GREECO
Territorial Potentials for a Greener Economy

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Annexes

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List of Annexes

A1. List of economic sectors covered in GREECO

First, a two-digit code is provided to indicate the inability to include such a sector in the analysis. Under each two-digit code is a three- or four-digit code which would be relevant for a given sector if data were to be available with European coverage

NACE codes	Activities
Manufacturing	
C20	Manufacture of chemicals and chemical products
C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
C22	Manufacture of rubber and plastic products
C24	Manufacture of basic metals
C25	Manufacture of fabricated metal products, except machinery and equipment
C26	Manufacture of computer, electronic and optical products
C27	Manufacture of electrical equipment
C28	Manufacture of machinery and equipment n.e.c.
C31	Manufacture of furniture
C32	Other manufacturing
C33	Repair and installation of machinery and equipment
Bioeconomy	
A01	Crop and animal production, hunting and related service activities
A02	Forestry and logging
A03	Fishing and aquaculture
Energy	
D35	Electricity, gas, steam and air conditioning supply
C19	Manufacture of coke and refined petroleum products
CA	Mining and quarrying of energy producing materials (NACE Rev.1 of aggregate of NACE Rev.2: B05, B06, B07.2.1, B08.9.2)
Tourism	
I55	Accommodation
I56	Food and beverage service activities
N79	Travel agency, tour operator reservation service and related activities
R90	Libraries, archives, museums and other cultural activities
R91	Gambling and betting activities
R92	Sports activities and amusement and recreation activities
R93	Sports activities and amusement and recreation activities
Water management	
E36	Water collection, treatment and supply
E37	Sewerage
Waste management	
E38	Waste collection, treatment and disposal activities; materials recovery
E39	Remediation activities and other waste management services
Buildings management and construction	
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
C23	Manufacture of other non-metallic mineral products
F41	Construction of buildings
F43	Specialised construction activities
L68	Real estate activities*
M71	Architectural and engineering activities; technical testing and analysis
N81	Services to buildings and landscape activities

Green research and eco-innovation	
M70	Activities of head offices; management consultancy activities
M71	Architectural and engineering activities; technical testing and analysis
M72	Scientific research and development
M73	Advertising and market research
M74	Other professional, scientific and technical activities
Transport (mobility and trade)	
C29	Manufacture of motor vehicles, trailers and semi-trailers
C30	Manufacture of other transport equipment
G45	Wholesale and retail trade and repair of motor vehicles and motorcycles
H49	Land transport and transport via pipelines
H50	Water transport
H51	Air transport
H52	Warehousing and support activities for transportation
H53	Postal and courier activities

Table 1: List of two-digit NACE codes investigated by GREECO sectors

Defining the construction sector using NACE codes is a challenging task involving a host of subjective decisions. This is due to the fact that the structure of the NACE classification scheme cuts across many of the sectors under analysis. As such, some sub-sectors may be included even though 100% of their output is not related to building or construction. Likewise, some sectors with portions of its activity related to buildings may not be included.

In general, the intention has been to be inclusive of activities across different sub-sectors, but without being so detailed that we are unable to compile regional data. According to the report "Sustainable Competitiveness of the Construction Sector", "Thus, there exists a trade-off between the comprehensiveness of the subsector and the validity and completeness of the data available to describe it." (EC, 2011 pg. 10) In fact, data availability is quickly understood as a main stumbling block for any analysis of the building sector on an international level, especially when attempting a regionalized (NUTS2) analysis. Future identification of opportunities for policy investment will be greatly aided by an increase of data comprehensiveness; not least a harmonization of national data in the EU. A clear example of this is found in **Table 2**, where it is shown that how the main wholesale and trade activities relating to the building construction and waste and scrap are not able to be included. In contrast, **Table 1** shows how this can be included in the transport sector because these activities are specifically identified at the two-digit level (G45 Wholesale and retail trade and repair of motor vehicles and motorcycles). We see a similar limitation in the transport sector, where rental and leasing, as well as repair and construction of transport infrastructure cannot be included.

