorial dimensions that are implicated by the green economy. These have been initially identified through the conceptualisation task (Task 2.1.1) and will be deepened and added to in the sector reports and case studies. In order to provide a clear and operable structure of the territorial analysis in these tasks, we propose to discuss relevant territorial perspectives being either the territorial analysis on factors of the green economy or territorial outcomes of the green economy as detailed below:

- Territorial analysis on factors consist of:

    o Regional analysis of current performance in relation to individual factor(s) that drive/enable or hinder achieving a greener economy. These are mainly related to the current performance of European regions in relation to:

        ▪ Natural, built or human capital
        ▪ Waste and emissions as by-products of society and economy
        ▪ Consumption of materials including energy.

    o Spatial analysis of other drivers and enablers related to policy and governance or other existing territorial concepts that are determined to be important factors affecting development of the green economy.

- Territorial outcomes consist of findings and conclusions that, based on the territorial analysis of factors of the green economy seek to discuss:

    o The regional patterns identified when analysing the potentials related to the green economy.

    o Existing or new territorial phenomenon that are accentuated in one way or another by pursuing the various elements of the green economy in European regions.

Based on the territorial analysis of factors of the green economy, territorial outcomes are first introduced while discussing drivers and enablers and regional potentials within the sector reports. They are then elaborated with more detailed analysis in the case studies. These outcomes discuss relevant territorial-bound patterns, processes, perspectives that are forecast to influence the development of greener economies either positively or negatively. At this early stage and based on previous research, examples of territorial outcomes that will be elaborated in GREECO include: urban-rural interactions, land use multifunctionality, the role of local, place-based, tacit knowledge, as well as the influence of settlement structure on green economy potential.

5.2. Structuring the territorial approach of GREECO

As outlined above, the territorial factors and outcomes constitute a highly complex structure showing both similarities and differences between the green economy sectors. The fundamental level of complexity is even further discussed in Section 3.3 of this report where Figure 3 presents a conceptual model of the green economy showing how the territorial and spatial characteristics of the economy are cross-cutting and interweaving the quantitative indicators that are considered defining a green economy as well as indicating the progress towards a green economy. In order to manage this complexity it is important to generalise it to a set of factors that is understandable and operational for deciphering the territorial dimension of the different sectoral approaches; in particular, to ensure that the different reports contribute to a comparable analysis.

And in this context it is important to emphasise the concept of "optimisation" as this will be a general measure of "best possible approaches" under the overall goal of achieving sustainable development; or as the OECD puts it, green growth relating to a general economisation of the basic production factors (materials, energy, labour, land) as well as reducing pollution, greenhouse gas emissions, minimising waste and inefficient use of natural resources, and maintaining biodiversity (OECD 2010).

The basis for such an exercise is the fact that the territorial dimension of the green economy and green growth fundamentally is based on characteristics of the material world. This material world is constituted of: physical characteristics (qualities, quantities), material characteristics of territories (distances in space and time, knowledge structures, relationships between territories, etc.), and the managerial characteristic that are needed in order to manage these realities. The result is what has been characterised below as *the general characteristics of the territorial dimension*:

1. Physical characteristics

    a. From non-renewable to renewable resources
    b. Quality, Efficiency, and Diversity in production
    c. Quality, Efficiency, and Diversity in consumption
    d. Recycling
    e. Waste reduction

2. Territorial characteristics

    a. Quality, Efficiency, and Diversity in territorial structures, including optimising area and non-area based distribution, and optimising reproduction and urban-urban and urban-rural interaction

    b. Quality, Efficiency, and Diversity in territorial connections, including optimising transport and information connections.

    c. Quality, Efficiency, and Diversity in territorial lay-out and consumption, including space, material and energy savings, as well as territorial multi-functionality and diversity.

    d. Quality, Efficiency, and Diversity in knowledge and experience distribution, including characteristics of knowledge and knowledge diffusion.

3. Governance characteristics

    a. Scale of policy support of policy coordination and implementation
    b. Consideration of EU territorial policy of the EU
    c. Ecosystem Services Management

There is an obvious difference between the three sets of characteristics due to what are the core material elements to be included. It goes without saying that the key element for the territorial dimension is *the territorial characteristics*. But the physical as well as the governance characteristics and constraints are needed in order to generate the territorial analyses. The *physical characteristic*s are needed because we need to know not only what, where and how much is produced and consumed, but also qualitative characteristics such as durability, fragility, etc. are needed. And last, but not least, the *governance characteristics* are

needed because we need to know under which condition territorial characteristics are to be coordinated, facilitated and, in general, managed.

5.3. An example of a territorially-relevant dimension of the green economy: energy productivity and delinking

Under present EU2020 policy framework, the delinking strategy is essential to every member state and any regional economy. The process entails many dimensions, but from a broad economic perspective it is usually analysed by decomposing the growth of per capita emissions into annual average growth rates of the following variables:

Variable	Abbreviation	Growth rate
GHG-emissions	Z	z
Gross inland energy consumption	GIC	gic
Final energy consumption	FEC	fec
Employment	L	l
Population	N	n

The average annual growth rate of key indicators can be defined by

Key indicator	Formulation	Growth rate
Emissions intensity	Z/GIC	z-gic
Gross per final energy consumption	GIC/FEC	gic-fec
Energy intensity of employment	FEC/L	fec-l
Employment rate	L/N	l-n

The growth of per capita emissions can then be decomposed into these four factors. The result is shown in the figure below:
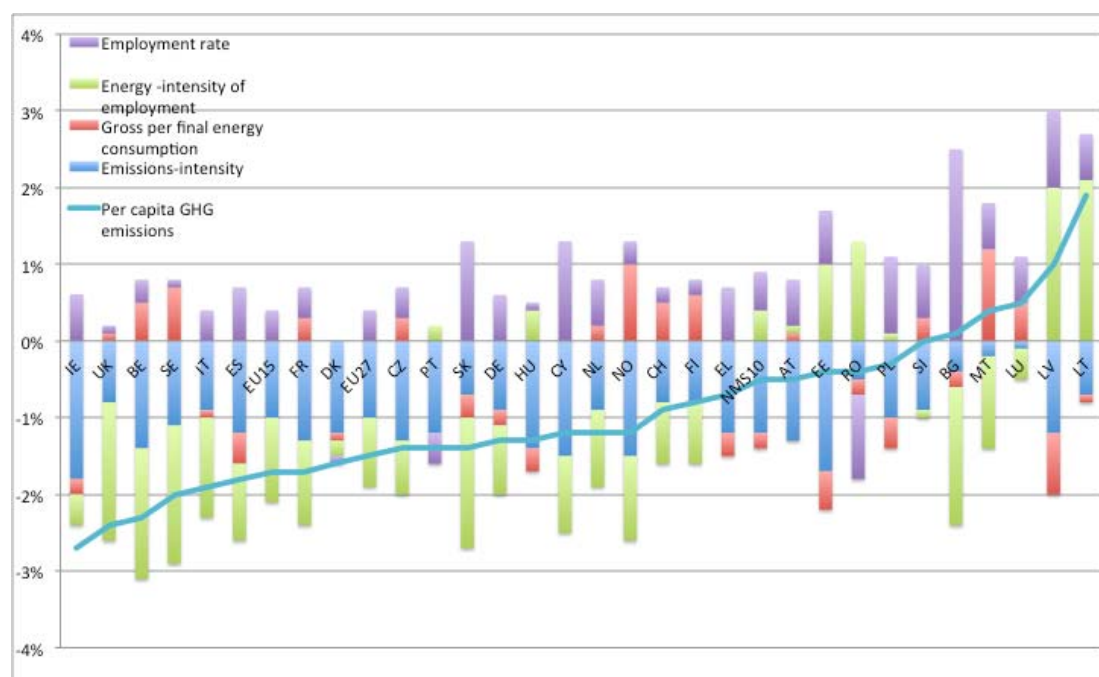
Source: own calculations based on Eurostat data.

Figure 4   Factors affecting the growth of per capita GHG emissions 2000-09 in the EU

As shown in Figure 4, in which countries are arranged according to the growth in their capacity emissions, the emission intensity of energy is an important factor in reducing emissions in all countries. It reflects that the use of the most CO_2 emitting fuel in power and heat production, coal, has not grown whereas a significant increase in electricity and heat

generation has been based on other energy sources.

The gross per final energy consumption reflects the transformation loss of the energy sector. It may, however, also be affected by the changes in the amount of energy that is imported. Countries with small emission reductions or even growth have experienced high growth rates of employment and some of them also of energy use per employed. Bulgaria represents an interesting exemption with high growth of employment but also a high growth of energy productivity.

The combined progress in energy savings and employment in the EU is top priority in the Europe 2020 strategy, but also a set of targets that involve an inherent conflict. Figure 5 below analyses this challenge in more detail:

Source: own calculations based on Eurostat data.

Figure 5   Delinking of final energy consumption from employment growth in 2000-10 and the implicit EU 2020 delinking targets

The 2020 strategy targets simultaneously to increase employment per capita (employment rate) to 75% in 2020 and reduce energy consumption by 20% less than the projected energy consumption in 2020. The average annual growth rates of the employment rate and gross energy consumption per capita are denoted *l* and *e*, respectively.

The position of the countries in the diagram can be used to categorise the delinking performance of each country in the period 2000-10. The diagonal line in the diagram divides delinking countries from relinking countries: Delinking means that final energy consumption grows less than the unemployment rate whereas relinking is the reverse change. Absolute delinking means that the energy consumption actually declines whereas the employment rate is decreasing. Absolute relinking means the opposite: employment declines whereas energy consumption increases.

The split between relinking and delinking countries was about 50-50, but many with a very small margin. EU15 countries dominated the delinking side whereas many NMS10 countries relinked. It should be kept in mind that the change in employment and energy consumption through 2000-10 went through a boom period followed by a severe recession.

Some countries experienced a reduction of final energy use alongside with a reduction in employment, but this cannot be characterised as sustainable development. As it follows the reduction in employment, it must be expected to reverse when the employment rises again.

The Europe 2020 targets include the aggregate targets of an employment rate of 75% and a final energy consumption of 20% less than the projected level in 2020. The growth rates required to reach these goals from 2010 through 2020 are calculated based on the actual energy consumption and employment rates in 2010. The targets for many member-states differ slightly from the overall EU target and this is reflected in the employment growth requirements.

Against this backdrop, the question arises about the regional disparities of energy intensity and the changes in these through the 2000-10 period. Map 1 below shows the average energy intensity in the European NUTS-2 regions measured as the ratio of final energy consumption to GDP.

Final energy consumption is the residential, transport and otherwise industrial energy consumption, which can be assumed to depend on the economic growth. The energy industry consumption includes a considerable loss that is linked to the choice of sources and technologies for primary energy supply rather than to GDP. Moreover, it can be located in other regions than the final energy consumption region. A considerable fraction of final energy consumption does, however, not vary in proportion to GDP, but in proportion to the amount of energy consuming floor area, appliances etc. and the energy standard of these. In the long run, a higher GDP implies a larger stock of energy consuming stock of fixed capital and durables, but not necessarily with a low energy efficiency.

The map is based on a dataset that is still under development. For the countries where no information on regional energy consumption has been found, (BE, BG, CH, FI, IE, IT, NL, PT, RO, SI, SK, TR) the national energy intensity has been assigned to the NUTS-2 regions. The statistics for the other countries is not complete for all years, but the data suffices to give a picture of the pattern of energy intensity disparities among the regions.

The energy intensity is very high in the new member states, but it is also decreasing at the fastest pace in these regions. Some regions in the new member states are already approaching the level of energy intensity prevailing in the EU15.

Some other countries have specialised in energy intensive industries, e.g., due to abundance of hydropower (NO) or of natural resources like timber and minerals requiring energy intensive processing (SE, FI).

This means that there is not a monotonously declining relationship between energy intensity and sustainability. Regions that specialise in the energy intensive production allow other regions to specialise in production with low energy intensity.

With the time series of energy consumption and emissions, it will be possible to characterise the regions according to their progress in the indicators for emission intensity, transformation efficiency, energy delinking and employment.
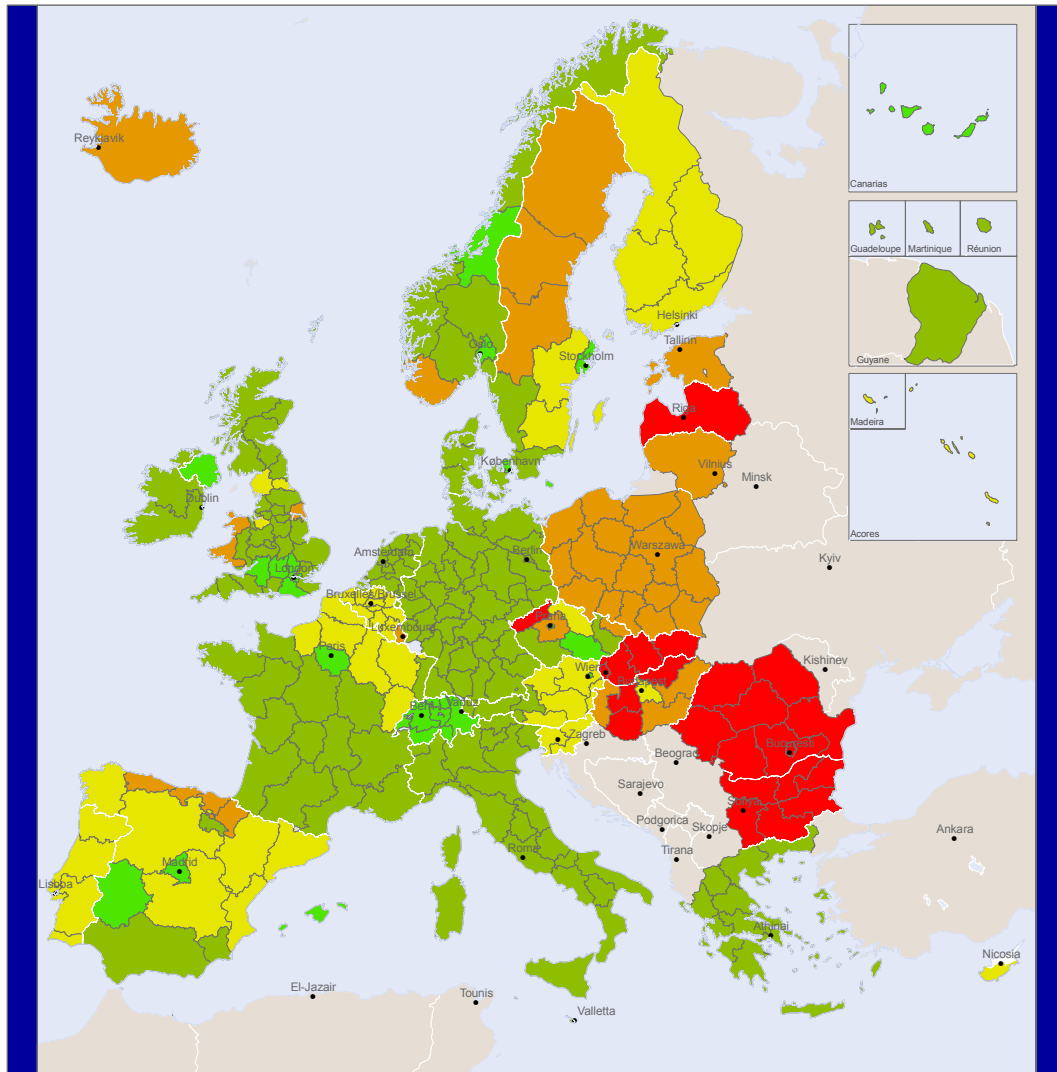
Final energy consumption (in Tera Joules)/ GDP (in million €)

- 0,715204 - 3,092399
- 3,092400 - 4,915376
- 4,915377 - 7,104609
- 7,104610 - 11,655127
- 11,655128 - 34,601081

Map 1 Average energy intensity by NUTS-2 regions 2000-2010[16]

6. Gauging the green economy: the sectoral perspective (Task 2.2.2)

This section introduces the sectors that are under investigation by GREECO. This includes a rationale for the inclusion and organisation of the sectors, as well as how the sectors have been defined – both from a statistically, but also from a conceptual perspective –. Discussion

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[16] So far regional figures at NUTS-2 level have been collected from different sources for the following countries: NO, SE, EI, UK, FR, AU, ES, DK, HR, HU and CZ. Other countries have been represented using national averages: BE, BG, CH, DE, GR, FI, IE, IT, LV, NL, PL, RO and SK. The map serves only as an illustration of ongoing work.

will also show how the sector analyses relate to the regional performance assessment (Task 2.2.3), drivers and enablers analysis (Task 2.2.4), assessment of regional potentials for a transition to the green economy (Task 2.2.5) and for the overall policy analysis (Task 2.5).

6.1. Presentation and rationale of sector structure

The sectors under analysis in GREECO are directly linked to the commentary of the ESPON Specification (Version 18, published January 2011). It was asked that any application "shall focus on the following 6 sectors, to which a large part of cohesion policy investment in environment is allocated..." (pg. 7). These six sectors are: Agriculture and Food, Forestry, Manufacturing, Renewable Energy, Tourism and Transport. It was then stipulated that 3 additional sectors, which cross-cut the above sectors and possess clear territorial dimensions, should also be considered. These include: water and waste management, building/ construction and green research activities (or the implementation of clean technologies such as carbon capture technologies).

The nine sectors identified in the specification have been considered by GREECO and are carried forward by GREECO as sectors to be investigated on an equal footing. They are:

- Bioeconomy (forestry, fisheries and agriculture)
- Building and construction
- Energy production
- Green research and eco-innovation
- Manufacturing
- Tourism
- Transport
- Water management
- Waste management

In a policy perspective, the rationale for including these sectors in the GREECO analysis is first and foremost due to the fact that each sector has strong implications for meeting the EU's policy goals of Smart, Sustainable and Inclusive growth. For example, in a Smart perspective, it is clear that Europe will continue to rely on a growth economy, and one that operates in the context of globalisation and global competition. As such, Europe needs to rely on its existing strengths, research and innovation-led production, consumption and export of goods and services. In a Sustainable perspective, it is obvious that the management of energy, buildings and construction, transport, water and waste management, as well as the bioeconomy have explicit connections to the way we consume a host of key natural resources. And in an Inclusive perspective it was already mentioned that these sectors are a strong focus of future Cohesion policy investment for the environment (EC 2012b). Furthermore, these are sectors which have strong territorial aspects, either on their own, or equally important and novel, in terms of linkages to each other. Deciphering these linkages and understanding how the territorial impacts of these linkages can be used to advance development of the green economy will be an important contribution of this project.

At the same time, the relevance of the chosen sectors for GREECO can be conceived in relation to the importance of *territory* when considering regional performance and potential of the green economy. To achieve this, we view the sectors in a "hierarchy" of territorial-bound "building blocks". This hierarchy perceives the basic needs and principles of land and resources as a point of departure, and moves all the way to the role of ensuring a sustainable future. In doing so, Figure 6 comprehensively accounts for the most important activities that will allow us to merge goals of growth and the environment. This hierarchy of sectors is characterised as follows:

1. Maintaining and developing a green territorial base: The Bioeconomy (forestry, fisheries and agriculture) as well as the input and output flows of Water and Waste management.
2. Ensuring and developing a green liveable environment: Building and construction, Manufacturing and Energy
3. Maintaining and developing the territorial connections: Transport (mobility and trade)
4. Promoting and enhancing the green territorial experience : Tourism

5.   Ensuring a future green development: Green research and eco-innovation
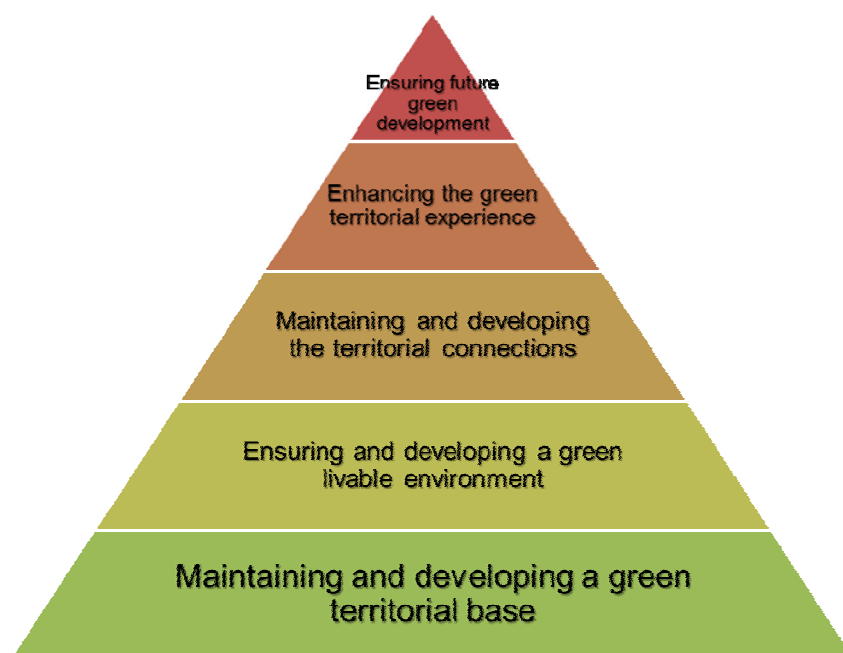
Figure 6   Territorially relevant sectors in the green economy

With this collection of sectors GREECO covers a broad spectrum of economic activities that account for a majority of the interactions between society and economy, and the environment. However, selected sectors with large economic contributions are not directly considered. For example, the finance sector is not explicitly acknowledged, but the reason for this is that its main resource input and output is in relation to resource consumption for electricity and heating/cooling. This perspective is taken up explicitly in the building and construction sector. One resource intensive sector not considered is the mining of non-energy products and there are multiple rationales for not including it. First, it is not an activity that, by nature, is either green at present or has the potential to become significantly greener in the future. Second, the policy and governance perspectives of advancing efficiency in mining is almost exclusively driven by the ongoing development of the European Emissions Trading Scheme (ETS), which makes it rather uninteresting to investigate comprehensively. Third, given that such a large share of mineral extraction are used as inputs into other sectors (especially buildings and infrastructure), it is assumed that green interventions to reduce input demand de facto improves resource performance of mining by reducing demand for such resources.

There are a number of small differences between the final list that GREECO proposes and the division of sectors in the specification. Perhaps the most important of which is the fact that GREECO includes the 6 main sectors and the 3 "cross-cutting" sectors on an equal footing. There are two reasons for this: first, all identified sectors have irreplaceable implications for achieving a balanced and green economy in their own right. Perhaps no better example exists than for the building/ construction sector. Not only does 40% of final energy consumption take place in buildings (EC 2011f), but the construction of buildings (and infrastructure) is the second largest consumer of raw materials in the EU - where construction and demolition activities alone account for 33% of our annual waste (EEA 2010). With that being said, the Roadmap for moving to a competitive low carbon economy in 2050 (EC 2011g) states that GHG emissions from buildings can be reduced by roughly 90% by 2050. This clearly shows an example of a "cross-cutting" sector that has an incredible potential in its own right.

A second reason for the equal footing of all sectors is to ensure that all the important connections (both mutual reinforcements and potential conflicts) between sectors are discovered and analysed by GREECO. Further, this responds to the fact that even though this is a sector analysis, emphasising the territorial dimension often comes from looking beyond the box of sector specific issues. As such, we believe that discovering the connections between sectors, as well as their associated territorial dimensions, is conceptually most

straightforward when all sectors are considered vis-à-vis one another.

The remainder of the differences are mainly related to issues of grouping and nomenclature:

- Water and Waste Management have been separated. While some perspectives of greening these sectors can be considered together (for instance waste water and waste can be harvested for energy production), their territorial perspectives, policy relevance and drivers and enabling conditions are, for the most part, very separate perspectives.
- Agriculture and Food, Fisheries and Forestry are grouped as Bioeconomy. They will be largely investigated individually, but are grouped together because they are each "traditional" land and water based resource sectors that, for the most part, operate mutually exclusively in spatial terms.
- Renewable Energy is broadened to Energy because of the critical importance of energy efficiency for meeting the EU's policy goals. Efficiency of energy transmission will be taken up here while efficiency issues linked to other sectors will be investigated as such.
- Green research activities (or the implementation of clean technologies) is consolidated to Green Research and Eco-Innovation because of the European research and policy focus garnered by the principles of Eco-Innovation, which is a term used for innovation across the spectrum of key economic sectors in Europe.

6.2. Sector analysis

The sector analyses combine quantitative analysis –on the regional performance of each sector, and on the future potential it has to become a contributor to the green economy – with qualitative analysis on drivers and enablers, and their associated territorial dimensions.

Quantitative scoping of each sector is first defined using NACE codes. Our own expertise combined with relevant sector reports have been used to define each sector in this NACE perspective. The classification used for defining employment and GVA from a quantitative perspective is shown in Annex 1. This provides a regional understanding of the importance of each sector in terms of key structural business statistics (SBS) such as gross value added (GVA) and employment. This will be undertaken at the NUTS-0 or NUTS-2 level depending on data availability.

A quantitative overview of each sector will further define the production (of goods and services) and consumption (of natural resources) characteristics of each sector. This not only provides a factual basis on the relevance of each sector for contributing to green regional economies, but it is also a first step in identifying the linkages with other sectors and society; for instance between agriculture and forestry as providing inputs into the production of the energy sector, which in turn serves as an input into key energy consuming sectors. However, some of these investigations into linkages will have to benefit from an approach where case study investigations are used to a large extent since it is apparent that European or global investigations does not seem to be available or fruitful to work with. For instance, the approach for the tourism sector will have to be based on 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[17].

Qualitatively speaking, identifying the drivers, enablers and their relevant territorial dimensions revolves around a clear and operational concept of what the green economy means to each sector. To achieve this, it is important to provide some background into the notion of how the green economy is distinguished from what could be considered the "brown" economy for each sector. This naturally lends itself to a problem statement, which states what are the main problems (trends) in each sector today and to what extent the EU expects it to

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[17] The case studies are performed to learn more about the territorial dimension of green economy/growth, but they will also focus on governance issues, policy and other drivers. As such, these case studies will be a vital component into the sector analysis and will provide a possibility to focus on specific sector that are important in each region and can provide more explicit examples of issues discovered in the desk based research.

be greened in the upcoming decades. None of this research will be overly innovative; in part it will be based on literature reviews of the sustainability concepts for each sector (i.e. OECD sector sustainability reviews), but it will be especially focused on a comprehensive review of key EU policies for each sector and how they relate to the green economy. This can be considered the "core" of the sector analysis, as a comprehensive understanding of the greening process of the sector, as well as a policy overview, is the main ingredient for identifying drivers and enablers.

Using both the quantitative and qualitative research as a basis, the process of developing a measure of regional performance and potential of the green economy for each sector will be pragmatic and sector specific. This keeps in mind the incredible lack of relevant regionalised data, and means that statistical techniques with proxy data could be used for some sectors. For other sectors this approach will not be possible and discussion on future potential will mainly be qualitative – oriented towards drivers and enablers, especially those with a territorial dimension –. Nevertheless, the overall approach will be to gather the appropriate indicators accounting for green economic production, consumption of key environmental resources, and/or the production of emissions or outputs and assess performance in relation to a regional comparison in Europe or distance to policy target.

Obviously the key value added of the sector analyses will be the "territorial glasses" that will be worn throughout their production. In the policy perspective this must include a reflection on how EU territorial policies that administer structural funds acknowledge each sector, as well as a scoping of the most important governing institutions (transnational networks, agencies, institutions, etc.) that support the development of the green economy for each sector. The territorial dimension will also be emphasised in the quantitative analysis through the aforementioned regionalisation (i.e. changing the geographical scale of analysis) of indicators of green economy potential for at least some sectors. This is an important undertaking of the project and will provide state of the art spatial interpretations of green growth potential.

However, we must go further than this to truly identify which territorial dimensions that are drivers and enablers of green growth for the different sectors. In this connection, the territorial dimension of the green economy is described in Section 5 of this report, but in short, it is clear that each sector must consider the implication of key territorial issues such as territorial assets, settlement structure and urban-rural connection, transport flows and infrastructures, and not least land use. In this regard, sector specific findings will be utilised from existing ESPON projects such as TRACC, EU-LUPA, LIVELAND, ReRisk and EDORA, among others. This analysis will provide a base for analysing how each sector can contribute (has a potential to contribute) to regional green growth, based on territorial "conditions". This can be seen as the main way in which the sector analysis feeds into the analysis of regional performance, as well as potential, in relation to a green economy. At this stage, the sector analyses are in the process of development. As such, we can briefly describe the relevance of examining each sector for GREECO:

Bioeconomy

The Bioeconomy is important from a territorial perspective since it is dependent on the geographic distributions of land- and water-based biological resources as input to production; as well as being dependent on many "brown" inputs like fuels and chemicals. At the same time bioeconomy activities offer possibilities for economic activity in rural places, and use skills that are based on intrinsic/tacit knowledge and resources. Likewise, bioeconomy also provides inputs to many other green activities of the economy, such as energy, tourism or building material, and it helps mitigate climate change through its role as a carbon sink. But there are great challenges for the bioeconomy in providing food, timber and energy for a growing and developing global population, and some say that a green bioeconomy is the only way to do so without depleting these critical resources.

Building and Construction

Green building and construction is about meeting Europe's building demands in a way that promotes economic growth and produces a more resource efficient building stock. In terms of operational emissions alone, it is the EU's goal to create a roughly 90% reduction by 2050 (EC 2011f). This is exceptionally high considering that buildings represent upwards of 40% of Europe's total energy consumption (EC 2011g). But for most people green building and

construction is mainly about producing buildings that demand less energy. Yet we can go beyond only energy to deliver a valid understanding of just how sustainable Europe's building stock can become. This perspective makes the distinction between resources consumed during the construction process and those consumed by the day-to-day use of buildings. Together they deliver a complete life-cycle perspective to the building and construction sector.

Naturally, the resource performance of buildings is cross-sectoral; where industries such as tourism and public services use buildings as a key interface to operate their affairs. And in a territorial perspective, there is an obvious connection between the location of demand for new buildings and underlying processes of urbanisation that dominate migration patterns in Europe. As such, key territorial-bound issues arise in terms of: building density, integrated building and transport development, urban renewal, renovation of existing buildings, and not least, the importance of local planning institutions.

Energy production

Taking the energy sector as a whole it has historically played a fundamental role in the development of all sectors in modern economies. This is because all sectors are completely dependent of a reliable and affordable input of energy to be able to function. This suggests that the energy sector will conceive the backbone for a future green economy. Furthermore, the dimensions in the "green economy" concept are clearly reflected in the three pillars of European energy policy, specifically security of supply, ensuring competitiveness and promoting sustainability, and combating climate change. The long term character embedded within the green economy concept, referring specifically to the long term availability of basic resources, is in-line with contemporary concepts of security of supply adopted by the energy sector in many Member States. The recycling dimension in the green economy concept is further reflected both in security of supply and energy efficiency as these strategies seek among others to utilise residual materials as a source of energy, and the recovering and reduction of process energy. Ultimately the green economy concept brings up the creation of new jobs and value added in the energy sector. The fact that renewable energy industries (RES) today not only have a strong position in national economies but also show greater potentials in the future implies that RES deployment will play a fundamental role as pillar in green economies. This implies that RES ultimately create new markets that reconcile limited use of natural resources with economic growth.

Green Research and eco-innovation

Green research and eco-innovation activities are not just sector specific, but have a potential impact in all the remaining sectors. Indeed, eco-innovation is, by definition, a cross-cutting sector which includes companies, research organisations and eco-innovation activities integrated within vertical sectors. Green products sell well, whereas these products are set to double by 2015 (EC 2011k). All in all, the eco-industry sector represents about 2.5% of Europe's Gross Domestic Product and it has expanded by around 7% every year since 2000. From the employment perspective, it is estimated that sector created 600.000 jobs between 2004 and 2008 and nowadays employs around 1.5% of EU workforce (ibid.).

Manufacturing

According to UNEP (2011), manufacture is one of the most polluting economic sectors, representing 20 per cent of total world emissions and accounting for one third of global energy consumption and over a quarter of primary resource extraction. In 2005, this sector contributed with 27.3% of the workforce and 30.4% of value added in the EU (Eurostat 2008). In such context, greening the manufacturing sector implies a structural change shifting from the traditional brown industry to an environmental friendlier manufacturing, which according to IEA scenarios, will lead to a considerable energy efficiency improvement by 2050, virtually decoupling energy use and economic growth. Furthermore, manufacture also comprises the production of environmental goods, creating new green jobs (15% more jobs than business-as-usual scenario in 2050 (UNEP 2011)).

Tourism

Tourism is a rapidly growing part of the economy around the world with many countries being

dependent on it as the dominant driver of economic growth and development. This sector holds a unique territorial relationship with the green economy because of the environmental paradox it insinuates; where, on one hand, it relies on the preservation of natural (as well as social and cultural) capital for its survival, but, on the other hand, touristic infrastructure is the dominant contributor to land take for many regions in Europe. Another key territorial issue is its dependency on the spatial distribution of the natural environment, coastal areas, lakes and rivers, forest, and not least, particular climatic conditions.

Growth of the tourism is naturally linked on the consumption of natural resources in other sectors, not least in terms of buildings, transport and water and waste management. As such, it is linked to significant environmental challenges including GHG emissions from transport and accommodations, water and waste consumption, and loss of biodiversity – both on land and in water.

Transport

The transport sector is a strong economic sector which has a tremendous importance in some European regions. The greening of the transport sector is one of the keys of the development towards a green economy. There is a strong need, but also a large potential to reduce energy use and greenhouse gas emission from the transport sector. The transformation of the output generated by this sector towards environmental friendly cars and lorries and more public transport vehicles and other freight transport vehicles than lorries is a huge challenge. In addition, the development of public transport systems and alternatives to road freight transport to shift transport demand is another challenge.

In general, transport has an inherent territorial dimension as it is derived from the wish or need to move persons and goods from one place to another. The spatial separation of all human activities including the functional specialisation of locations for different economic activities are fundamental causes for the ever rising transport demand. In addition, the environmental impacts of the transport system have a clear spatial dimension. Issues such as landscape fragmentation or population exposure to noise and pollutants linked to transportation differ across different types of territories.

Waste management

Waste management has a direct and indirect impact to virtually all economic sectors through its ecosystem services. Avoiding waste generation is the main goal of green economy. However, as long as Europe is far from being a zero-waste economy, waste collection, separation, recycling and incineration are all green economy activities with a big potential for generating turnover and jobs while avoiding environmental harm.

Water management

Water can be considered as the single most important natural resource input for human wellbeing. Similar to waste, water management is a sector that naturally cross-cuts with almost all economic and domestic activities. For instance, in addition to supplying household water requirements, the energy, agriculture, industrial and tourism sectors all depend on reliable freshwater resources. The role of water in the green economy can be defined through the European Environmental Agency's definition: "Managing water sustainably in a "green" economy means using water more efficiently in all sectors and ensuring that ecosystems have the quantity and quality of water needed to function effectively" (EEA 2012b).

A large part of managing water sustainably involves the manner in which different types of waste and storm water can be separated and re-used accordingly. In a territorial perspective this is especially important given the incredible differences in the spatial distribution of freshwater in Europe, which naturally influences the meaning green water management for different regions.

7. Assessing green economy regional performance (Task 2.2.3)

In GREECO, Task 2.2.3 *Characterisation of regional green economic performance*, aims to shed light on how the regions in Europe are doing from a green economic perspective. The task is based on the conceptualisation and operationalisation of the green economy and the indicator definition and collection done in Task 2.1.2 and further refined in Tasks 2.2.1 Definition of the territorial dimension of green economy and 2.2.2 Sector definition of green economy. The outcome of Task 2.2.3 will be used in subsequent parts of GREECO, in particular in the analysis of driving forces and enabling conditions (Task 2.2.4) and in the assessment of potentials for the green economy (Task 2.3.1).

The analysis will lead to a quantitative profile of green economy at the regional level in Europe, i.e. it will be attempted to give an answer to the question on how far we have already progressed towards a green economy in different parts of Europe.

7.1. Basic approach

The analysis of green economy regional performance will be based on two different but interrelated strands of research within GREECO, a bottom-up approach and a top-down approach.

- The bottom-up approach will be built on the GREECO analyses of economic sectors. For each of the sectors under study, a limited number of one to three key indicators will be selected at the end of the sector analysis task. The main requirements for those indicators are that they have a certain representativeness for the sector and that they are available at regional level.
- The top-down approach is more comprehensive across individual sectors. This part of the performance analysis will be based on the "Core features of the green economy" as classified in Figure 3 on Section 3.3. For each of the core features, environment, society, diverse territories, the economy and its production and consumption aspects and the econosphere, quantitative profiles with relation to state and process towards regional green economic performance will be given.

The different indicators in the two strands of analysis will be first presented and analysed one by one, i.e. the green economy regional performance will be analysed by economic sector in the first part and by green economy core features. The analysis will be done at two spatial levels, the country level (NUTS-0) and the regional level (NUTS-1, NUTS-2, NUTS-3 depending on data sources and possibilities for disaggregation, see section below). That means that all green economy performance indicators will be mapped and analysed at both levels side by side, the country level at which the data situation is better and the regional level at which some data might have to be estimated. The analysis will employ a plurality of data sources and a plurality of data handling methodologies. The analysis aims at a full geographical coverage of ESPON space, i.e. data gaps are being filled with estimations at the spatial level of available data for other parts of Europe

Having done that, different approaches will be explored to aggregate from individual indicators to more abstract levels of analysis, if relevant. However, it has to be stated that this is a very explorative task which might also lead to the conclusion that a more aggregate way of treating the green economy performance indicators is not appropriate and could not communicated, i.e. that this step might be skipped afterwards from the presentation of GREECO results (see below).

The output from these steps will be a regional characterisation of Green Economy across Europe. Finally, the green economy performance indicators will be related to non-green economy indicators. Green economic performance will be compared with the overall regional economic performance. And, green economic performance will be analysed against the regional typologies developed in ESPON. The final result will be the identification of regional typologies related to green economic performance.