NACE codes	Activities
Waste management	
G46	Wholesale trade, except of motor vehicles and motorcycles
G46.7.7	Wholesale trade of waste and scrap
Buildings management and construction	
C25	Manufacture of fabricated metal products, except machinery and equipment
C25.1.2	Manufacture of doors and windows of metal
C25.2.1	Manufacture of heating radiators and boilers
G46	Wholesale trade, except of motor vehicles and motorcycles
G46.1.3	Agents involved in the sale of timber and building materials
G46.4.3	Wholesale of electrical household appliances
G46.6.3	Wholesale of mining, construction and civil engineering machinery
G46.7.3	Wholesale of wood, construction materials and sanitary equipment
G46.7.4	Wholesale of hardware, plumbing and heating equipment and supplies
Transport	
C33	Repair and installation of machinery and equipment

C33.1.5	Repair and maintenance of ships and boats
C33.1.6	Repair and maintenance of aircraft and spacecraft
C33.1.7	Repair and maintenance of other transport equipment
F42	Civil engineering
F42.1	Construction of roads and railways
G47	Retail trade, except of motor vehicles and motorcycles
G473	Retail sale of automotive fuel in specialised stores
N77	Rental and leasing activities
N77.1	Renting and leasing of motor vehicles
N77.3.4	Renting and leasing of water transport equipment
N77.3.5	Renting and leasing of air transport equipment

Table 2: List of three- and four-digit NACE codes that would be investigated by selected GREECO sectors if data were available at such a resolution.

Source:

EC (2011e) FWC Sector Competitiveness Studies N° B1/ENTR/06/054 – Sustainable Competitiveness of the Construction Sector. Report Commissioned by the European Commission: Directorate-General Enterprise and Industry.

A2. List of preliminary variables and indicators included in the GREECO database

The following table presents a continuously updated broad list of indicators in the project[1]. A number of other ESPON projects work with similar indicators and themes – SEGI, ATTREC, TOWN, TERCO, SIESTA, besides completed projects –. The GREECO work will as far as possible be coordinated with these projects (see Annex 3 below) to avoid repetition.

Temporal	Missing ESPON countries	Resolution / scale	Description	Source	Code	Status
Economic sphere						
Economic background indicators						
2000-09	LI	NUTS3	GVA (curr/2005pr)	nama_r_e3vab95r2, NIS, OECD, other	GVA	Collected
2000-09	LI	NUTS3	GDP (curr/2005p/PPS/defl/PPPdefl)	nama_r_e3gdp, nama_gdp_k, NIS, OECD, other	GDP	Collected, ESPONTI
2000-08	LU, MT, CY, IS, LI (NO)	NUTS2	Household budgets	nama_r_ehh2s	SEC	Collected, ESPONTI
2000-08	LU, MT, CY, IS, LI (NO)	NUTS2	Tax and social contributions in % of primary income	nama_r_ehh2s	SEC	Collected
2000-10		NUTS3	Employment, 6 sectors, employment rates (target gap)	lfst_r_lfu3pers, NIS	L	Collected
2000, 2009	Mg	NUTS2	GVA, 64 sectors	EUROSTAT national accounts, SBS, LFS and NIS	GVA_EMP	Collected
2000, 2009	Mg	NUTS2	GVA, 64 sectors, growth rates	EUROSTAT national account	GVA_EMP	Collected

[1] Mg = Many gaps, too many for a time series matrix.

Fg = Few gaps that can be filled in.

NUTS2/0 = Mixed territorial structure of data.

GIS = Data available in grid or vector form that can be aggregated to any NUTS level

Temporal	Missing ESPON countries	Resolution / scale	Description	Source	Code	Status
				s, SBS, LFS and NIS		
2000, 2009	Mg	NUTS2	Employment, 64 sectors	EUROSTAT national accounts, SBS, LFS and NIS	GVA_EMP	Collected
2000, 2009	Mg	NUTS2	Employment, 64 sectors, growth rates	EUROSTAT national accounts, SBS, LFS and NIS	GVA_EMP	Collected
2000, 2009	Mg	NUTS2	Productivity, 64 sectors	EUROSTAT national accounts, SBS, LFS and NIS	GVA_EMP	Collected
1960-10	Mg	NUTS0	Industrial structure, share of GVA, 6 sectors	AMECO	INDSTR	Collected
Economic balances						
2000-11		NUTS0	Government debt	EUROSTAT		EU ST indic
2006, 2009, 2012		NUTS0	Sustainability indicators of public finance, S1 and S2	EC: Public finance	S1S2	Collected
1995-2011	BG, ES, FR, MT, LI, LU, UK, CH	NUTS0	Non-renewable resource rent adjusted net-savings	nama_inc_c, [nama_nace64_c	ANS	Collected
Green demand and jobs						
2000-07	ES, FR, CY, UK	NUTS2	Gross fixed capital formation	nama_r_e2gfcf	INV	Collected
1996-09	CY, MT, CH, IS, LI	NUTS2	Mining, electricity and heat, water and waste related employment, and investment in % of total	sbs_r_3k_my_r2 sbs_r_3f_my		In process
2000, 2009	Mg	NUTS2	Employment and VA in water supply, waste and wastewater treatment	EUROSTAT national accounts, SBS, LFS and NIS	GVA_EMP	Collected
		NUTS0	Green shares of investment	env_ac_exp4 &		In process

Temporal	Missing ESPON countries	Resolution / scale	Description	Source	Code	Status
			in fixed capital, consumption and exports	-r2, GVA_EMP, national and EU studies		
			Estimated employment impact of green demand			In process
2009,2011 ?		NUTS2	Potential employment in environmental goods and services		EMP_EGSS	In process
2009,2011 ?		NUTS2	Potential Gross Value Added in environmental goods and services		GVA_EGSS	In process
			Transport sector data			Cooperation with SEGI and, transport sector study
Environmental sphere						
2015		NUTS2	Wind resource economic potentials and resource rent	EEA and other		Collected, ESPONTI
2015		UNTS2	Solar (PV) resource economic potential and resource rent	JRC		ESPONTI
2015		NUTS2	Geothermal resource economic potential and resource rent	JRC		In process
			Biomass technical potential	EFNE		In process
		NUTS0-3	Land use resources	Various sources		In process
Econosphere						
Mg	ES, UK, BE, DE, EL	NUTS2	Final energy consumption (energy productivity, target gap)	NIS and other		Collected
		NUTS2	Final energy consumption, total	EUROSTAT, NIS	Total	Collected

Temporal	Missing ESPON countries	Resolution / scale	Description	Source	Code	Status
		NUTS2	Final energy consumption, production	EUROSTAT, NIS	Production	Collected
		NUTS2	Final energy consumption, residential	EUROSTAT, NIS	Residential	Collected
		NUTS2	Final energy consumption, transport	EUROSTAT, NIS	Transport	Collected
			Area under organic farming	EUROSTAT		EU Sust Ind
?	IS, NO, SE, FI, CH	NUTS3	Soil erosion (t/ha/yr)	ESDAC /JRC		ESDAC/ JRC
1994-06		NUTS0	Unsustainably catched fish	EUROSTAT		EU SustInd
2000-09	Mg	NUTS0	Material flow accounts	EUROSTAT		EU SustInd
1990-2010	LI, (IS)	NUTS0	Renewable share of electricity consumption	EUROSTAT		EU Sustind
1999-2011		NUTS0	Mineral fuel net-exports in % of GDP	ext_lt_intertrd,	FFIM	Collected
Different years	All but BG, CZ, DE, EE, FR, CY, LV, MT, NL, AT, PT, RO, SI, NO, CH	NUTS2	Water supply and use, waste water	env_ac_exp4 & -r2	ABSTR, CONN, WWGEN, GROUNDWATER	Collected, Cooperation with Segi
(2000-2008)	LI	NUTS0	Waste water treatment	EUROSTAT, EEA	WETR	Collected, Cooperation with Segi
Different years	Mg	NUTS2	Waste collection coverage rate (%)	env_rwas_cov	WASTE	Collected, Cooperation with Segi
Different years	Mg	NUTS2	Waste use rates: Deposit, energy recovery, recycling	env_rwas_gen	WASTE	Collected
2000, 2007,2009		NUTS3	Per capita and per GVA emissions	E-PRTR, EMEP EDGAR		In process
		NUTS0	Remaining carbon budget	IPCC_AR4, EUROSTAT		
		NUTS3	Exceedance rates O3 and	EEA: Air		In process