7.2. Spatial levels of analysis

One of the theoretical aspects when considering the regionalisation of the green economic performance is whether there is a knowledge gain when going down to lower spatial levels

with the analysis. Probably, many aspects of the green economy would get already a value added in spatial terms, if NUTS-1 or even NUTS-0 data would be analysed. The topic of the green economy is so immature in every respect that an analysis at such aggregate spatial levels would bring huge new knowledge in spatial terms. This is supported by the fact that policies fostering the green economy are developed very often at national level or depending on the level of subsidiarity in different countries at NUTS-1 level, but not below. However, more spatial detail is requested in ESPON and probably necessary for many aspects of the green economic performance. GREECO tries to go as deep as feasible in spatial terms.

As said above, the green economy regional performance analysis in GREECO will be done at two levels side by side, the country level and the regional level. For the latter, there exist data gaps for several indicators that might be useful for describing green economy regional performance. There are basically two options to deal with such a shortage of regional data; either this is accepted and the analysis would be done only at NUTS-0 level, or some reasonable estimation techniques are to be applied that might overcome the deficiencies of the data situation. GREECO tries to go into the second direction, but is well aware of the shortcoming of disaggregation techniques and thus will take care that these will be communicated along with the estimated data. Below, some possible options for data disaggregation in GREECO are summarised.

7.2.1.   *Excursus*: spatial disaggregation of data

One inherent important methodological aspect is the question of how to spatially disaggregate aggregate data from NUTS-0 or NUTS-1 regions to NUTS-2 or even NUTS-3. There are a couple of options for the disaggregation at hand:

- The first option is simply to use the values of the more aggregate spatial unit also for the regional subdivision of that unit. This technique might be appropriate for percentages, ratios or other coefficient, but not for absolute values. Regional indicators derived from this might be particularly useful for the development of synthetic indices, i.e. in cases in which they are combined with other indicators.

- The second also simple option is to downscale data available at a more aggregate spatial unit to the regional subdivision by using regional information, e.g. on population, GDP, jobs etc., as regional weights. This technique might be appropriate for absolute values describing aspects of the green economy.

- Depending on the type of data, another option is to use shares of certain economic totals available at upper spatial level and to apply them to the totals at the regional level. This could be used for instance for a disaggregation of green employment or green GVA for which sectoral data exists at national level. Taking the green share of an economic sector and applying it to the regional totals of the sector would give a green total across all sectors at the regional scale. This approximation would be based on the assumptions that the green shares of economic sectors are similar across the territory of the upper level, however, depending on the different sectoral composition of the economy, this would lead to different green performances in different regions.

- A fourth option is to use estimation techniques that use other regional data that are in a certain relationship with the indicator to be estimated. Those relationships can be taken from other regions in which the indicator values are available and can be expressed in transformation rules. Such transformation rules are usually developed in form of regression models, i.e. it is tried to estimate the regional values of a certain performance indicator by using other data that have a combined effect on the magnitude of the indicator to be estimated.

These disaggregation options will be systematically tested and assessed in terms of sensitivity and validity. The outcome of this exploratory phase might be also a combination of different options for different indicators. The outcome of this exercise might also be that the validity of the disaggregated data might be not given, i.e. that those estimated data should not be used at all.

7.3. From green economy concept to performance indicators

The analytical concept of GREECO to deal with the green economy is laid down in Section 3.3 and Figure 3 of this report. The task of measuring green economy regional performance is closely related to the state of the core features of the green economy, namely the environmental sphere, the social sphere, the territorial sphere, the economic sphere and the econosphere. This section first reviews a few international sources that have developed an explicit indicator system for measuring the green economy. It than proposes a first set of headline indicators by which GREECO intends to address the question of green economy regional performance.

7.3.1. Measuring the Green Economy

As already mentioned in Section 3.1 above, the OECD (2011b) proposed a concept for measuring the progress towards green growth which closely follows their working definition: "Green growth is about fostering economic growth and development while ensuring that the natural assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities." (OECD 2011b, p.16). The indicator system is considered as being pragmatic: "green growth indicators are seen as markers or milestones on a path of greening growth and of seizing new economic opportunities" (ibid.)

The indicator system is besides some background indicators organised in four main themes (in italic) reflecting the elements of the working definition of green economy:

- *Environmental and resource productivity:* CO_2 productivity, energy productivity, material productivity, water productivity, multi-factor productivity,
- *Natural asset base:* freshwater resources, forest resources, fish resources, mineral resources, land resources, soil resources, wildlife resources,
- *Environmental quality of life:* environmentally induced health problems and related costs, exposure to natural or industrial risks and related economic losses, access to sewage treatment and drinking water,
- *Economic opportunities and policy responses:* R&D of importance to GG, patents of importance to GG, environmental related innovation, production of environmental goods and services, international financial flows of importance to GG, environmentally related taxation, energy pricing, water pricing and cost recovery.

As introduced in Section 3.1 above, UNEP (2012) proposes in a recent working paper an indicator system for measuring progress towards a green economy by closely following their definition of green economy that has to deliver improved human well-being and social equity while significantly reducing environmental risks and ecological scarcities. Based on UNEP's view that green economy is not as a goal as such but as a tool to achieve sustainable development and poverty reduction, the proposed indicator system is only partly focussed on the state of the green economy which is of interest here, but mostly on how green economy as an approach is applied in policymaking processes. However, the indicator lists have the character of illustrative examples rather than that of a fixed indicator system.

For the environment, the following issues (in italic) and related indicators are given:

- *Climate change:* carbon emissions, renewable energy share, energy consumption per capita,
- *Ecosystem management:* forestland, water stress, land and maritime conservation area,
- *Resource efficiency:* energy productivity, material productivity, water productivity, CO_2 productivity,
- *Chemicals and waste management:* waste collection, waste recycling and reuse, waste generation or landfill area.

For policy interventions the following policies (in italic) and related indicators are given:

- *Green investment:* R&D investment, EGGS investment,
- *Fiscal reform:* Fossil fuel, water and fishery subsidies, fossil fuel taxation, renewable energy incentive,
- *Pricing:* Carbon price: value of biodiversity, value of ecosystem services,
- *Green procurement:* expenditure in sustainable procurement, CO_2 and material productivity of government operations,
- *Training:* training expenditure, number of people trained.

Finally, indicators for issues (in italic) of well-being and equity are given:

- *Employment:* construction, operation and management, Gini coefficient,
- *EGSS performance:* value added, employment, CO_2 and material productivity,
- *Total wealth:* Value of natural resource stocks, net annual value addition/removed, literacy rate,
- *Access to resources:* access to modern energy, access to water, access to sanitation, access to health car,
- *Health:* number of people hospitalised due to air pollution, road traffic fatalities.

A somewhat different approach is being performed by the Directorate General for Economic and Financial Affairs (ECFIN) of the European Commission. The iGrowGreen assessment framework is set up to "systematically compares EU Member States' environmental performance with macroeconomic and fiscal implications across 4 green policy domains and 9 policy areas, taking account of performance in levels and changes for more than 70 indicators" (ECFIN – GD Economic and Financial Affairs of the European Commission 2012). iGrowGreen contains quantitative scores for the 27 Member States, together with the underlying data and computations. It covers four domains, each reflecting a key link from environmental performance to macroeconomic and fiscal considerations:

- *Environmental tax reforms and fiscal consolidation:* indicators on the revenues side and the expenditure side,
- *Strengthening market functioning and competitiveness:* indicators on clean and efficient energy sector, sustainable use of resources, markets for green products,
- *Boosting new sources of growth:* indicators on green human capital and green technological progress
- *Climate change and biodiversity:* indicators on climate change and biodiversity.

The difference to the other indicator systems is that in iGrowGreen not only the individual indicators can be used, but that the main aspect here is the option to get one synthetic score per country for each of the four topics above. The weighting system is made transparent for the user.

7.3.2. Green economy regional performance measuring via headline indicators

The conclusions from the three examples on green economy or green growth indicator systems developed by international organisations are

- that indicator systems on green economy have to have a close relationship to the theoretical conceptualisation they are embedded in;
- that an indicator system on green economy should be organised in a hierarchical way, i.e. with major topics supported by headline indicators and a wider set of indicators in the background;
- that the indicator systems are dealing with a wider range of topics than with the economy in a narrow sense only by addressing also aspects such as human well-being, environmental aspects and in particular all kinds of resource efficiency;
- that it is reasonable to work with indicators on green economy side by side, but also that it is meaningful to aggregate indicators to synthetic indices;
- that none of the indicator systems explicitly addresses territorial differentiation and

that none of the indicator systems goes spatially below the country level.

Against this background, the proposed indicator system for measuring the green economy regional performance in GREECO is closely related to the conceptual base of the project. On the one hand, there is a strand of indicators for green economy directly derived from the bottom-up approach, i.e. the sectoral analysis. The second set of indicators is more comprehensive, i.e. does not necessarily address individual economic sectors, and is strictly derived from the core features of green economy as developed in Section 3.3 and Figure 3.

Along these lines, both indicator sets on green economy regional performance of GREECO are organised along major topics which are either the economic sectors or the green economy core features. Each topic is decomposed in some components which are represented by selected headline indicators and which again might be backed up by a series of corresponding indicators.

Table 2 below gives the overall structure of topics, i.e. economic sectors and components and representative headline indicators for the bottom-up derived regional performance indicator set. However, the definition of components and headline indicators will be a result of the ongoing sector analyses and cannot reported at this stage.

Economic Sector	Component	Headline indicator
Bioeconomy		
Building and construction		
Energy production	*Components and headline indicators*	
Green research and eco-innovation	*to be identified on completion of sector analyses*	
Manufacturing		
Tourism		
Transport		
Waste management		
Water management		

Table 2   Possible headline indicators for green economy regional performance based on economic sectors

The indicators for the green economy regional performance based on the core features of the green economy are organised along the five aspects defined in Figure 3. Table 3 below lists the core features and an initial list of components to be addressed and headline indicators. Further indicators will be added in the subsequent research process.

- For the *environmental sphere*, the source function and the sink function are the two main components to be addressed. The first headline indicator shortlisted is a comprehensive indicator developed by the EEA on environmental and natural assets, which describes what the current performance of the environment is in terms of availability of open space, biodiversity etc. The second proposed headline indicator reflects how much the sink function of the environment is being exploited, an index of air pollution expressed as a combination of different emissions will be used for this.

- For the *social sphere*, first the readiness of the society will be addressed by its willingness to adapt to a "greener way of living". One ideal headline indicator would be the subscription rate of households to renewable energy. The second indicator reflects the impact of the economy on the well-being of population; life expectancy is used as a proxy for health.

- For the *territorial sphere*, the concept of territorial keys developed in the background document of the Polish Presidency (Böhme et al. 2011) will be used. One important territorial key for green economy is "Territorial capacities/endowment assets" for which one of the indicators of the document referred to above can be directly used, i.e. renewable energy production. A second indicator on land take per GDP unit can

be seen as a proxy for the "Wise management of cultural and natural assets" or, more generally, as a proxy of "Spatial efficiency".

- For the *economic sphere*, GREECO intention is to address the "greenness of economic activities" as far as possible. How far green technology is being developed by the regional economies is reflected in the share of green patents of all patents. This indicator can also be considered a green economy driver, as it is strongly related to the green technological development of a given region and thus with its future capacity for green growth. How far economic activities can be considered as being green is reflected in the EGGS share of GVA and employment.

- The *econosphere* is covered by environmental and resource productivity indicators. Prime candidates for headline indicators are energy and carbon productivity.

Core feature of Green Economy [18]	Component	Headline indicator
Environmental sphere	Source function	Environmental and natural assets (EEA)
	Sink function	Air pollution (expressed via different emissions)
	...	...
	...	...
Social sphere	Demand for green products	Subscription of households to renewable energy
	Health	Life expectancy
	Environmental risk	Exposure to environmental risk
	...	...
Territorial sphere	Territorial key: territorial capacity	Renewable energy production
	Spatial efficiency	Land take per GDP unit
	...	...
	...	...
Economic sphere	Green technology	Share of green patents
	Green production	Green GVA (EGGS share)
	Green labour	Green jobs (EGGS) share
	...	...
Econosphere	Energy productivity	GDP / TOE
	Carbon productivity	GDP / CO_2
	...	...
	...	...

Table 3   Possible headline indicators for green economy regional performance based on core features of green economy

7.4. Aggregation of green economy performance indicators?

The presentation and analysis of the green economy regional performance indicators as outlined above will give a comprehensive picture on Europe, its countries and its regions. This comprehensive picture allows depicting several aspects of green economy for different economic sectors and for the core features of green economy as defined in the GREECO concept. This is a value as such as is allows to illustrate which regions are strong or weak in what aspect. However, this green economy regional performance picture is not a single picture but a picture with numerous components, i.e. a set of individual pictures. A direct assessment of the overall green economy performance of regions is not possible based on such a range of individual indicators.

The question is whether individual performance indicators can be reasonably combined to give a more aggregate view on green economy performance of the regions? GREECO will try to address this by exploring different approaches to aggregate from individual indicators to more abstract levels of analysis. There are three main options to aggregate across individual

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[18] As in Figure 3 (see Section 3.2)

performance indicators:

- A simple method would be to depict the group of best performing regions for each indicator and to add up for each region across all indicators considered how often it was included in the best performing group ("Gold medal approach"). Such a method could be done for individual economic sectors and for all sectors and could be done for single core features of green economy and for all of them. Of course, the number and selection of indicators has to be carefully justified. A similar, additional approach would be to look at the worst performing regions and to count the belonging of individual regions into the weakest class ("Red flag approach").

- A second option would be to perform a cluster analysis, i.e. the grouping of regions that have a certain degree of similarity with respect to green economy regional performance. Such a cluster analysis could be done for individual economic sectors and for all sectors and could be done for individual core features of green economy and for all of them.

- Finally, the combination of different data and indicators through multicriteria analysis techniques, i.e. the aggregation to basic themes of the green economy, will generate synthetic indices describing the regional green economic performance at a thematically more aggregate level for the regions in Europe. It will be part of the research process to elaborate whether only one very comprehensive index should be implemented or whether this should be accompanied by a group of indices describing single core features of the green economic performance only. The comprehensive index might be labelled as "Green Economy Development Index of European Regions (GEDIR)".

These options will be tested for the two strands of the green economy performance analysis, the bottom-up approach for the economic sectors and for the top-down approach for the core features of green economy. However, as there is some overlap between bottom-up and top-down approach, indicators will not be mixed between the two strands. The options will also be tested for the two spatial level of the green economy performance analysis, the NUTS-0 level and the regional level. Results of these steps might be used to construct a typology of regions regarding green economy regional performance.

It has to be stated that this is a very explorative task which might also lead to the conclusion that a more aggregate way of treating the green economy performance indicators is not appropriate and could not communicated, i.e. that this step might not be included afterwards in the presentation of the main results of the project in the GREECO Final Report.

7.5. Relationship to non-green economy features

The output from the previous steps will be a regional characterisation of green economy across Europe. On such basis, these green economy performance indicators will be related to non- green economy indicators. This will be done in three ways for three different purposes:

- First, green economy regional performance will be compared with the overall regional economic performance. The objective is to explore whether a certain degree of green economy performance would correlate to a certain degree of overall economic performance or whether such a relationship does not exist. For the green economy performance side this will be done for selected individual indicators and depending on the outcome of the aggregation exercise also for aggregate indicators. Regional economic performance will be represented by standard indicators such as GDP, unemployment etc.

- The outcome of this analysis will also be used for the identification of regional typologies related to green economic performance. This will especially be done for progress indicators on resource productivity. A performance success criterion will be introduced, e.g. the reduction of resource use while expanding employment. Regions will then be classified in "delinking" and "relinking" regions and intermediate positions.

- And, green economic performance will be analysed against the regional typologies developed in ESPON. The final result will be the identification of regional typologies related to green economic performance.

8. Detecting driving forces, barriers and enabling conditions (Task 2.2.4)

In the context of the GREECO project, Task 2.2.4 *Identification of drivers and enablers*, focuses on identifying what factors promote or hold back green economy development at regional level. In doing so, Task 2.2.4 integrates the results from Tasks 2.2.1 *Definition of the territorial dimension of green economy*, 2.2.2 *Sector definition of green economy* and 2.2.3 *Characterisation of regional green economic performance* in order to, on the one hand provide an inventory of driving forces and enabling conditions (both territorial and non-territorial) linked to the sectors considered within GREECO, and on the other hand analyse those driving forces and enabling conditions that are crucial for the "green economy transition". Finally, the outputs and results of this Task will feed Task 2.3 *Assessment of the regional potential of green economy* to elaborate regional typologies focused on regional potentials for the green economy.

Considering that the green economy transition is defined in GREECO as the transition towards a socio-economic growth that takes place vis-à-vis a more sustainable use of natural resources, preservation of environmental capital and fewer environmental risks and degradation, within a context of enhanced regional competitiveness and cohesion over the long term (see Section 3.3 above), this transition from a brown economy to a green(er) economy comprises several aspects, economic, environmental, social, as well as territorial. This being the case, GREECO will pay special attention to the territorially relevant drivers and enabling conditions that foster transition towards a green economy.

Likewise, within GREECO there has been an intensive discussion on the differentiation between drivers and enabling conditions based on the possibility to act upon the factors through policy and to modify them. However, after a careful review of the somehow incompatible terminology used in the literature (OECD 2011a; UNEP 2011; World Bank 2012) the GREECO TPG came to the conclusion that such a differentiation would be confusing and the term "drivers, enablers and hindering conditions" has been agreed upon to refer to both types of directly modifiable and non modifiable factors. Still, this differentiation will be made explicit in classifications and regional typologies through an alternative terminology to be defined at a later stage of project develoment (e.g *internal* versus *external*, *dynamic* versus *structural*, or *modifiable* versus *non modifiable* factors)

Along these lines, the research flow of Task 2.2.4 begun with a preliminary literature screening aimed at providing a preliminary characterisation of the drivers and enabling conditions, as well as barriers behind the green economy transition (top-down). This structure provided guidelines for further identification of drivers and enabling conditions and indicators within the sector and case study research (bottom-up). This bi-dimensional bottom-up / top-down approach is summarised in Figure 7 below.
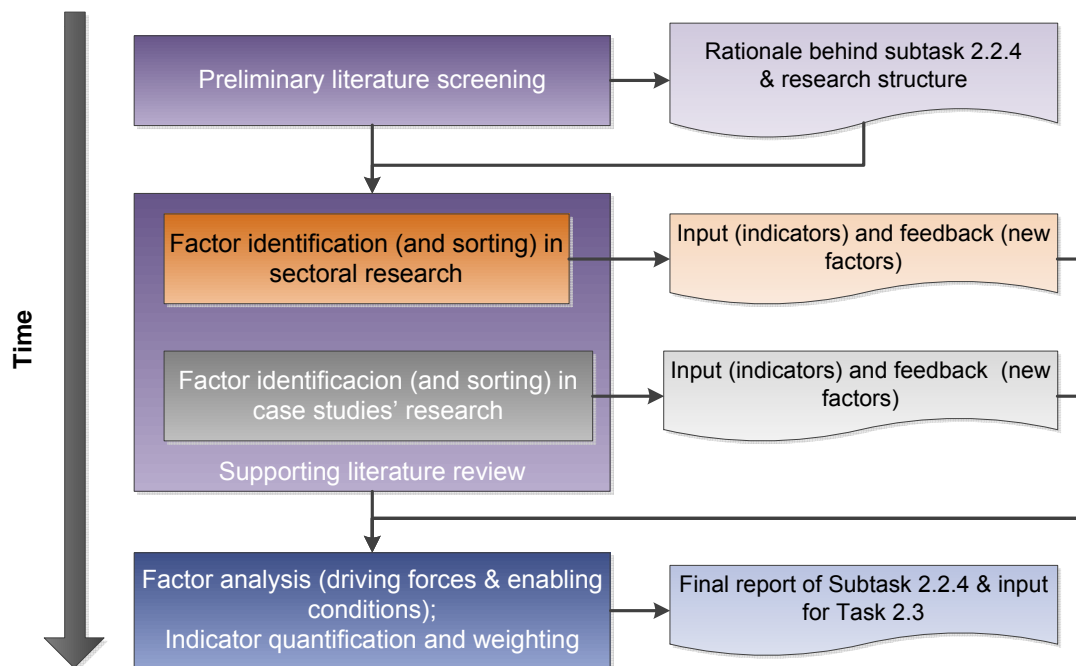
Figure 7   Research flow of Task 2.2.4 *Identification of drivers and enablers*

Against this background, it must be emphasised that the proposed methodological approach for identifying green economy factors is also instrumental to the assessment of regional potentials for a green economy (see Section 9 below for an explanation on how regional potentials are understood in GREECO). The process is at the same time closely related to the conceptual base of the project. On the one hand, some indicators for green economy factors will be directly derived from the bottom-up approach, i.e. the sectoral analysis and case studies. The second set of indicators considered is less specific, i.e. does not necessarily address individual economic sectors, and is strictly derived from the flows between the different spheres of the green economy as depicted in Section 3.3 and Figure 3 above.

It goes without saying that there are many potential drivers and enabling conditions favouring or hindering green economic development, which could be classified based on an array of criteria, including:

- Potential implication in macroeconomic terms (e.g. turnover, exports, employment potentials, etc.)

- Target economic sector (e.g. water resources condition agriculture potentials in the same measure as renewable energy potentials).

- Type of market force, i.e. demand or supply drivers. For instance, environmental problems can be considered demand-side drivers as they constitute a market stimulus for remediation activities, while specific environmental assets are mainly supply-side drivers that enable (or discourage) organic agricultural activities, for example.

- Direct or indirect impact on economic activities (e.g. wind resources can be considered a direct driver fostering green energy potentials, but they also have an indirect impact on a number of ancillary activities related to the value chain of wind turbines, to name only one).

- Positive or negative impact on specific sectors: both positive (fostering) and negative (hindering) stimulus on green economies will be considered. The latter only in those cases where there is a policy action that can be implemented to tackle them. It would be pointless focusing on the structural conditions hindering green growth that are beyond the range of action of policy intervention.

- Accountability: some drivers can be of qualitative nature (e.g. existence of a specific

regulatory instrument or a regional incentive), whereas others are of quantitative nature or can be quantified through indirect assessment methods.

- Generic versus specific nature: some factors affect in the same measure all economic sectors regardless of their greenness (e.g. overall government quality potentially affects economic activity in general), whereas others are specific to green sectors (e.g. specific regulations or policies targeting green products).

Likewise, in GREECO the analysis of the drivers and enabling conditions fostering or holding back the green economy transition is a policy-oriented exercise performed in close collaboration with Task 2.5 *Policy analysis* and thus will be structured taking into account the potential capacity of policy action to act upon them:

- On the one hand, there are drivers and enabling conditions that cannot be easily (or directly) influenced by the actions of local and regional policy-makers, in the short to medium terms. Still, such drivers largely condition the behaviour of the sectors and thus their transition towards a green(er) economy. Such drivers and enabling conditions include at least the following categories: (i) the environmental resources; (ii) certain aspects of human resources (those skills for which there is a longer time lag between strategic educational planning and local availability of expertise, let alone migration of experts to bigger and capital cities); (iii) certain aspects of territorial dynamics (accessibility, city networking, functional regions, etc.), ; (iv) certain aspects of technology and innovation (intellectual assets and capacity of companies to innovate); (v) and certain aspects of the institutional framework (efficiency of institutions).

- On the other hand, there is another category of drivers and enabling conditions, which may be addressed more directly by local authorities and policy-makers in the short or medium terms. They cannot guarantee a successful transition to a greener economy per-se, but they determine to a great extent the direction and speed of transition. These drivers and enabling conditions include different kinds of policies introducing targets, setting the right price of an economic good or forbidding a certain type of individual or company behaviour incompatible with green economy. Removing a certain type of policy barriers also belongs to this category. This group of drivers and enabling conditions also includes setting appropriate funding schemes for different key aspects of green economy such as: training of non-specialised human resources, innovation, etc. Funding is a matter of priorities and political consensus can be easily modified to the better or worse in the short term. Funding can also be optimised and made more efficient therefore size is not the only thing that matters.

- Certain drivers and enabling conditions lie in a grey zone between the easily modifiable in the short term and those for which there is a significant time lag. For example, while it is relatively easy and inexpensive to regionally train operators for a certain type of uncomplicated green job, it takes educational planning and vision to educate high-level environmental engineers and environmental policy specialists and additionally create the right conditions to keep them in the territory. It is also relatively simple to organise awareness raising for companies on advantages of innovations, energy efficiency, zero CO_2/waste economy and other aspects of green economy. However, real change of behaviour of companies takes time and depends on a number of other factors such as market pressure; company culture; competitive environment, etc. We propose to further elucidate this grey zone within the bottom-up tasks, namely the sectoral reports and the case studies.

As it emerges from previous discussion, there is a tight link between non-policy drivers, barriers and enabling conditions on the one hand, and policy intervention on the other hand. Appropriate policies can speed up transition towards a green economy by strengthening the territorial assets present in the region or put barriers on such transition by imposing ill-designed combinations of measures impeding creativity and innovation (UNEP 2011). These policies are currently being investigated through sectoral analyses, will be analysed in more detail within case studies, and will be assessed against a number of criteria in Task 2.5, as explained in Section 12 of this Interim Report. Thus, GREECO acknowledges that barely all factors of green growth can be acted upon by policy action, to the point that, when it comes to defining potentials, policies themselves can be considered essential factors boosting or

hindering back the green economy (ibid.), as illustrated in the figure below:
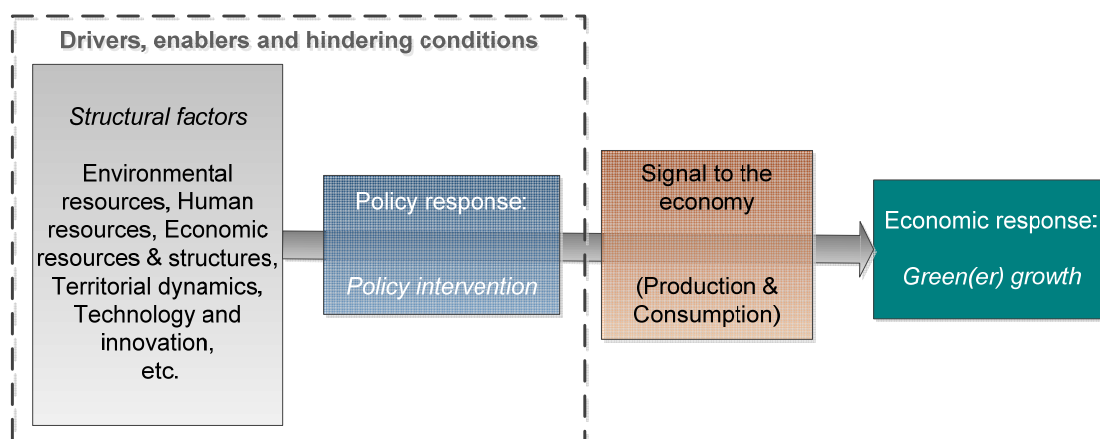
Figure 8   GREECO understanding of driving forces and enabling conditions of green growth

In parallel, GREECO will also make an attempt to capture as far as possible the specific characteristics and trade-offs between the different types of indicators, considering that the interpretation of some of them (particularly environmental pressure indicators) is a complex one for two main reasons:

- On the one hand, it should be considered that most demand-side factors of green growth related to specific environmental problems, such as water pollution or environmental degradation in general, can be understood in most cases as drivers boosting green growth. This assumption holds because the farther a region is from its environmental or overall performance targets, or the larger room for improvement a region has in environmental terms, the more economic opportunities linked to environmental restoration will be generated locally (i.e. the bigger market a region has for green products and processes). Still, accepting this might without any additional consideration might deliver the wrong policy message to stakeholders. For this reason, drivers will be handled in GREECO not only in terms of their overall impact on regional green economy potentials, but also in terms of their intrinsic implications in strict environmental terms.

- On the other hand, explicit and implicit trade-offs between drivers will also be considered. This relates to the fact that some factors could have a different and even contradictory impact on various sectors. For instance, high water stress might favour the development of specific green economic activities aiming at reducing water consumption, but at the same time this factor hinders overall agricultural potentials, including organic farming and other forms of sustainable agriculture. Accordingly, the resulting impact over the green economy will be considered within the top-down analysis, whereas the specific impact for specific sectors will be part of the sectoral analyses. Likewise, some other drivers, particularly policy and institutional frameworks have the capacity to impact and modify other factors of green growth. These bi-directional impacts will also be part of the analysis, as far as data allows it.

As for the analysis of regional performance, in Task 2.2.4 the enabling conditions and driving forces will be operationalised through some associated indicators that will be organised in a dashboard of indicators that will allow visualising and mapping the potential of the regions for the green economy transition within Task 2.3[19].

Along these lines, the table below structures the drivers and enabling conditions preliminarily

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[19] Potential is understood in GREECO as the *presence* within regions of the drivers and enabling conditions related to green growth. See Section 9 below for further details.

identified in the top-down analysis of potentials. These potential drivers have been classified in "spheres/domains", "components", "potential factors" and "example of indicators" (from left to right). The "spheres/domains" are those aspects identified by GREECO as being the most relevant dimensions illustrating the drivers and enabling conditions of the green economy, as in Figure 3 (see Section 3.3 above). The "components" are the main elements included in these domains/spheres. The "potential factors" are the main drivers, hinders and enabling conditions identified to date. The column labelled "example of indicators" includes some potential indicators that have been identified so far basing on literature review performed in Task 2.1 *Literature review and data assessment*, and on-going sectoral analyses within Task 2.2.2 *Sector definition of green economy*, respectively. The final domains, factors, as well as indicators to be considered might change as project evolves, particularly as additional factors are identified within sector analysis and case studies. It must be also mentioned that in particular the territorial sphere includes at this stage of the project development a very preliminary list of elements that should be explored in GREECO.

Sphere/Domain	Component	Potential factors	Example of indicators
Environmental sphere	Environmental resources	Selected environmental assets	- Combined index of natural and environmental assets developed by the EEA. - Share of Natura 2000 area - Renewable energy potentials
	Environmental pressure	Selected environmental problems	- Combined vulnerability to climate change - Distance to target indicators
	…	…	…
Social sphere	Human resources	Education and training	- Participation of adults aged 25-64 in education and training
		Degree of specialisation	- Employment knowledge-intensive services
			- Employment medium-high & high-tech manufacturing
			- Human Resources in Science and Technology (HRST)
		Degree of underutilisation	- Long-term unemployment rates
			- Rate of Early School Leaving
		Labour productivity	Apparent labour productivity (thousand EUR PPP/worker)
	Social trends	Income	- Disposable income per capita (EUR PPP)
		Poverty	- Population at risk of poverty rate
	Other resources	Cultural resources and amenities	- Quality and conservation of cultural heritage and amenities (such as UNESCO sites, museums, etc.)
	…	…	…
Economic sphere	Overall economic trend	Growth	- Growth of GDP per capita (ppp)
	Economic balances	Deficit	- Combined public and private debt as % of GDP
	Pushing factors	Green entrepreneurship	- Number of EMAS

Sphere/Domain	Component	Potential factors	Example of indicators
	(supply side)		registered companies
		Green production	- Green GVA potentials (EGGS share)
		Green labour	- Green jobs potentials (EGGS) share
	Pulling factors (demand side)	Consumer behaviour and advocacy	- Share of organic food in sales - Share of Renewable Energy in Final Energy Consumption
		Investment	- Gross fixed capital formation
		Environmental protection investment	- Environmental protection expenditure
		Trade	- Balance of trade
	…	…	…
Territorial sphere	Territorial cohesion	Convergence	- Catching-up behaviour
	Territorial key: territorial capacities / endowments	Landscape diversity	- Shannon evenness index
	Territorial key: accessibility	Accessibility factors relevant for the green economy	- ESPON accessibility index - ESPON transport multimodality index - Accessibility to natural assets - Accessibility to green industry clusters
	Territorial key: city networking	Cluster economies	- Enterprises / employees in selected industry clusters
		Agglomeration economies	- GDP of FUA (as a share of total regional GDP)
	Territorial key: Service of general economic interest	Localism	- To be defined
	Territorial key: Functional regions	Sustainable cities	- Compact city indexes
	Urban-rural relationships	Multifunctionality	- Land-use multifunctional index
	…	…	…
Technology and Innovation	Technologic enablers	Finance and support of Innovation	- Regional Innovation Scoreboard - Business R&D share of GDP (%) - Business R&D personnel (% of total) - Public R&D share of GDP (%) - R&D expenditure of importance to green economy - Public R&D expenditures
		Environment-related innovation	- Number of eco-innovating SMEs
		Technology transfer and diffusion	- To be defined
	Outcomes	Intellectual assets	- Patents per million habitants - Green technology patent application to the EPO
	…	…	…
Governance	Strategic instruments	Long-term plans and policies	- Availability of regional

Sphere/Domain	Component	Potential factors	Example of indicators
characteristics			strategies in different sectors
	Regulatory Instruments, including Command and Control instruments	Territorial development strategies supporting the green economy	- Spatial development strategies
		Region-specific regulations and standards	- Existence of specific policies and/or targets
	Economic incentives and disincentives	All kinds of, tariffs, fees, incentives, grants, subsidies, including Environmentally Harmful Subsidies (EHS)	- Energy taxes - Transport fuel taxes - Vehicle taxes - Electricity taxes - Environmental taxes - Energy tax exemptions and subsidies - CO_2-subsidies (grandfathered EUAs) - Regional incentives (e.g. grant programs) - Tradable permits at regional level
	Institutional capacity	Institutional support to environmental policies	- Availability of specialised institutions
		Institutional support to eco-innovation practices	- Availability of specialised institutions
	Governance issues	Quality of government	- Quality of Government Index
		Tradition on sustainable practices	- Historicity of certain environmental policyies - Number of cities that applied to become "green capital" over a given period
		Institutional support of green initiatives	- Covenant of mayor signatories, share of population
	…	…	…

Table 4 Preliminary selection of drivers and enabling conditions fostering or holding back the green economy

The indicators proposed in the above classification of drivers and enabling conditions will be reduced to a subset of 15 to 20 headline indicators according to the latest literature updates, sector analysis and case studies. These will be processed differently depending on whether they are of qualitative or quantitative nature (e.g. the existence of a regional energy tax or the nature of a specific regulatory framework). Qualitative indicators will require some pre-processing (e.g. building dummy indicators in order to enable graphical representation). In addition, not all drivers and enabling conditions will be equally relevant. Thus, it might be necessary to normalise indicators, as well as weight them, before mapping.

Likewise, all these methods will allow producing synthetic indexes illustrating regional potentials, if relevant. Similarly to the performance analysis, this latter exercise might lead to the conclusion that a more aggregate way of treating the green economy potentials is not appropriate and could not communicated. Accordingly these results might not be included afterwards in the presentation of the main results of the project in the GREECO Final Report.

9. Defining regional typologies based on green economy potentials (Task 2.3)

Task 2.3 *Assessment of the regional potential of green economy* has the following objectives:

- to define (jointly with Task 2.2.4. *Identification of drivers and enablers*) and map regional potentials basing on the actual structure of concurrent determinants of green growth across all NUTS-2 regions included in ESPON space;

- to create regional typologies resulting from the overlapping of the green economy performance and green economy potentials mentioned above;

- to test hypotheses on the explanatory factors of regional performance of the green economy by the drivers and enabling conditions. The final goal of this exercise is to answer questions such as what is the relation between regions' performance and the drivers and enabling conditions present in their territories. The final method used to produce this assessment will depend on the nature, scope and coverage of the inputs received from tasks 2.2.3 and 2.2.4.

- to overlap previous ESPON territorial typologies with the typologies created in GREECO, seeking to explore potential coincidences between both types of categorisation. The research question to be answered is what is the relation between ESPON typologies and the potential of the region to make the transition to green(er) growth?

9.1. Defining regional potentials

Given that Task 2.3 aims at detecting regional potentials for a green economy, the research approach of this task should be framed under a clear delimitation of the notion of territorial potential. Two aspects should be considered from this perspective: On the one hand, the territorial definition of green economy itself, which is an output of Task 2.1 *Literature review and data assessment*, implicitly determines which kind of green economic dimensions are to be evaluated and prioritised for assessing regional potentials. On the other hand, a precise definition of what territorial potential means for the green economy should be developed in Task 2.2.

According to the standard definition, the notion of potential refers to qualities that exist and can be developed or, more precisely, to any inherent ability or capacity for growth, development, or coming into being. Along these lines, GREECO understands the regional potential for a green economy as the combination of drivers and enabling conditions that regions and territories hold to successfully start or consolidate a transition to a green(er) economy and existence of barriers that hold regions back on their road to greener economy.

In other words, the regional potential for green economy development is defined in GREECO by the existence/lack within regions of drivers and enabling conditions of green growth identified by Task 2.2.4. These are the components that GREECO project will take into consideration as the potential that each territory holds to actually start a successful transition to a green(er) economy.

On this basis, Task 2.3.1 *Definition of regional typologies* builds on previous GREECO research tasks in order to produce coherent regional typologies aiming to capture the actual range of regional structures connected to green economy development potentials across ESPON space.

9.2. Producing regional typologies (Task 2.3.1)

In principle, taking into account the abovementioned research framework and all the previous conceptual developments of GREECO, the regional typologies with regard to the green economy will be developed in Task 2.3.1 by overlapping two relevant dimensions:

1. The current state of ESPON space regions from the green economy perspective. This dimension will be assessed in close collaboration with previous GREECO tasks, particularly with Task 2.2.3 *Characterisation of regional green economic performance.* Its inclusion as one of the components defining the typologies is justified as it implicitly captures the range of transition, i.e. the road ahead for all regions in terms of expected green economy development. From this perspective regions will be divided in pre-transition and transition regions. The former are the regions whose green economic

activities are at a relatively low level and whose transition to a green(er) economy is to take place sooner or later. The latter would be regions that have already developed a sizeable green economy sector through the years and whose perspective is to continue innovating or stalling.