Temporal	Missing ESPON countries	Resolution / scale	Description	Source	Code	Status
			PM	2011, Risoe		
Social sphere						
2000-10		NUTS3	Population	demo_r_d3avg + NIS + other	POP	Collected
2000-10		NUTS3	Labour force, age groups	lfst_r_lfp3pop, NIS	LF	Collected
2007-10	BG	NUTS2	Human Resources in Science and Technology (HRST) – (higher education/creative class)	hrst_st_rca	HRST	Collected
2008-10	BG, PT	NUTS2	Educational participation rate 25-64	educ_renrlrg3	EDU	Collected
2000-10	Mg	NUTS3	Unemployment rate, 15-24,25+	lfst_r_lfu3rt	UL	Collected, ESPON TI
2007-10	Fg	NUTS2	Long term unemployment rate	lfst_r_lfu2ltu	UL	Collected
2000-10	MG	NUTS0	Income inequality	EUROSTAT		EU SustInd
		NUTS2	Universal access to social, health and educational services	OECD		Cooperation with SEGI
2000-10		NUTS2	Life expectancy at birth	demo_r_mlifexp	LFX	Collected, ESPON TI
2008-09	PT	NUTS2	People at-risk-of-poverty	Ic_li41	AROPE	Collected, ESPON TI
2008-10		NUTS2/0	Severely materially deprived people	ilc_mddd21	MATDEP	Collected, ESPON TI
			Satisfaction with local environment	Urban audit		FOCI
			Exposure to environmental risk	EEA		ESPON TI
			Nature accessibility	CORINE, CDDA		
			Regional specialisation indices	GVA_EMP		
Territorial sphere						
2009	CY, MT,	NUTS2	Land cover	lan_lcv_	LCLU	Collected

Temporal	Missing ESPON countries	Resolution / scale	Description	Source	Code	Status
	IS, NO, LI, CH		and land use aggregates	ovw		
2009	CY, MT, IS, NO, LI, CH	NUTS2	Wood, shrub, grass, bare land in % of total	lan_lu_ ovw	LCLU	Collected
2009	CY, MT, IS, NO, LI, CH	NUTS2	Artificial surface ratio	lan_lcv_ ovw	LCLU	Collected
2006/10		NUTS3	Quality nature area ratio	CDDA, NATUR A2000set, CLC		
		NUTS3	Land use change	LCC data		EU-LUPA
1990-09	Mg	NUTS0	Common farmland bird species	EUROSTAT		EU SustInd
2003-10	Mg	NUTS0	Habitats sufficiency index	EUROSTAT		EU SustInd
Governance and institutional characteristics						
1995-2009	LI, IS, CH	NUTS0	Implicit tax rate on energy	EUROSTAT		EU ST Indic
2008-09		NUTS0	Green taxes	env_ac_taxind2, env_ac_tax, EC: Taxation trends, EEA/OECD database, NIS		
			Fossil fuel subsidies	Forthcoming OECD study		
2012	LI, IS, CH, NO	NUTS2	Covenant of mayor signatories, share of population	Covenant of Mayors		In process
			Water tariffs	Urban audit		Cooperation with SEGI

A2.1 Economic sphere

A2.1.1. Economic background variables

GVA, GDP, SEC, L

The table above contains a long range of background variables that are useful for the formation of typologies and for normalising to enable comparisons. The principles for data quality has been to achieve

- the most recently updated data
- time series coverage 2000-09
- consistency in data definition

Many of the background data are national accounts data or closely related to these. National accounts data are often revised and *recent updates* are thus important. In Europe the industrial classification code has shifted from NACE, rev. 1.1 to NACE rev 2 following the international shift from ISIC, rev. 4 to ISIC, rev 4. Moreover, there was a major revision of aggregates such as gross value added in the spring of 2012. Thus, it will not be recommendable to use the previously collected national accounts data.

The green economy is about change and therefore access to *time-series* will often be more useful than only cross-section data for a particular year. 2000-2009 is chosen as the period for which it is realistic to find consistent time series data at sub-national territorial levels.

The data are used in rates normalisation the national accounts data with other data or vice versa. Thus, it is of importance that they follow the same *definition*. Population for instance must be accounted for according to the “residence” rather than the “national” criterion.

GVA_EMP

Some of the industrial branches are to some degree considered “green” in the sector reports. The national accounts as to grow value added and employment has been regionalised to a NUTS2 levels to the extent that reliable information on regional distributions could be found. The procedure was, first, to complete a NUTS0 level 64 branch accounts in NACE rev. 2 for 2000 and 2009 and then to regionalise them to the NUTS2 level. The national accounts data were retrieved from EUROSTAT datasets at various aggregation levels, AMECO and national statistical institutes. The regionalisation keys used was 1) Regional national accounts material in EUROSTAT, 2) Regional national accounts material from national statistical institutes and other national sources 3) Labour force survey data from EUROSTAT, 4) Statistical Business Survey data from EUROSTAT.

INDSTR

Background information on long term trends in industrial and regional structures is derived from the AMECO database and the Ulysses project.

A2.1.2. Economic balances

S1S2, ANS

The economic balances often used to indicate economic sustainability include government debt, public finance sustainability indicators and adjusted net savings, all at NUTS0 level.