2. The existing potentials for green growth within ESPON space regions, understood as the presence of the drivers and enabling conditions identified by Task 2.2.4 *Identification of drivers and enablers*. In order to differentiate between different green economic potential GREECO will classify regions basing on a selection of indicators of drivers and enabling conditions indicative of green growth potentials. Regions will be divided in regions with high, medium and low green economic development potentials. The level of potential will be conditioned by the mix of drivers and enabling conditions.

Thus, a typology at NUTS-2 level resulting from the combination of the abovementioned dimensions will be produced, tentatively:

1. **Regions with pre-transition economies and high green economic development potentials.** These are regions where both modifiable and non-modifiable drivers, hindering and enabling conditions are present. We may expect these to be regions with rich environmental resources, a good mix of drivers and enabling conditions and a certain political willingness to remove existing barriers. Probably, these will be regions where the environmental resources are particularly favourable but where the rest of the drivers and enabling conditions have recently been established (i.e. New Member States which have relatively recently adopted EU targets) These are the regions where marginal growth (δ) of green economy value added over relatively short periods of time will be high. A number of these regions will be Cohesion Regions and will be in the position to benefit from significant financial resources. These might also be regions which are still not compliant with a number of EU acquis and where the compliance pressure will lead to the necessary actions and investments. The recommendations to such regions might be to remove any remaining barriers and obstacles to embarking on a new growth path, utilising EU policy and financial mechanisms and capitalising on their natural and institutional assets.

2. **Regions with pre-transition economies and medium green economic development potentials.** These will typically be regions which have not yet benefited from green economy development and which do not have an outstanding mix of drivers and enabling conditions to take them on a new growth path in the near future. This will mean that they either have excellent territorial assets but deficiencies in policy and its implementation or they have average to low territorial strengths but are able to utilise them fully through smart policy drafting and robust institutions. For the sake of future policy relevance these regions can be split in two typologies which stem from the nature of their medium potentials:

   ▪ **Regions with pre-transition economies, excellent non-modifiable drivers and enablers and low- to medium- level of policy and finance-related drivers and enablers.** These will typically be regions with excellent natural assets and presence of other structural drivers, where the necessary EU policies have been adopted on paper but have not been fully embraced as guiding principles of social and economic development. It may be expected that regional political and hence financial and institutional support will be average to little. This situation might lead to impossibility of fully utilising EU funds in the current and future Programming Period 2014-2020 or utilising them for common, carbon intensive investments. The recommendations to this type of regions might be to fully benefit from their advantages in terms of natural environment and other driving and enabling factors (i.e. human resource) but also improve those deficiencies in drivers and enabling conditions which are modifiable and which do not allow them to be in the group of "regions with high potential".

   ▪ **Regions with pre-transition economies, low- to medium non-modifiable drivers and enablers and excellent level of policy and finance-related drivers and enablers.** This will be a relatively rare group of regions which have not yet benefited from green economic development, which do not dispose of strong natural and other non-modifiable assets but which are ambitious and have

recently developed a solid mixture of policy and finance-related drivers and enabling conditions which may take them on a green development path despite the lack of outstanding natural assets. The recommendations to such regions would be to continue on this path and to concentrate on these green economy sectors which are not directly dependent on natural endowments and other drivers and enabling conditions that cannot be acted upon.

3. **Regions with pre-transition economies and low green economic development potentials.** These would be those regions which have not been a part of serious green economy development and which have a number of obstacles to create the right conditions for that. Having in mind that all EU regions benefit from the stimulating EU policies, being in this group may mean existence of significant institutional and financial barriers or lack of capacity for implementation of EU policies. Such regions will also have low capacities for benefiting from EU Structural and Cohesion policies and will choose to spend them (if at all) for one off carbon intensive investments. These might also be regions where lack of the above drivers and enabling conditions and/or existence of serious obstacles is coupled with very low environmental assets, low human resource capacities and weak institutions. The recommendations to these regions would be to switch their mode of operation from being laggards to being at least average performers. They may be inspired by transition regions with low natural and other non-modifiable assets. They would need to focus on the little natural endowments that are available and to embark on rigorous prioritisation exercise on spending scarce public funds. Such regions might need to reconsider the utilisation of the EU subsidies in the next Programming Period 2014-2020 and concentrate them on innovative green projects.

4. **Regions with transition economies and high green economic development potentials.** These are regions where both modifiable and non-modifiable drivers and enabling conditions are present. These will typically be the most successful regions which have already embarked on a path of green economic development years ago and which are at the forefront of institutional and policy innovation. These may be regions which have already realised a big part of the lower-hanging fruits of green economic development (including the ones related with traditional EU policy) as a consequence of robust institutional and policy mixture as well as significant funding. However, these regions might be good candidates for forerunners in setting up innovative behavioural and new economic patterns. These will typically be regions which realise and which have internalised the competitive advantage of a green economy environment and which will exert certain pressure on national and EU policy makers for higher targets. Of course, the marginal growth might not be that big because of the fact that it already took place in the past. The recommendations to such outstanding regions would be in line with continuing their leading role, capitalising on what has already been done and innovating further.

5. **Regions with transition economies and medium green economic development potentials.** These will be regions which have already benefited from a certain level of green economy development because of traditionally good mix of drivers and enabling conditions. However, these might be regions which do not have outstanding natural capital and whose geographical location and economic realities do not allow them to be at the forefront and do not promise outstanding green economy development in more than a limited number of sectors. Theoretically, similar to Typologies 3.1 and 3.2, there might be different combinations of drivers and enabling conditions. However, in order to avoid overcomplicating the analysis we may assume that if the region has already transitioned to green economic development the existing policy, institutional and finance-related drivers and enabling conditions are more or less in place and the limited possibilities for development come from natural and other realities that cannot be modified, at least in the short-term The recommendations could possibly be directed at keeping the current momentum as much as possible, keeping and consolidating current progress and success while working on further improving any modifiable drivers and enabling conditions.

6. **Regions with transition economies and low green economic development potentials.** If these regions have already walked a significant part of the green economy road this means that probably their drivers and enabling conditions set-up is relatively favourable with the exception of environmental assets. This might also mean that after

significant green economy investments have been made, there has been a change of political leadership leading to a change of economic priorities. These regions might be about to lose their status of relative leaders and embark on a flattening curve of development. These might also mean that the regions and states have made the initial investments related to green economy pressured by compliance considerations but where economy structures and big companies and SMEs have low innovation performance and potentials. The recommendations to these regions would be to get back to their strengths and political impetus that helped them develop green economic activities.
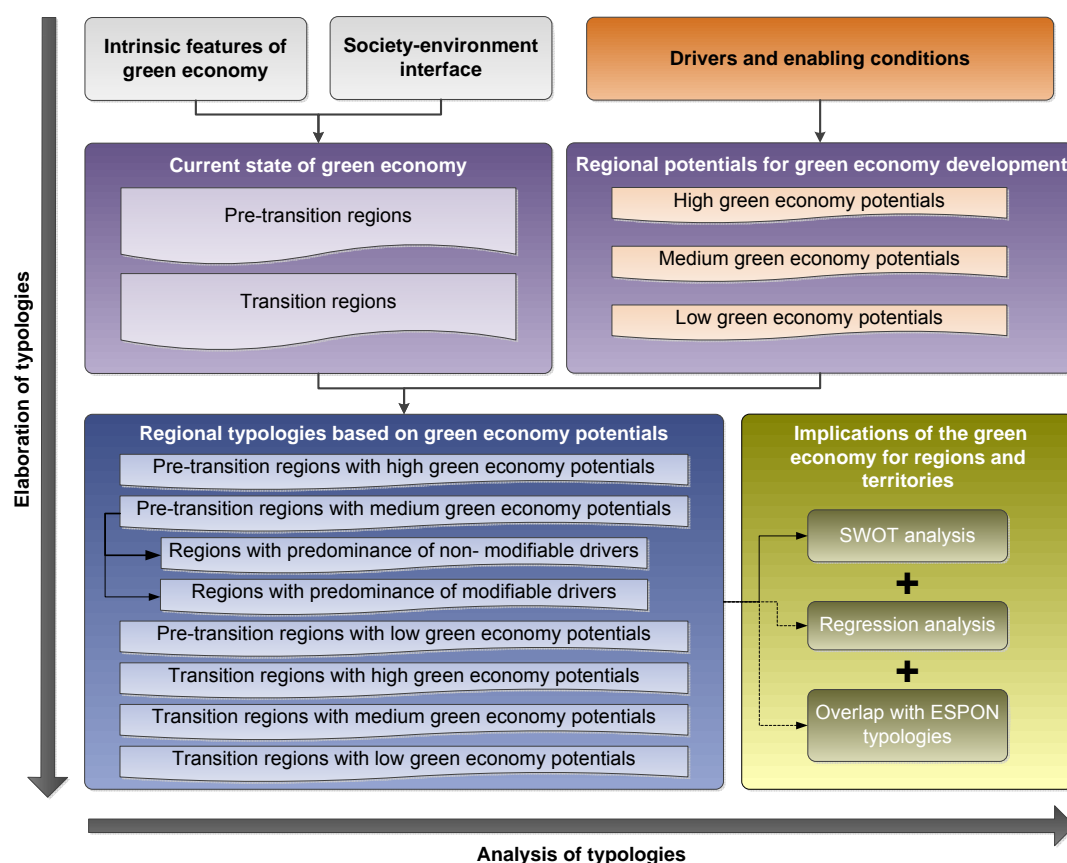
Figure 9   Proposed approach for the elaboration of the typologies (classes are preliminary)

10. Assessing the implications of the green economy on environment, society and territory (Task 2.3.2)

Task 2.3.2 *Assessment of the economic, environmental and social implications of green economy* will develop in parallel to the definition of typologies as its main objective is to perform a holistic evaluation of the implications of green economy development from a regional perspective. Along these lines, Task 2.3.2 will explore how the territorial potentials for the development of green economic activities correlate with some relevant dimensions of green growth, such as:

- the overall development of green economy within ESPON regions;
- the different components of a green economy;
- the different drivers of green growth taken in isolation.

As mentioned in the project proposal and in the Inception Report, a traditional SWOT analysis (or equivalent method) will be applied to each regional typology generated by Task 2.3.1 in order to achieve specific conclusions and potential strategies for each typology that could eventually lead to tailor-made policy recommendations for enhanced green growth.

Besides this SWOT analysis, within Task 2.3.2 some regression techniques will also be tested as far as possible in order to investigate how the drivers identified in Task 2.2.4 correlate with the regional performance assessed within Task 2.2.3. Although this regression analysis would allow GREECO project to assess and validate the relevance of each driver proposed by Task 2.2.4, it must be acknowledged that regression techniques are very dependent on data availability and, particularly on comparable temporal series. This implies that, similarly to other tasks of the project where data manipulation is accomplished, at this point of time it cannot be guaranteed that the results derived from this exercise will provide relevant results usable for the Final Report of the project.

Similarly, performing the overlap of previous ESPON territorial typologies with the typologies created in GREECO will only be feasible if both typologies are available at the same geographical scale. ESPON CU has already warned GREECO TPG on this issue, discouraging to use ESPON typologies at NUTS-2 level "due to the loss of significant differences between regions behind the global average for the aggregated level" (ESPON CU 2012, p.10). Thus, given that ESPON typology is available at NUTS-3 level, whereas GREECO typology on regional potentials has been conceived from the beginning at NUTS-2 level, it will be impossible to generate this output unless some disaggregation techniques are applied to GREECO typologies, using some of the disaggregation techniques introduced in Section 7.2.1. Again, the TPG of GREECO project will make an attempt in this direction but cannot commit at this stage to base any relevant finding of the project on this disaggregation exercise.

11. Collecting evidence on green economy within case studies (Task 2.4)

The development of case studies has been proposed as one of the activities within the GREECO project in order to give real life dimension to the theoretical concepts and hypothesis developed within the other tasks. The following table shows the case study areas GREECO is proposing the following ten case studies:

Name	Country	NUTS	ESPON type	Geographical and historical context	Cohesion policy type	Centralised system
Navarra	Spain	3	Border, coastal, metropolitan, mountainous, industrial transition, intermediate (urban-rural)	Mediterranean	More developed	Decentralised
Puglia	Italy	2	Coastal, metropolitan (Bari Taranto), industrial transition (Taranto), mostly intermediate	Mediterranean	Less developed	Largely decentralised
Jamtland	Sweden	3	Border, Sparsely populated, mountainous, industrial	Northern Europe	More developed	Decentralised

Name	Country	NUTS	ESPON type	Geographical and historical context	Cohesion policy type	Centralised system
			transition, predominantly rural,			
Louna Eesti	Estonia	3	Border, coastal, intermediate (urban-rural)	Northern Europe	Less developed	Centralised but ideas of decentralisation.
Ruhr Area	Germany	3[20]	Metropolitan, predominantly urban,	Western Europe	More developed	Decentralised
Burgenland	Austria	2	Border region, moderately montainous under urban influence, as well as region with internal industrial structural change	East-central Europe	More developed.	Decentralised
Sjaelland	Denmark	2	Border, coastal, some parts intermediate, some rural,	Northern Europe	More developed	The NUTS-2 region is split in two NUTS-3 regions but they do not represent any existing administrative territory.
Cornwall and Isles of Scilly	UK	2	coastal	Western Europe	Transition	Decentralised
Southern Transdanubia	Hungary	2	Mountainous, industrial transition, between intermediate and rural	Central and eastern Europe	Less developed	Centralised.
Malta		2	Border, coastal, island, metropolitan, predominantly rural	Mediterranean	Transition	Centralised

Table 5   Case study areas and selection criteria

The initial objectives of case studies included: (i) identification of good practices at regional level to develop a greener economy; (ii) analysis of key policy areas with an impact on environmental, economic and social behaviours; (iii) identification of financial instruments and investments with an impact on green economies, and; (iv) analysis of transferability of good practices to other territorial contexts.

Building on these principles, during internal TPG meetings and the first joint meeting with the Sounding Board there have been extensive discussions on the role of the case studies and the principles that should guide their preparation. As a result the case studies will:

a) Serve to create an integrated narrative of how green economy works in the selected regions. This means binding together a creative storyline around drivers, barriers, enabling conditions, indicators and other green economy development factors.

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[20] 15 NUTS-3 regions part of 3 NUTS-2 regions

b) The case studies will specifically focus on the analysis of key factors, drivers and conditions (policies, financial instruments and investments, etc.) which provide a regional dimension to the green economy and which have an impact on environmental, economic and social behaviours.

c) The case studies were initially designed as a good practice only exercise. However, while the focus of the case studies will be on positive aspects and approaches within the case studies regions, the authors will try to paint a relatively comprehensive picture of the green economy. This means they will also have to describe obstacles and disincentives and hindering factors which in many cases can bring useful insights on what needs to be improved.

d) Another main objective of the case studies will be testing hypothesis and validating GREECO regional typologies coming from the other tasks and fine-tuning them.

e) The authors believe that the case studies have the potential to inform the other tasks and not only to test the hypothesis and typologies but also enrich them.

f) The narrative will try to capture complex sector interrelations which are not necessarily obvious from the figures. Before the completion of the case studies the sector characterisation will presumably provide a robust analysis of individual sectors. In the case studies the partners will be in the position to elaborate on the sector specificities related to green economy but also to enrich the inter-sector analysis.

g) The case studies will dwell on environmental and social implication of green economy in the given territory.

11.1. Selection of case studies

a) Different types of territories according to the standard ESPON typologies:

Border regions – six of the proposed regions are border regions (Navarre, Jamtland, Louna Eesti, Burgenland, Cornwall, Malta) and two are partly border (Puglia and Southern Transdanubia).

Outermost – there are no outermost regions among the selected ones.

Sparsely populated – there is one sparsely populated region – Jamtland (Sweden)

Coastal – five of the suggested regions are coastal (Navarre, Puglia, Louna Eesti, Sjaelland, Cornwall and Malta). According to ESPON typology, Navarre is considered coastal while it is not located at the seaside.

Island – only Malta is an island region.

Metropolitan – there are three metropolitan regions among the suggested ones (Navarre, Ruhr and Malta) and two partly metropolitan (Puglia and Sjaelland).

Mountainous – there are three moderately mountainous regions (Navarre, Jamtland and Southern Transdanubia).

Regions in industrial transition – there are five regions in industrial transition (Navarre, Louna Eesti, Ruhr, Malta and Southern Transdanubia) and one (Puglia) where part of the region is in industrial transition.

Urban-rural perspective – There are two predominantly urban regions (Ruhr and Malta); there are four intermediate regions (Navarre, Puglia, Louna, Cornwall) and two partly intermediate (Sjaelland and Southern Transdanubia); and there is one predominantly rural region (Jamtland) and three where parts of the region are such (Puglia, Sjaelland, Southern Transdanubia).

b) Different geographical and historical contexts. GREECO partners have deemed it necessary to include regions from different European parts from the point of view of geography, history, economy, wealth, etc. Three of the regions are in the Mediterranean area (Navarre, Puglia and Malta), three in Northern Europe (Jamtland, Louna Eeesti and Sjaelland region), two in Western Europe (Ruhr region and Cornwall) and one in Central and Eastern Europe (Southern Transdanubia).

c) Sector: 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. Each case study will cover several of the strong sectors for the given territory.

d) Size of the region. There are four NUTS-3 regions and six NUTS-2 regions (Malta is considered at all effects a NUTS-.
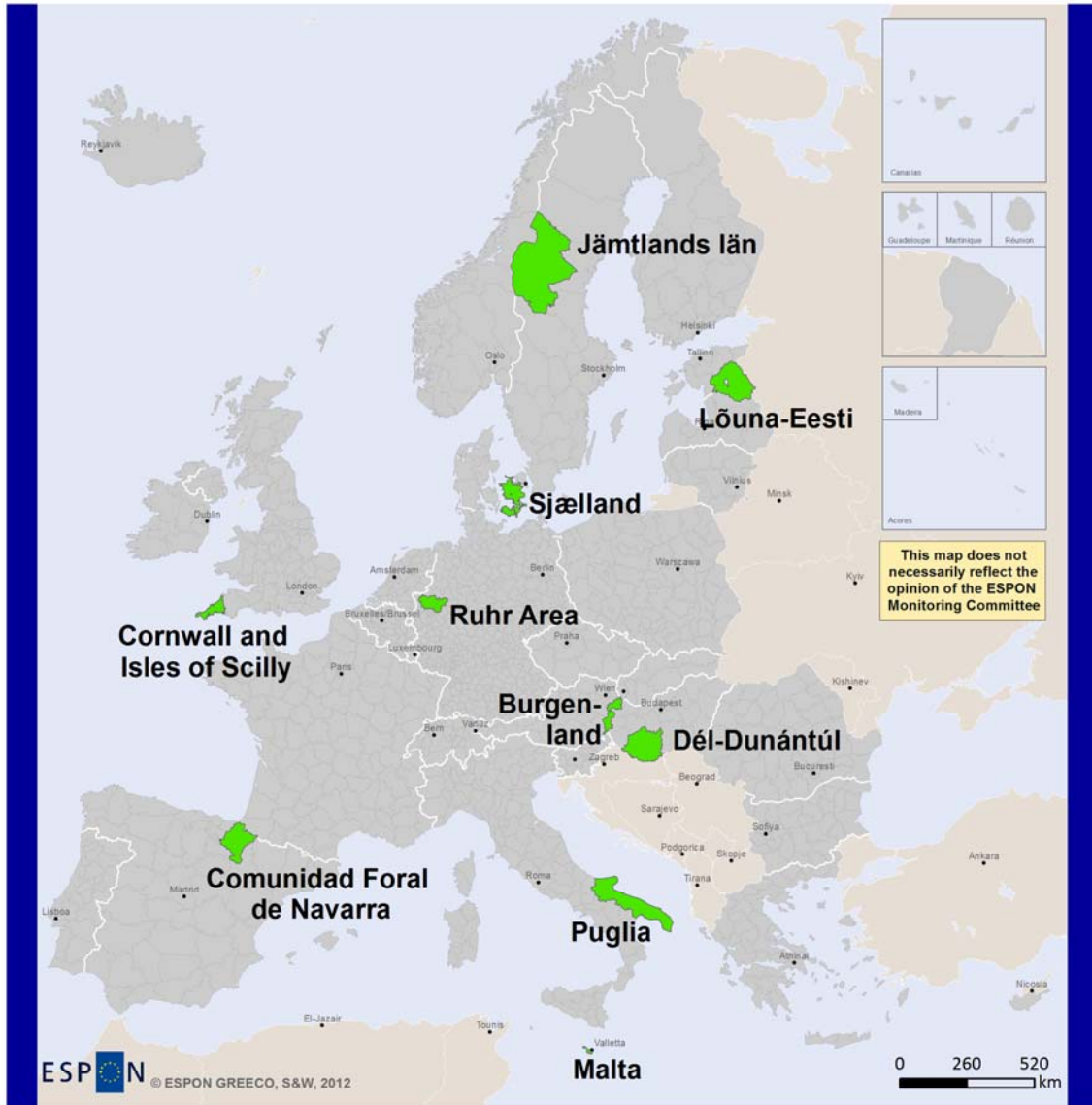
GREECO Case Studies

▮ Case study areas

Map 2 GREECO case study areas

GREECO has also taken into consideration a number of weaker criteria for the selection of the case studies. As it is not possible to have detailed information on these criteria prior to work on the case studies some of them will also be a subject of the case studies:

e) Non explicit drivers of green economies development, such as governance

frameworks and public-private collaborative schemes;

 f) Maximum diversity of drivers / enablers and sector characterisations found across Europe;

 g) Economic dynamism – case studies will include more developed as well as less developed regions.

A more detailed description of all Case Study areas can be found in Annex 5 to this Report.

11.2. Approach and methodology

The drafting of the case studies is scheduled to start in the autumn of 2012. GREECO has developed some basic principles for case study preparation.

(1) Desk research
(2) Phone interviews
(3) Additional desk research and analysis of information
(4) Personal interviews / mail surveys
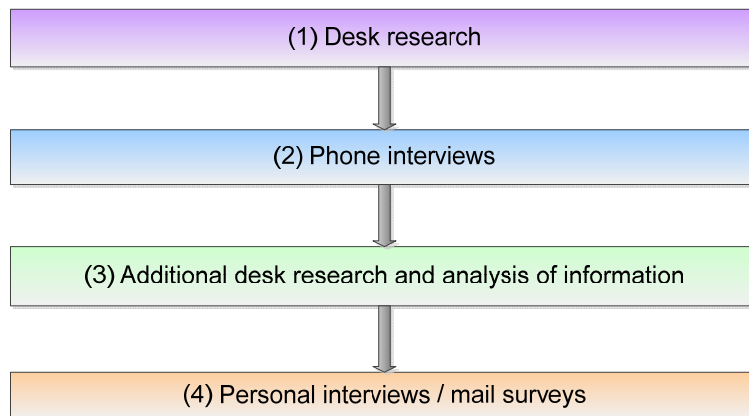
Figure 10 Principles for case study preparation

1. Desk research. The drafting of the case studies will start with desk research and familiarisation of the authors with the territory: economy, economic history, geography, climate, figures, policies, etc. Authors will review existing literature on green economy features of the region.

2. Phone interviews. The desktop research will be followed by phone interviews with key stakeholders (bottom-up): policy makers from ministries and key state institutions, funding institutions, associations, NGOS. The choice of stakeholders will vary on the sector focus of the case study and the territorial level. However, they will include:

 ▪ sector responsible people within the regional/local authority;
 ▪ management of "green" enterprises;
 ▪ development agencies;
 ▪ representatives of the civil society (NGOs, entrepreneur associations, trade unions, etc.)
 ▪ representatives of the institutions managing special financial instruments, etc.

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.

3. Additional desktop research and analysis of information – The interviews will be followed by an additional desktop research of information and insights provided by the interviewees.

4. Personal interviews. These will be a function of budget availability and necessity. When the case study is in the region of the partner phone interviews can be complemented by personal interviews.

11.3. Preliminary outline of the case studies

While developing the case studies GREECO will keep as much as possible to the same outline across all case studies. However, case study authors will have the possibilities to adapt the outline in order to accommodate regional specificities. It is suggested that the authors focus on the two-three sectors having the most relevance to green economy in their region.

1. **General description** of the region (Setting the stage):
    1.1. geography (including natural assets and resources);
    1.2. state of infrastructure;
    1.3. demographics;
    1.4. administrative structure;
    1.5. governance.

2. **Regional economy**
    2.1. Overall economy of the region covering all GREECO sectors. Analysis of the importance of the different economic sectors in the region. Justification of the choice of the focus sectors.
    2.2. More detailed description of the selected key sectors of green economy. Presentation of main policy documents. Short overview of the main relevant EU policies.
    2.3. Description of the **interrelation between the sectors.**

3. **Performance of the key sectors of green economy-** through measuring performance indicators which will answer the question "How green is the economy of the region?" The indicators will be aligned with the indicators for measuring performance in the respective sectors of the sectoral reports. The indicators will be measured for a longer period of time making sense from analytical point of view, i.e. since 1995. They should include GVA and job generation if possible, but also distance to target.
    3.1. Sector A: GVA, job generation, distance to policy target;
    3.2. Sector B: GVA, job generation, distance to policy target;
    3.3. Sector C: GVA, job generation, distance to policy target.
    3.4. …

4. **Key milestones** of the development of the key sectors of green economy – these will be key moments of the development of key sectors of the green economy. An attempt will be made to correlate the milestones with introduction of certain internal drivers (i.e. new EU policy, new local target, new financial mechanism, feed-in tariff, etc.)

5. **Drivers and enabling conditions** Drivers and enabling conditions are crucial for the development of the key sectors of the green economy. Besides description, authors will try to make an assessment of their efficiency based on insights from stakeholders and own judgment**.**
    5.1. Identification and description of external drivers – most important territorial assets, e.g. land use constraints and territorial keys (Böhme et al. 2011); energy consumption and production patterns; social affairs and living conditions; etc.
    5.2. Identification and description of internal drivers: policies, institutions, financing
        5.2.1. Insights on efficiency of EU policies in the region;
        5.2.2. Insights on efficiency of local/regional policies;
        5.2.3. Ambition of the regions: driven by compliance versus proactive, ambitious and innovative;
        5.2.4. Role of Structural and cohesion policy funds in the region;
        5.2.5. Role of regional and local funding for the sector;
        5.2.6. Role of economic instruments.
        5.2.7. Others: voluntary schemes; innovative financing mechanisms; green

public procurement.

    5.3. Description of problems and barriers encountered within sectors,

6. **Assessment of the regions' potential to develop green economy in the future**.

    6.1. Distance to target/best performers/technical potential.
    6.2. Potential for GVA increase and job creation.
    6.3. Interaction between external and internal drivers in view of realising the regional potential.
    6.4. Conclusions.

7. **The Road ahead and conclusions**

    7.1. Validation of regional classification region according to GREECO regional typologies.
    7.2. Road ahead and policy needs as seen by local stakeholders.
    7.3. Road ahead and policy needs as seen by GREECO.
    7.4. Recommendations.

8. **Transferability** – considerations on which of the positive aspects of the regional case study are transferable to other territorial contexts within Europe.

9. **Lessons learned** from the case study and input to the other tasks within GREECO

11.4. Preliminary characterisation of Case Study areas

What follows is a preliminary characterisation of the ten case study areas. For additional information on case study areas, please refer to Annex 5 to this Interim Report.

Austria - Burgenland, NUTS-2 (AT11)

Burgenland is a NUTS-2 region with its own regional government (*Landesregierung*). The region is further subdivided in seven political districts and two independent cities. NUTS-3 regions do not have political power. The Burgenland is interesting from a green economic perspective because of its path towards energy autarky based on renewable energy production including wind energy and biomass. There is a strong governmental support for development of renewable energies. The objective is to become independent in energy terms with renewable energies and to export surplus to other regions, via a *Regional strategy for wind parks* and the development of the largest wind park in central Europe by Austrian Wind Power. The territorial capital here is huge: over 40 % of total area is occupied by agricultural land with high wind potential. Burgenland is a relatively polycentric region, with a network of six technology centres, one of them leading in renewable energy issues and European Centre for renewable energies (EEE).

Denmark - Sjaelland, NUTS-2 (DK021, DK022)

The NUTS-2 region Zealand consists of 17 municipalities (LAU-2). Most of the local authority drivers are controlled by the municipalities, but the region council has a strong coordinating role. The NUTS-2 region is split in two NUTS-3 regions (DK021 and DK021), but they do not represent any existing administrative territory. Rather, the border between them represents the border of the Capital Region before the local administration reform in 2007 and can be useful for historical reference. The northeast part of the region serves as hinterland to the capital region with a relatively high level of education and income, unlike the western and southern parts, both with low levels of education and income. It can be observed a relatively strong and further growth potential in renewable energy, bioeconomy, and tourism. Likewise, the area holds very good wind energy potential, alongside clean-tech positions and growth potentials in the north-east.

In this context, the region and the municipalities have focused policies on development of renewable energy, bioeconomy and green experience economy. The region council has a sustainable development programme. Almost all municipalities are signatories to the Covenant of Mayors and national green economy commitment arrangements. They pursue own climate and energy programmes: In particular, development of wind energy, district heating based on biomass and gasification of manure and other industrial waste. A

comprehensive industrial development support programme *Growth forum* has a strong emphasis on "clean-tech". There have also been attempts to development of university network in the west and the south and to develop attractiveness for space-demanding green technology experimental innovation, in the south. The west has continued an industrial ecology development strategy with remarkable results.

Estonia - Lõuna-Eesti, NUTS-2 (EE008)

Planning is a cross-cutting issue in Estonia. This stresses one of the most important issues in relation to green growth and developing, namely that existing planning and development structures to some extend are unprepared for a shift towards green economy, and therefore would take advantage of exchanging knowledge and experiences by joining forces through concrete projects. Energy supply and development with focus on how local/regional renewable resources such as biomass, wind, and biogas can be expanded and improved in the area. Maritime/Fish/Fish farming is an issue very relevant for a region, and the focus on improving water qualities is considered being crucial for the region, partly in order to make better use of the opportunities in relation to new types of fisheries, and generally in order to make better use of the unique environment with the combination of sea, islands, historic towns and villages, and leisure time activities. Technology and innovation is, just as planning, a cross-cutting theme relating to new approaches to fisheries, biomass usage, etc. Issues such as organic farming and fisheries combined with short or long term tourism are emphasised as providing large potentials. In this connection for instance restoration of historic building and thereby ensuring links to the past are emphasised as important issues. But also new approaches to tourism in connection with the access to the sea are among the most relevant issues to be investigated in the are.

Germany - Ruhr Area

Ruhr area consists of 15 NUTS-3 regions (DEA12, DEA13, DEA16, DEA17, DEA1F, DEA31, DEA32, DEA36, DEA51, DEA52, DEA53, DEA54, DEA55, DEA56, DEA5C). Out of these, 11 regions are large independent municipalities with widespread decision power, in particular on spatial development issues. The other four regions are counties each consisting of a number of municipalities. These 15 regions together institutionally form the Regional Association Ruhr (RVR) which is responsible for regional planning and several tasks in tourism and business development, public relations and development of open space. However, the Ruhr Area is not a NUTS-2 region, but spread over three different regional administrative districts (*Regierungsbezirke*). On top of this, the State of North Rhine-Westphalia (NUTS-1) has extensive legislative and financial power, alongside the Federal State (NUTS-0).

The regional structure ranges from high-density core cities of the agglomeration to rather rural counties forming the hinterland of the region. The Ruhr Area might serve as an example for a regional transition from and old and heavy industrial base (coal, steel, etc.) to a modern high-tech and service oriented region with some focus on green economic development.

The region is endowed with some "natural" territorial capital, mainly in the rural parts (forests, agricultural land), but also in the high-density cores (open space, Ruhr landscape park). Also the numerous brownfields can be understood as territorial assets for development of green economic activities. Multiple forms of agglomeration economies and existence of several eco-innovation clusters do exist as well, with a strong university base with high-tech orientation and attached technology centres and parks.

These assets are backed by a high awareness among political and economic actors for the potential of a green economy strategy for the development of the region. Several political initiatives and programmes at different governance levels have been established for green transition of the economy, in particular for energy savings and renewable energy development, such as the cooperative strategy of Ruhr cities towards a sustainable urban and regional development. Innovation City Ruhr is a prominent demonstration example of the transformation of the economy and the building stock to increase sustainability. The region has also applied to become *European Green Capital 2015* and there are also on-going initiatives to apply for a *Climate Expo 2020*.

Hungary - South Transdanubia (Dél Duantúl), NUTS-2 (HU23)

Hungary has traditionally been a centralised country. The regional policy making takes place at the national level. Following the EU recommendations statistical-planning regions were created but their main role is only to provide inputs and signal the needs of the region for the national government. The South Transdanubian Region (ST) consists in the administrative sense of Baranya, Somogy and Tolna counties (NUTS-3 level), which are further divided into a total of 24 micro-regions (NUTS-4 level). The centres of the counties, also the major cities (of county rank) of South Transdanubia are Pécs, Kaposvár and Szekszárd. The South Transdanubian Regional Development Agency is the managing body of the Regional Operational Programme of the Structural Funds.

South Transdanubia is the most sparsely populated region in Hungary. The region is characterised by a large number of poorly accessible settlements and a relatively low share of manufacturing. With most indicators much below national and European average the region still possesses strengths that could be developer further.

Starting from an underdeveloped basis, the region's innovation system is rapidly developing through R&D infrastructure- and inter-regional linkage building. Although the importance of R&D activity lags far behind the more developed regions, emerging technologies related R&D efforts exists in the field of bio- and life sciences & eco-innovation; information technology, and laser technology. Environmental technology research – especially in the field of waste management – has appeared in ST, along with businesses and organisations active in the area of the environment industry.

Similarly, the region lags substantially behind European Union expectations in the field of wastewater treatment and purification. The proportion of settlements with a sewer network only reached 20.7% even by 2003, while in relation to the total number of houses in the region, the ratio of homes connected to sewerage reached only 54.4%.

Italy - Puglia, NUTS-2 (ITF4)

Puglia (or Apulia) is a NUTS-2 region located in south-east Italy with a population of about 4m inhabitants, comprising the following NUTS-3 provinces: Foggia, Bari, Brindisi, Lecce and Taranto. It should be noted a new province, Arletta-Andria-Trani (BAT), was created in 2004. The latter is excluded from ESPON typologies. Even if it has a low rate of industrialisation and its contribution to national GDP is modest, Apulia is still considered as the most dynamic region in Southern Italy.

Puglia has a great potential for renewable energy (solar in particular, it is the leading Italian region). Moreover, Puglia has important cultural assets and numerous beach resorts, which facilitate the growth of the tourism. In addition, recently the region has showed progress in terms of innovation capacity and increasing awareness about innovation issues in regional policy-making.

Regional authorities have recently promoted several initiatives in support of R&D and innovation, with a focus on the creation of technological districts and investment in human capital. Two strategies dealing with applied research have been launched in the region: Framework Programme Agreement - National Operational Programme (NOP) *Research and Competitiveness Puglia 2007-2013* and the Regional Strategy for Research and Innovation in Apulia Region. Regional authorities develop policy initiatives with the support of the recently created Regional Agency for Technology and Innovation (ARTI). There is also a Strong political agenda related to consumption patterns and accordingly recycling and recovery rates are growing. It should be also highlighted that the regional administration recently took important steps in changing the regional innovation governance system that are aimed at rationalising policy development and implementation.

Malta, NUTS-0 (MT)

The Maltese archipelago - consisting of the islands of Malta, Gozo and Comino - lies at the cultural, financial and geographical crossroads of the Mediterranean Sea. Malta, with the capital Valletta, is the largest island of the archipelago. Malta is considered as a city-state with one urban agglomeration, housing over 80% of the country's population. Malta is highly centralised country. The whole territory is NUTS 0-2 region. From green economy perspective

Malta is an interesting case since it already made efforts to encourage green economy development by developing the policy frameworks and stimulating green investments. Key sectors with green economy potential include bio-economy, renewable energy, building sector, tourism, waste recycling, organic forming.

Thus, Malta has a big potential to decouple growing total energy demand from economic growth by investing in RES and alternative technologies. The principal renewable sources of energy considered for electricity generation are wind and solar radiation. The potential of waste, wave energy and solar water heating for buildings is also being considered. Improvement of energy technologies through energy saving and energy efficiency measures is a priority as well. Malta is strongly dependent on the tourism industry and encourages its sustainable development. The ECO certification scheme was launched in 2002 with the aim of improving the environmental performance of hotels. In its efforts to attract foreign investments, Malta provides incentives to companies operating in the fields of ICT, knowledge-based services, education and training; and R&D, and others. Besides, the National Strategic Plan for Research and Innovation 2007-2010 identified energy and environment as a priority research area.

In any case, Malta's innovation performance is below the EU average but has progressively improved over 2004 to 2009. Malta has a relatively strong position when it comes to high-tech exports. The share of eco-industrial turnover in GDP (2.22%) was around 25% higher than the EU average. The number of firms implementing eco-innovation-related management systems remained significantly low. In 2008, total investment in R&D reached 0.59 % of GDP, where the business sector accounted for GDP 0.21% of GDP and the public sector 0.39% of GDP. Putting these figures in perspective, Malta's total investment in R&D is well below the estimated 1.83% of the EU27. The main innovation challenges for Malta are those in relation to boosting financial and human resources in research and innovation, stimulating research and innovation in enterprises and promoting an innovation culture.

The "environmental goods and services industry" is a growing sector. The draft National Environment Policy of Malta calls for the creation of green jobs and for the increase of such jobs by 50% by 2015; the preparation of a Green Jobs strategy by 2012; and setting up of an incubator for green industries by 2014. It is estimated that wind and solar energy will create around 8 mil jobs in a 20-year period.