The government debt indicator is available at EUROSTAT, whereas indicators on public finance sustainability (S1 for 60% government debt to GDP ratio by 2060 and S2 for zero debt in an infinite perspective).

The adjusted net savings indicator uses net-savings in % of net national income adjusted for net-profits from non-renewable resource extraction (mining).

A2.1.3. Green demand and jobs

EMP_EGSS, GVA_EGSS

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 (EMP_EGSS) or GVA (GVA_EGSS) 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

INV

The trade and production data are not collected at a sufficiently detailed level to analyse the share of the products that in popular understanding are green. The alternative route is to estimate final demand components that are green according to the EUROSTAT statistics on environmental goods and services and to calculate the employment effect of this. A part of this is, however, already accounted for in the industrial branches providing electricity and heat, water and waste water treatment and waste treatment.

A2.2. Environmental sphere

The major economic challenge in the transformation to a green economy is the transition from fossil to *renewable energy resources* (whether nuclear is considered part of a green economy differs by country). Unlike fossil energy reserves, renewable energy resources are distributed across all regions and particular types of renewable energy can be of economic importance for particular regions.

The economic value of a natural resource can be measured by its resource rent. The resource rents of the potential for wind, PV and geo-thermal energy in the NUTS2 regions can be calculated on the basis of the economic potential of the energy resource in question and the social value of the energy generated.

The previous efforts in ESPON on wind resource mapping have focused on data on wind velocity. These data are important, but are not equal to the economic potential of the wind resource.

The renewable energy potential and related resource rents are calculated following the standard renewable resource accounting procedure. For the wind potential the idea was to de-compose the EEA study in its consecutive steps and update some of the inputs with new knowledge. When the method is based on GIS-layers, it is possible to make a standard framework for future use where the layers can be exchanged when new assumptions are required.

The EEA procedure also involves a power-velocity transformation to full load hours depending on roughness, altitude etc. Mountainous areas and forests are assigned separate values.

A2.3. Econosphere

In addition to the economic potentials of renewable energy, there are very large economic potentials in the more efficient *final use of energy*. The EUROSTAT data on final energy use by region are of varying quality, but data have been collected from national sources enabling a regionalisation of final energy consumption for production, residential and transport purposes for most of the countries.

Indicators of organic farming, soil erosion and unsustainable fishing pressure represent agricultural and fisheries resource use. The soil erosion data are grid data that allow for calculation of NUTS3 level indicators.

FFIM

The other resource and energy indicators are standard indicators at NUTS0 level referring to aggregate weight of material throughput, the renewables share in electricity and the fossil fuel import drain in terms of the mineral fuel trade balance to GDP ratio.

ABSTR, CONN, WWGEN, GROUNDWATER, WETR, WASTE

The regional data in the EUROSTAT water and waste water statistics are in many respects too scattered for cartographic purposes. There is, however, sufficient data for national level analysis. Waste collection and treatment data are similarly scattered, although they better for recent years. Thus, the analysis of the water and waste sectors can be made with good coverage at the NUTS0 level and wit supplementing regional analysis for selected countries or groups of countries.

Gridded air emission data are available for greenhouse gasses (EDGAR/JRC) and local and regional pollutants (EMEP). Raster cells in these databases are being aggregated at NUTS3 level. Both of the databases, however, are subject to the problem that only a fraction of the data – point sources that do not claim confidentiality – are registered with certain coordinates. The rest of the data are distributed with surrogate vectors such as population. Thus, they can serve as estimates of the expected emission rate in a geographical area, but not as indices for monitoring progress towards a green economy.

The IPCC has calculated a global carbon budget as well as carbon budgets for developing and developed economies. Some of the European countries have instituted the carbon budgets in legislation and considerations along similar lines are going on in other European countries. The European Commission has presented a roadmap with scenarios for the decarbonisation of the European energy economy and transport sector. Greenhouse gas emissions can be estimated, but not observed at sub-national territorial levels cf. above. Observed national use and residual budgets, however, can be calculated and annualised on the national level, which can serve as a reference rate for the pace of regional transformation towards a green energy economy.

EEA provides a range of air quality analyses on observed air quality compared to critical loads, limit values and targets. Selected air pollution topics will be studied for differences in territorial challenges.

A2.4. Social sphere

POP, LF, HRST, EDU, UL, LFX, AROPE, MATDEP

The quality of life indicators include in addition to the conventional, but crude life expectancy statistics, accounts of regional averages derived from the model calculations of health impacts of air pollution. These results are available in GIS-format and NUTS2 or NUTS3 averages can be extracted. Other standard Quality-of-life indicators include unemployment,

severe deprivation and risk-of-poverty-rates, and distribution of public services and redistribution.