Spain - Navarra, NUTS-2 (ES22)

Spain is a highly decentralised country, where autonomous communities have the authority for policy making, coherently with national legislation. It should be noted that autonomous communities in Spain can consist of a single NUTS-2 region, or of a NUTS-2 region composed by two or more NUTS-3 regions (provinces). Navarra is a NUTS-2 region composed by one single NUTS-3 region.

Navarra holds one of the most developed environmental legislative frameworks in Spain. In addition, in 2010 Navarra adopted MODERNA, a strategic plan to define a new model of economic development for in the medium and long term. The strategy foresees investing in wind energy and eco-innovation. In addition, regional effort on RTD and innovation in Navarra has experienced a remarkable evolution since its regional R&D expenditure as a percentage of GPD has increased from 0.9% in year 2002 to 2.13% in year 2009. This can be attributed to a steady regional innovation support policy. Moreover, it also has a wide variety of sectors prone to become green(er).

Sweden - Jämtland , NUTS-3 (SE322)

Jämtland is a sparsely populated area with some problems of outmigration. It is rich in resources and potential for developing both traditional and "new" forms of activities within the green economy. It is an active region in the area of green growth (for instance development of a green highway project to provide a fossil free transport corridor from the cost-cost in Sweden-Norway). It is also very active in structural funds programs and development of networks for regional development and innovation. Thus, Jämtland can provide a good example of how to develop green economies in remote and (large) sparsely populated areas.

The governance framework is characterised by a mixed centralised/decentralised model.

Some policies as well as all laws etc. are passed by the Swedish government, while the County board as well as local municipalities decide on issues such as local taxes, spatial planning, etc. There is also a good climate for businesses and an ongoing collaboration between university and entrepreneurs in clean-tech. Many interesting sectors were the green economy can be developed further: Agriculture, forestry, energy production and tourism/recreation economy.

The area holds a strong "natural" territorial capital in the form of renewable stocks of biomass, agricultural land, water and wind. Also in the form of less tangible assets like business climate (most small firms per capita in Sweden). Some eco-innovation clusters with business and university.

Policies: Influence the production and consumption side. Sweden has strict policies in the environmental domain and this stimulates the development of clean-tech and methods which can be developed and exported. It also stimulates substitution behaviour for consumers (fuels for cars, heating of homes, management of household waste, etc.

United Kingdom - Cornwall and Isles of Scilly, NUTS-2 (UKK3)

The NUTS-2 and NUTS-3 region Cornwall and Isles of Scilly (unit: Council of Cornwall) consists of the two LAU1 territories Cornwall and the Isles of Scilly. The economy in the region is relatively specialised in experience economy (tourism and creative services) and bioeconomy (agriculture and fisheries), but less in the "high value" industries financing, consulting and ITC.

The area holds strong green potentials in relation to the valuable landscape (and seascape) amenities. In fact, Cornwall already is a great tourism destination. About a fourth of the employment generated in the region depends on tourism. It also has a very good wind energy potential, but with possible conflicts with landscape interests.

Cornwall is signatory to the Covenant of Mayors and it has done a strategic choice of green economy driver: "Low carbon" as a catalyst for economic development. Domestic energy and behavioural change programme. It also supports renewable energy and environmental technologies using national and EU funding, while it has endorsed specific public sector procurement policies. Besides that, Cornwall develops a university network (with the University of Exeter), supporting the innovative research environment and an adequately educated labour force enabling indigenous development of green solutions.

Region	Strong sectors
Navarra	Green Industry (production of windmills), Energy (wind energy production), Green Research & Eco-innovation, Tourism and Bioeconomy
Puglia	Energy, Water and Waste management, and to a lesser extent Bioeconomy and Tourism
Jamtland	Bioeconomy (forestry, agriculture), energy production, small scale manufacturers in clean-tech, Tourism.
Louna Eesti	Agriculture, Tourism (largest lake of Estonia)
Ruhr Area	Energy, Water and Waste management, Building and Construction.
Burgenland	Bioeconomy, Energy, Experience Economy and Green Research.
Sjaelland	Bioeconomy and Building.
Cornwall	Bioeconomy and Tourism
Southern Transdanubia	Eco-innovation (R&D), Tourism, Bio-economy (forestry, agriculture), Energy production
Malta	Bio-economy, Experience economy

Table 6   Most relevant green economy sectors/activities fund in case study areas

12. Fostering the green economy: the policy perspective (Task 2.5)

GREECO TPG proposes renumbering of the policy analysis task as follows:

2.5.1 Characterization of policy instruments/tools

↓

2.5.2. Identification of green economy policy implications

↓

2.5.3. Policy recommendations
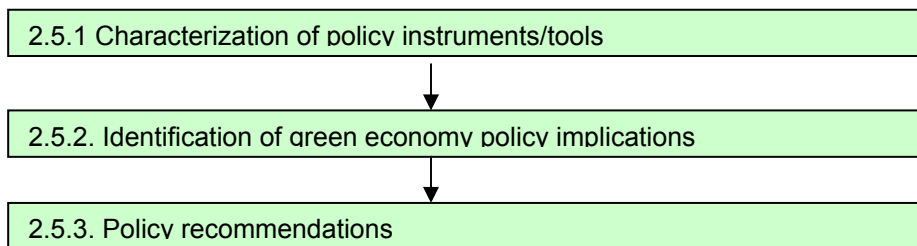
The renumbering reflects the evolved policy logic within the project. Policy work starts with an inventory of sectoral policies and defining their territorial aspects. Then follows a collection of suitable indicators which show both the volume of green economy generated in connection with the policy or the potential of green economy to be generated (often relative to a target imposed by the policy). Logically, these two tasks lead to identification of green economy policy implications. The green economy implication of a policy is the intersection of the policy's territorial implication – relevance –, the policy's current impact in terms of green economic development and the potential for green economic development triggered by the policy. The final logical step within the policy work is the policy recommendations. They will build on the previous policy steps (2.5.1. and 2.5.2) and through superimposing the findings against regional typologies defined within other tasks.

12.1. Short description of tasks' main components and location of the respective policy analysis

Task 2.5 aims to formulate policy recommendations that seek to develop a policy pathway which enables transition processes towards a greener economy taking into account local, regional, national and European governance levels. In doing so it pursues to initiate a dialogue with policy-experts, policy-makers and regional authorities and develop and validate policy recommendations. The policy analysis tasks and their logical components are elaborated in Table 7 below. The policy analysis will feed into different tasks of the project and for the sake of clarity, the table indicates the location of different policy analysis components - a part of other deliverables or within a separate deliverable. Short methodologies for parts of the analysis are presented further in the text.

Task	Short description	Location of task implementation and deliverable
2.5.1. Characterisation of policy instruments and tools	- During its implementation GREECO is observing policies with strong multi-sector implications like Cohesion policy, Europe 2020 strategy, Territorial agenda 2020, EU Sustainable Development Strategy and others. The policies will receive special attention through an analysis of their territorial dimensions and their implication for the development of green economy in territories. Among other things, the analysis will give options for fostering green economic development.	Final report
	- Where relevant, these policies will also be briefly analysed within the sectoral analysis and the case studies.	Sectoral reports and case studies
	- Create inventory of policy instruments and options in use on EU level including their territorial implications (strong, medium, weak) and taking into consideration issues like cost, applicability and expected impact. This inventory will also include Environmentally Harmful Subsidies (EHS) on EU level (if any).	Sectoral reports

	- Collection of suitable indicators and data connected to the main policies within a sector (only those identified as having strong territorial implications and strong green economy implications, especially in sectors with a large number of EU directives and acquis)	Sectoral reports
	- Inventory of additional policy instruments and options used exclusively on national and regional level in the countries and regions covered by the case studies. (Such an inventory of policy instruments which are additional to the transposed EU policies will be possible and will be relevant only in the regions (and respective countries) covered by the case studies). This will also include Environmentally Harmful Subsidies functioning on national and/or regional level.	Case studies
2.5.2. Identification of green economy policy implications	- Description of the potential of main EU policies to contribute to green economy development on territorial level (based on policy characterisation, other ESPON, projects, academic literature and stakeholder consultation).	Sectoral reports (general description of potential) Case studies (specific description)
	- Description of the potential of main national and regional policies (different from nationally transposed EU policies) to contribute to green economy development on territorial level (based on policy characterisation, other ESPON projects, academic literature and stakeholder consultation)	Case studies
2.5.3. Policy recommendations	This task will be informed by all previous tasks, deliverables and consultations and it will aim to distil GREECO policy-related knowledge for future practical purposes. The goal of the recommendations would be to support policy development in the field of territorial development, competitiveness and cohesion. Within the Policy Recommendations GREECO will superimpose the potential of a policy to contribute to green economic development of territorial level (NUTS-2 and NUTS-3) with the typologies of regions to be developed. The following aspects will be included: - Structure policy recommendations mainly by regional typologies based on green economic potential but also indicate their level of implementation (EU, national, regional) and type of action (investments, fiscal, market-based, etc). - Add considerations and strategies for implementation of the recommendations depending on types of regions; A preliminary outline of the report is available in section 12.9 below.	Report on policy recommendations

Table 7   Logical components of the policy analysis

12.2. Main research questions to be answered within the policy analysis

The main questions underpinning the analysis within the three policy tasks are the following:

- What role do main multi-sectoral (e.g. EU cohesion policy) and sectoral policies (at least those with strong territorial implication) play for the development of green economy within territories and which of them are the most useful?

- What role do explicit territorial policies (both national and regional/municipal) play in order to support the development of a greener economy within territories and which of them are the most useful?

- ▪ Are there specific sets of policies which are suitable for specific regional typologies?
- ▪ What innovative instruments are there and which are especially effective in boosting green growth in territories?

12.3. Policy analysis within sectoral reports. Methodology for analysis.

The sectoral reports (together with the case studies) are the main deliverables where policy analysis will take place. The analysis will address the territorial implications of policies and their potential for development of green economy on territorial level. This will represent the main value added of the project in terms of policy analysis.

The sectoral analysis will contain the following components:

1. Overview of big multi-sector policies with an implication for the sector
2. Overview of EU policies for the given sector and description of their territorial implications
3. Collection of indicators and data connected to the main policies. Distance to target analysis.
4. Policy effectiveness analysis.
5. Identification of the potential of main EU policies to contribute to green economy development on territorial level (NUTS-2 and NUTS-3).

Further details of the components of the sectoral analysis follows below:

Overview of large multi-sector policies with an implication for the sector

This overview will present in a descriptive form how the big EU multi-sector policies (i.e. Cohesion policy and transport policy) interact with the concrete sector. While in the Final Report those big multi-sector policies will be analysed overall, within the sectoral analysis authors will focus on the implication for the respective sector.

Overview of EU policies for the given sector and description of their territorial implications

Within the sectoral reports GREECO will perform a short overview of all sectoral EU policies for sectors with few EU acquis. For sectors with a large number of EU acquis an overview will be made just of the main sectoral policies. The territorial implications of policies will be a part of the review.

Analytical approach	Description and methodology
Territorial implication of policy	The territorial implication of the main policies within each sector should briefly be analysed: • The link between the policy and the NUTS governance level. (e.g. there is a close link between the Waste Framework Directive and NUTS-2 and NUTS-3 governance because of the historical development of MSW management and its optimal deployment on regional level.) • The link between the policy and financing on a territorial level (e.g. it happens in NMS that municipalities are obliged to implement a policy but in practice do not have the necessary funding) • Policies which are geographical by definition (e.g. Water Framework Directive requirement for drafting River Basin Management Plans, Structural and cohesion policy being mainly based on regions. • Role of territorial development policies (cohesion policies, etc.) Potential sources of information: • Existing EU or peer-reviewed reports

| | • Opinions on legislative proposals on the website of the Committee of the Regions[21]. |
| | • Interviews within Case studies |

Table 8   Methodology for describing the territorial implication of a policy

Policies will be characterised in terms of their territorial implications. Such a categorisation already exists for a large number of policies but where it is not yet available, GREECO will assign labels of territorial implications for policies based on the following considerations, outlined in Table 9 below:

Characterisation factor	Group 1	Group 2	Group 3
	Weak	Medium	Strong
Territorial implication of policy	Lack of strategic, institutional, financing territorial relevance. Policy's benefits have weak territorial correlation.	Average role of regions for implementation of the policy in terms of strategic and institutional framework. Average correlation between regional efforts and benefits of policy	Regions play an absolutely key role for the implementation of the policy and the policy benefits are manifested on a regional level

Table 9   Characterisation of policies according to their territorial implications

Collection of indicators and data connected to the main policies: distance to target analysis.

The analysis of all (or main) policies within the sectoral reports will attempt to follow the distance-to-target methodology for policy analysis. Analysis will take place on a regional (NUTS-2) level where data are available and where this analysis makes sense in terms of potential for green economic growth and in terms of policy recommendations. For example, regional data for access to waste collection service has numerous gaps and where it is available differences between regions are so small that it does not make sense to make a regional distance-to-target analysis (target being 100%) despite the strong territorial implication of the Waste Framework Directive. However, in this case it is very important to have the distance-to-target analysis on a national level and then specify that the potential for green economy development lies in the regions (i.e. if waste collection rate is 70% on a national level there is a 30% potential for development and the regions are the main actors in this development as waste collection and further recycling is entirely within the responsibilities of municipalities and groups of municipalities).

Analytical approach	Description	Methodology
Target and distance to target, if relevant	The sectoral analysis will highlight the policy targets (where appropriate) and the distance to targets per region or per country (based on indicators). Where possible authors will refer to geographical analyses carried out in other projects.	Through comparison of EU legislative targets and regional or national indicators. If regional indicators are missing, national ones should be used.

Table 10   Methodology for analysing distance to target

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[21] The list of adopted opinions can be found here:
http://cor.europa.eu/en/activities/opinions/Documents/a2f12dc6-ae73-47b0-b6c4-4cbf9f47bfba.pdf

Characterisation factor	Group 1 (regions)	Group 2	Group 3
Target and distance to target – regions (where relevant) or countries will be split according to distance to target	Far from target	Average distance to target	Close to target

Table 11   Groups of regions/countries in terms of distance to target

Policy effectiveness analysis

GREECO lacks of enough resources to perform full-blown policy effectiveness analysis. Therefore insights on policy effectiveness in developing green economy will come from the following existing sources:

▪ Existing studies and peer-reviewed papers;
▪ Regulatory impact analysis performed on the relevant legislative proposal;
▪ Opinions of industry associations.

> **Box 3 Criteria for policy effectiveness**
>
> The effectiveness of an environmental policy instrument in fostering green innovation can be assessed on the basis of a few criteria or properties. These include (i) dynamic efficiency, i.e. whether it creates incentives for searching continuously for cheaper abatement options, (ii) stability, i.e. whether the instrument creates a clear, credible and fairly predictable signal about the long-term policy objectives, (iii) flexibility, i.e. to what extent the instrument gives leeway as regards the technology used to achieve environmental objectives, and (iv) incidence, i.e. to what extent the instrument is directly targeted at the externality it seeks to address, as opposed to an input or output used as a proxy (OECD 2010; Johnstone & Hascic 2009).

Division of main policies in groups according to their effectiveness, as suggested in Table 12 below, is only optional. The final decision on this possibility will be validated with the Advisory Board and the ESPON CU at the upcoming joint meeting. It is inevitable though to reflect on the issue at least at a general level both on EU level and on regional level for the case studies. Policies will inevitably be identified as strong, average or weak drivers and enabling conditions for green economic activities.

Weak effectiveness	Average effectiveness	Strong effectiveness
- Less than 30% improvement towards target (after introduction); - Little dynamic efficiency; - Little stability and flexibility	- 30%-60% improvement towards target; - Average dynamic efficiency; - Average stability and flexibility	- >60% of improvement towards target; - Good to excellent dynamic efficiency; - Good to excellent stability and flexibility

Table 12   Groups of policies according their effectiveness

Identification of the potential of main EU policies to contribute to green economy development on territorial level (NUTS-2 and NUTS-3).

Within Task 2.5.2 (previous Task 2.5.1) GREECO will describe the potential of policies to contribute to green economic development. This assessment can only be realised if several of the previous analytical steps are taken into consideration, namely:

• territorial implications of a policy;
• distance-to-target analysis;
• policy effectiveness analysis.

The identification of the potential of a policy to contribute to green economic development may also be supported by the following indicators:

- Nominal GVA or % of regional GDP;
- Environmental: reduced impact on environment with comparison with Business as Usual (BAU) scenario;
- Green job potential.

Note: Similar identification of the potential of national and regional policies (different from the transposed EU directives) will be performed within the case studies following the same methodology.

12.4. Policy analysis and case studies

GREECO will take advantage of case studies to include additional insights on effectiveness of particular sets of policies (all levels and all types). They will be described and analysed from the point of view of green economy developments in a particular region/country. In this case the main method for evaluating policy effectiveness will be through semi-structured interviews with national and regional stakeholders. Box 4 below contains sample questions to be asked during the interviews.

The policy analysis within case studies will cover the following policies/issues:

- EU policies with biggest impact;
- National and regional policies with biggest impact;
- Policies which present serious obstacles (i.e. EHS)
- Need for additional EU/national/regional policies

The specific participatory methods enabling consultation on policy issues within case studies will be elaborated on Section 12.5 below.

12.5. Policy analysis and stakeholder involvement

Besides case studies, in order to amplify the acceptance of policy options to be developed, it is foreseen to arrange discussions with policy makers on recommended policies. GREECO envisages two types of stakeholder consultations:

- within the case studies;
- at a separate workshop;
- email consultation with relevant stakeholders. In practice this will involve sending the sets of recommendations to a wider (and targeted) group of stakeholders and giving them the possibility to comment.

	Target group(s)	Approach and goal	Period
Within case studies	National policy-makers, regional authorities, local authorities, other relevant stakeholders identified.	The consultation will take place through semi-structured interviews in order to obtain: ▪ regional point of view on GREECO sectoral conclusions (policy-related and others) for sectors which are the focus of the case study; ▪ regional point of view in terms of EU policy effectiveness for the same sectors; ▪ identification of innovative specific national and regional policies with significant impact on green economy development; ▪ Insight into stakeholders' needs.	End 2012 – 1st semester of 2013

	Target group(s)	Approach and goal	Period
Workshop	Special focus on MC members'. A minimum of 5-10 MC members participating would be desirable.	MC will be invited by the LP and ESPON CU will be asked if this event could be advertised under the "Events" section of the ESPON website. In order to facilitate MC member's participation, the aim is to organise the workshop a day before or after an ESPON event. The workshop will present the sets of policy recommendations developed within Task 2.5.3. 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)

Table 13   Stakeholder involvement

Consultation within case studies

The consultation with stakeholders within the case studies will take the form of semi-structured interviews. Authors of the case studies will identify the most suitable stakeholders on national and regional level. Precise questions will be a function of the main sectors organised within the case studies but will generally take the form of the questions in Box 2 above.

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Box 4 Potential policy-related questions during semi-structured case studies interviews

- *Would you enumerate the EU policies (transposed through national legislation) which have had the biggest impact on the development of green economy in Sectors X and Y? (both to national and regional level interviewees)*

- *Would you enumerate the national and regional policies (different from the transposed EU legislation) that have been instrumental for the development of green economy in Sectors X and Y? These would include specific targets, financial mechanisms, etc. (both to national and regional level interviewees)*

- *In the above questions would you please elaborate on the role of particular institutions (national and/or regional) and stakeholders which made these policies a success?*

- *Would you describe those policy elements (all levels of policies) which hamper the development of green economy in Sectors X and Y? (both to national and regional level interviewees)*

- *Do you consider that the region/city (depending on the case study unit) has the potential to introduce additional policies which would spur the development of green economy in Sectors X and Y and what exactly?*

- *In the above questions would you please elaborate on the institutional (national and/or regional) and stakeholder factors which made these policies into a barrier?*

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Sample workshop format

The workshop will take place back-to-back with an ESPON event in order to guarantee maximum attendance at minimum costs. The duration of the workshop will be around half a day. The workshop will be a combination of short presentations by regional typologies as defined in Task 2.3.1, followed by discussion.

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Box 5 Sample agenda for the policy validation workshop

- Presentation of Typology 1 and related policy recommendation set (10 min)
- Discussion (20 min)

- Presentation of Typology 2 and related policy recommendation set (10 min)
- Discussion (20 min)

- Presentation of Typology 3 and related policy recommendation set (10 min)
- Discussion (20 min)

Break – 20 min

- Presentation of Typology 4 and related policy recommendation set (10 min)
- Discussion (20 min)

- Presentation of Typology 5 and related policy recommendation set (10 min
- Discussion (20 min)

Note: The number of typologies is not finalised yet.

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12.6. Policy hierarchy and policy types to be applied throughout all policy analysis

EU legislation and policy

The tables below categorise the different types of policies to be considered in the analysis, on EU, national, and regional level. The overview of policies and their analysis will follow this particular classification and all different legal, financial and even institutional mechanisms listed below will be referred to as "policies". This concerns the sectoral reports, the case studies and the Policy recommendations report.

Type of policy	Short description
Roadmaps	Usually in the form of EC communication. They take a prominent place and although they do not have a binding legal character they give the style of the coming EU policy (i.e. A Roadmap for moving to a competitive low carbon economy in 2050**)**
Thematic strategies	Usually in the form of EC communication. They are not legally binding but have a strongly recommended character (i.e. Thematic Strategy on Prevention and Recycling of Waste, 2005)
Other important communications	They are not as prominent as the roadmaps but because of the process of their drafting (through wide inter-institutional consultation) they reflect the thinking and the legislative intentions within the European Commission.
Green papers (only important ones)	Widely discussed sectoral reports prepared by the EC. Aims to stimulate discussion and consultation.
White papers	Documents containing proposals for Community action in a specific area. Usually follows a Green Paper.
EU Directives	Binding texts which have to be transposed by each individual MS taking into consideration the specific legal set-up
EU regulations	Binding texts which are directly applicable and which do not require transposition

Voluntary instruments with EU coverage	Instruments which allow companies to commit to certain levels of performance voluntarily (i.e. EMAS), rating or labelling programmes as well.

Table 14   EU legislation and policy documents

All of the above can be classified in another way as well: (i) command and control (where certain standards or technologies are imposed and later controlled); (ii) technology support policies (promotion of development and deployment of certain technologies, and; (iii) voluntary approaches (OECD 2010).

National and regional policies

These are relevant mainly to the case studies. A particular national or regional policy can be mentioned in the sectoral analysis only if it is particularly innovative and goes beyond the respective EU directive in its ambition. A particular regional policy could also be key for spelling out the territorial dimensions of a sector within the sectoral analysis.

Type of policy	Short description
National legislation transposing the directives	EU Directives will be mainly analysed in the sectoral reports but concrete national legislation transposing the directives can be mentioned in the case studies where this legislation has acted as a driver and enabling condition for green economy development or is an obstacle to it
National legislation which goes beyond the EU Directives or which is innovative and on top of the EU legislation	GREECO will make an inventory for such "more ambitious" and innovative legislation in the countries covered by the case studies.
National strategies	Those who have served as a driver and enabling condition of or as a barrier to green economy development.
Regional strategies	Those who have served as a driver and enabling condition of or as a barrier to regional green economy development.
Regional development programmes (RDP)	RDPs are the blueprint for the development of the region and additionally they reflect (at least in theory) the views of local stakeholders. RDPs lead to subsequent financing for priority sectors and other incentive measures.

Table 15   National and regional policies

Economic instruments

Sectoral EU instruments will be addressed in the sectoral reports while national and regional instruments will be addressed for the countries and the regions of the case studies. If relevant, GREECO will use ready-to-use national classifications.

Type of instrument	Short description
Taxes, levies, fees, charges, including price-based environmental taxation.	Market-based instruments mainly on national level which have an impact on the behaviour of economic subjects.
Subsidies, like tax credits or subsidised prices, including EHS	EHS are a result of a government action that confers an advantage on consumers or producers, in order to supplement their income or lower their costs, but in doing so, discriminates against sound environmental

	practices. These can be fossil fuel subsidies, transport subsidies, etc.
Incentives, like grant programmes	EU, national or regional financial incentives for green economy activities.
Tradable permits	Tradable emissions permits are used in an environmental regulatory scheme where the sources of the pollutant to be regulated (most often an air pollutant) are given permits to release a specified number of tons of the pollutant.

Table 16   Economic instruments

Additional instruments

These are instruments that function on all levels – EU, national and regional – and are sometimes crucial for stimulating green economy development. Their impact is difficult to quantify but nevertheless they can be inspirational for other regions and may have a potential to be transferred.

Type of instrument	Short description
Networks	Networks can be on an EU or national level and could be instrumental in knowledge dissemination.
Awareness programmes	Awareness programmes could be key for driving company and individual behavioural patterns in a given direction.

Table 17   Additional instruments

12.7. Criteria for selection of policies for review and analysis (to be applied only within sectors with a big number of EU acquis)

The body of policies within some sectors within GREECO is extremely large. No meaningful green economy related analysis can be performed unless the number of analysed policies is narrowed down.

Location of policy review and analysis	Criteria
Task 2.2.2. Sectoral reports	All EU policies will be reviewed, especially the directives. The decision on which policies to be reviewed more in depth should be made on the basis of sectoral knowledge of the authors.
	Focus will be given to those policies that have the "largest green economy implications on a territorial level". (e.g. Waste Landfill Directive has a much bigger green economy implication than the Batteries Directive simply based on the share of Municipal Solid Waste of total waste. It also has a stronger territorial implication.) Such choices will mainly have to be made in those sectors with big legislative bodies like waste, water, industry, etc.
Task 2.4. Case studies	As it will be described in the following section, case studies will focus on several sectors in the studied regions which generate the biggest GVA in terms of green economy or which have the biggest potential for development.
	Once the sectoral focus of the case study is determined the authors should review the main policy instruments that have a bearing on these sectors in terms of green economy implications. These should be the first several most efficient policy instruments per sector. Efficiency should be judged based on existing studies. The cut-off line will be defined by the authors of the studies.
	The choice of the instruments will also be defined on the basis of desktop research and preliminary interviews. The analysis of the chosen policy instruments will be strengthened during subsequent interviews.

Table 18   Criteria for selection of policies for review and analysis in GREECO

12.8. Sample contents of Policy recommendation report

The policy recommendation report will summarise all policy related work through a brief overview of territorial dimensions and green economy implications of policies but focusing on **suggestions for improvement**.

Box 6   Preliminary content of Policy recommendation report

- Introduction.
- Overview of EU multi-sectoral policies, their territorial dimensions and their potential for development of green economy within the regions.
- Suggestions for improvement of these EU multi-sector policies in order to increase their potential for green economy development.
- Overview of main policies by sector, their territorial dimensions and potential for green economy development.
- Suggestions for improvement of sectoral policy instruments in order to increase their potential for green economy development with a focus on territorial issues.
- Overview of national and regional policies from case studies countries and regions and their potential for green economy development.
- Identification of innovative and efficient instruments.
- Suggestions for improvement of national and regional policies in case studies countries and regions in order to increase their potential for green economy development.
- Suggestion for policy mixtures according to regional typologies.
- Potential for action amongst national, regional and local institutions.

12.9. Example of territorial policies with potential impact on the development of a green economy

The dimension of space and territorial scale will play a main role in analysing the policy perspective in GREECO. This is because territory is not only one important dimension for green growth, but it is also a separate analytical strand itself. Territorial aspects can for instance have an impact in the effect and impact of policy. That is, they can determine the outcome of policies and they can determine the implication in terms of distributional effects and distribution of winners and losers. In other words, the elasticity with respect to policy impact can be determined by territorial characteristics.

Likewise, territorial cohesion suggests the need to pay attention to territorial impacts, territorial differences and performance when designing and implementing sector policies. Territorial approaches should be applied to optimise spatial impacts and the territorial interplay of policies. Synergies between them should be supported by their coordination at each territorial level.

Accordingly, as part of the work on policy analysis, GREECO will identify territorial policy areas that have especial interest for contributing to a greener economy through successful territorial development and cohesion policy actions. Quantitative assessment of regional progress towards the abovementioned objectives is valuable for the further governmental policies and the GREECO project is concerned with the provision of an improved basis for decisions on these investment support programmes, particularly with regard to territorial policies. Special attention is being paid to the following policy areas (see Annex 6 to this Report for further details):

- Sustainable development strategies.
- Policies dealing with territorial development.
- Regional policy.

- Sectoral policies for the eight sectors under study within GREECO.
- The link between sectoral policies and sustainability (taking into account that GREECO understands green economy as an operationalisation of sustainability).

Within the sector analyses currently under development in GREECO the specific policy measures within these strands will be further analysed and the implications from a territorial perspective will be made more explicit.

12.9.1. The green economy and the territorial competitiveness (LEADER programme)

LEADER stands for (in French) "link between rural development measures". The method was first introduced in 1991 as a tool to implement rural development in an alternative and more flexible way. The aim was to encourage innovative solutions to old and new rural problems. The method is based on stimulating solutions or projects that can then be transferred to other regions, the model value and the dissemination of information is thus paramount. In 1991 LEADER was not a part of the CAP, but the method and the funding was integrated into the CAP's second pillar for the period 2007 -2013.

LEADER aims to promote the effective implementation of the Rural Development Programme by the added value of local support, influence and cooperation. Through a local mobilisation of endogenous (intrinsic / site specific / idiosyncratic) development potential the goal is to implement rural development policies based on a holistic view of the countryside. The aim of LEADER is thus to contribute to overall rural program goals and (sustainability). It can be said that the "intervention logic" is "territorial" rather than to have a sector specific approach. There are specific geographic areas and LEADER is going across traditional administrative boundaries and is based on local resources, conditions, local "capital", available in each region.

LEADER is also based on a "model value" and "transferability" of practice and experience. I.e. transfer of operational projects (with an understanding of the conditions that led to the results) but also the transfer of work and training. This can be related to the green growth process as well where it is important with a transfer of ideas and solutions, as well as policy solutions. Intervention in LEADER works through both the projects that are actually carried out (actual expenditure) and through relationships, learning and community involvement. It has become widely acknowledged that results in terms of outcomes goes beyond the traditional indicators when it comes to this kind of interventions. Obviously there should be results and effects associated with the projects and programs quantitatively measurable objectives. But it is also acknowledged that it is difficult to measure the impact that activities and practices initiates learning and knowledge, interaction and relationships, local organisation and embedding of project activities in their local environment.

If we consider the keywords within the LEADER implementation idea we can see that they are also close at hand for a discussion about regional/territorial green growth processes: local partnerships, bottom-up approach, multi-sector collaboration, decentralised decision making and financing, transnational cooperation, exchange of ideas and practices, networking, good governance, social capital, learning regions, endogenous development potential…

12.9.2. Legal and policy framework for Carbon Capture and Storage

A new dimension in European energy policy is the introduction of Carbon Capture and Storage (CCS) which not only is expected to help in reducing CO_2 emissions but also may offer a high degree of energy security in European countries with high availability of coal and lignite (Fischer 2012).

Being a technology initially applied in upstream oil and gas production activities, Norway started promoting CCS in the first place. CCS entered high-level political discussion in the EU for the first time in 2005 during negotiations about the second phase of the European Climate Change Programme (ECCPII). CCS was later presented in the Green Paper *A European strategy for sustainable competitive and secure energy* (EC 2006) as strategic solution for

future exploitation of coal and lignite for energy generation. Moreover, the Commission stressed the need of investments in CCS technology and proposed several support mechanisms for its development. In the EU Energy Action Plan 2007-2009 the European Council followed the Commission's recommendations in the Green Paper (Council of the European Union 2007b). It identified the development of CCS as a main challenge in the SET-Plan. Heads of state and governments asked the Commission to improve knowledge about CCS, to promote the deployment of 12 demonstrations plants until 2015 and to develop the technology towards full and cost effective market integration in 2020 (Fischer 2012).

In 2007 the Commission started to prepare legislation on CCS, focusing on two aspects, the regulation of local and global risks related to the use of CCS and the establishment of investment security and favourable conditions for integrating CCS into the European energy markets. In a communication from 2008 the European Commission elaborated challenges that have to be addressed in connection to CCS, namely the regulation of potentially negative impacts from the application of an unknown technology while offering incentives to invest in large-scale demonstration projects (EC 2008a).

As part of the *Climate and Energy Package* published on 23 January 2008, the Commission proposed a directive to enable environmentally safe capture and geological storage of carbon dioxide in the EU, giving then foundations for a legal framework to promote the development and safe use of carbon capture and storage. The Commission decided to consider three questions in the context of the Climate and Energy Package; how far the CCS should be regulated at the EU level, whether there should be one comprehensive legal framework for the three steps involved in CCS (capture, transport and storage), and whether support schemes for CCS should be established at the national or EU level.

The CCS Directive 2009/31/EC

The EU Directive on the geological storage of carbon dioxide was adopted by the Council of Ministers on 6 April 2009 and entered into force on 25 June 2009 as part of the Climate and Energy Package (European Parliament 2009). The Directive establishes a comprehensive regulatory framework for geological storage (both on- and offshore) and associated capture and transport activities. The Directive is often described as "enabling" legislation to provide the necessary regulatory framework upon which CCS deployment could move forward (Centre for Law and the Environment 2012).

The aim of the Directive is the "environmentally safe" storage of CO_2, meaning its permanent containment as to prevent and eliminate as far as possible negative effects and any risk to the environment and human health (ibid.). The three steps in the CCS chain are addressed in the Directive stipulate rules concerning planning and operational procedures for the capture, transport and storage of CO_2. However, the Directive sets mainly rules on storage of emission while capture and transport are regulated primarily by national and EU legislations. The Directive states rules on storage of CO_2 concerning procedures in the site selection and exploitation, storage permits, operation, monitoring, closure and post-closure and transfer of liability (Fischer 2012).

The capture process is primarily regulated through the EU's Integrated Pollution Prevention and Control (IPPC) Directive (1996/61/EC). The CCS Directive also lies down, through an amendment to the Large Combustion Plant (LCP) Directive (2001/80/EC), a Carbon Capture Readiness (CCR) requirement meaning that new combustion plats with an output of 300MW or more should be capable of being fitted with capture technology (Centre for Law and the Environment 2012).

In terms of transport of CO_2 the Directive addresses few provisions, relying principally on national pipeline regulations, and property planning laws, together with existing European legislation including the regulation on conditions for access to natural gas transmission networks (2005/1775/EC). The Directive deals however with third-party access to both transport networks and storage facilities; implying that member States must ensure that potential users can obtain fair and open access to transport and storage facilities (Centre for Law and the Environment 2012).

Incentive for investing in CCS installations

According to Severin Fischer (Fischer 2012, p.90) the cost of building CCS installation currently outweighs the cost of preventing GHG emission because the ETS only covers parts of the European economy. Furthermore, export potentials on CCS technology and its positive externalities for global climate policy are not fully understood and therefore not obvious in the present status of technology development. Lastly, CCS is also an energy demanding process which implies a drop in energy efficiency of more than 10%. In order to overcome these barriers the European Commission has perceived several measures as being applicable:

- Exclusion of CCS from emission trading
- Mandatory use of CCS in new installations
- Direct public financial support to private investments

Article 10(a) 8 of the revised Emissions Trading Directive (2009/29/EC) contains the provision to set aside 300 million allowances (rights to emit one tonne of carbon dioxide) in the New Entrants' Reserve of the European Emissions Trading Scheme for not only subsidising installations of innovative renewable energy technology but also up to 12 commercial demonstration projects on CCS (NER300.com 2011).

Through the Regulation 663/2009/EC the European Council and Parliament on the allocation of EUR 1.05 billion to seven CCS projects in a geographically and technologically balanced way. This Regulation not only demands competition among companies to installation start operating in the next years but also is considered to initiating a race among governments to create investment friendly.

13. Description of further proceeding towards the Draft Final Report

The up-coming research activities of the project will ensure compliment with the main deliveries expected by the Draft Final Report, namely:

Task 2.1. *Literature review and data assessment*:

- 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. *Characterisation of the regional dimension 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*

- 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 SWOT or similar analysis

Task 2.4 *Case studies*

- 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*

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

Obviously, the Draft Final report will also take into account the comments received from the Sounding Board and the stakeholders at the last ESPON seminars.

The final objective will be to provide the deliveries foreseen in the project specifications, particularly:

- The operational use of the territorial dimension of the green economy in relation to EU policy development.
- Indication of policy options that could improve the tested policies in terms of supporting European strategies and territorial policy orientations.

The Draft Final Report of the project will be structured as follows:

- Vol 1. Executive Summary and main content of the Draft Final Report, comprising:

    o Key analysis/diagnosis/findings and the most relevant indicators and maps
    o Headline policy recommendations for all regional typologies, including key messages on:

        - The operational use of the territorial dimension of the green economy in relation to EU policy development.
        - Indication of policy options that could improve the tested policies in terms of supporting European strategies and territorial policy orientations.

- Vol 2. Scientific Report, including all the relevant outputs derived from the top-down scientific tasks of the project, comprising:

    o Commented literature review, including a discussion on the most important assessment frameworks related to the green economy.
    o Inventory of data sources, including a complete methodological description of new indicators, as well as identification of data needs.
    o Exploratory report on the territorial dimension of the green economy, addressing the most relevant territorial features linked to the concept of green economy, in relation to the territorial factors and outcomes.
    o Complete top-down analysis on regional performance and related regional typologies, including methodology.
    o Complete top-down analysis on regional potentials and related regional typologies, including methodology.

- Vol 3. Sector Reports:

    o Executive summary
    o Methodological outline
    o Main conclusions.

        - Sector reports:
        - Bioeconomy
        - Building and Construction
        - Energy production
        - Green Research and eco-innovation
        - Manufacturing
        - Tourism

- Transport
- Waste management
- Water management
- Vol 4. Case study reports:
  - Executive summary
  - Methodological outline
  - Main conclusions
  - Case study reports:
    - Navarra
    - Puglia
    - Jamtland
    - Louna Eesti
    - Ruhr Area
    - Burgenland
    - Sjaelland
    - Cornwall
    - Southern Transdanubia
    - Malta
- Vol 5 Policy recommendations report, as presented in Section 12.8.

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