A2.5. Territorial sphere

LCLU

Indicators of land cover and land use in aggregated classes at NUTS2 level are available from EUROSTAT. They are supplemented by a GIS-based account of nature including nationally designated areas, NATURA 2000, the CLC based high nature value farmland areas and other CLC classified nature areas. This is supplemented with results from the EU-LUPA project on land-use change and the work will be closely coordinated with EU-LUPA.

Common farm-land bird species and habitat sufficiency index are available at EUROSTAT, but only at NUTS0 level.

A3. Potential links between GREECO project and other ESPON projects

The following table lists some ESPON indicators of possible use within GREECO framework, as well as the methodologies linked to the elaboration of some of them. The indices and maps from the projects SEGI, ATTREG, SIESTA and FOCI listed in the table below will be assessed when they become available with a view to their usefulness for the GREECO project. The work in GREECO will be adapted to avoid repetition.

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
ESPON Climate	Data Climate	Change in annual mean temperature	Projections between 1961-2100	ESPON Climate research / Lautenschlager, Michael; Keuler, Klaus; Wunram, Claudia; Keup-Thiel, Elke; Schubert, Martina; Will, Andreas; Rockel, Burkhardt; Boehm, Uwe (2009): Climate Simulation with CLM, Climate of the 20th Century and Scenarios A1B and B1, Data Stream 3: European region MPI-M/MaD. World Data Center for Climate.	NUTS3	Change in annual mean **temperature** K Climate change variable (1961-1990/2071-2100) as an output of the climate model CLM averaged over models runs (Climate of the 20th Century (run no.1 and 2) and Scenario A1B (run no.1, 2 and 3)), time periods (1961-1990, 2071-2100). Aggregated to European NUTS3 regions by share of cell coverage of regional area. Changes calculated as either of absolute changes (difference between future value (average of 2071-2100) and present value (average of 1961-1990) or relative changes (dividing absolute change by present value) by region.
		Change in annual mean of frost days				Change in annual number of **frost days** Climate change variable (1961-1990/2071-2100) as an output of the climate model CLM averaged over models runs (Climate of the 20th Century (run no.1 and 2) and Scenario A1B (run no.1, 2 and 3)), time periods (1961-1990, 2071-2100). Aggregated to European NUTS3 regions by share of cell coverage of regional area. Changes calculated as either of absolute changes (difference between future value (average of 2071-2100) and present value (average of 1961-1990) or relative changes (dividing absolute change by present value) by region.
		Change in annual mean precipitation in winter months				Relative change in mean **winter precipitation (months 12,1,2)** in % Climate change variable (1961-1990/2071-2100) as an output of the climate model CLM averaged over models runs (Climate of the 20th Century (run no.1 and 2)

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
						and Scenario A1B (run no.1, 2 and 3)), time periods (1961-1990, 2071-2100). Aggregated to European NUTS3 regions by share of cell coverage of regional area. Changes calculated as either of absolute changes (difference between future value (average of 2071-2100) and present value (average of 1961-1990) or relative changes (dividing absolute change by present value) by region.
		Change in annual mean precipitation in summer months				Relative change in mean **summer precipitation (months 6,7,8)** in % Climate change variable (1961-1990/2071-2100) as an output of the climate model CLM averaged over models runs (Climate of the 20th Century (run no.1 and 2) and Scenario A1B (run no.1, 2 and 3)), time periods (1961-1990, 2071-2100). Aggregated to European NUTS3 regions by share of cell coverage of regional area. Changes calculated as either of absolute changes (difference between future value (average of 2071-2100) and present value (average of 1961-1990) or relative changes (dividing absolute change by present value) by region.
		Change in annual mean evaporation				Relative change in annual **evaporation** in % Climate change variable (1961-1990/2071-2100) as an output of the climate model CLM averaged over models runs (Climate of the 20th Century (run no.1 and 2) and Scenario A1B (run no.1, 2 and 3)), time periods (1961-1990, 2071-2100). Aggregated to European NUTS3 regions by share of cell coverage of regional area. Changes calculated as either of absolute changes (difference between future value (average of 2071-2100) and present value (average of 1961-1990) or relative changes (dividing absolute change by present value) by region.
		Change in annual mean number of days with snow cover				Change in annual number of **days with snow cover** Climate change variable (1961-1990/2071-2100) as an output of the climate model CLM averaged over models runs ~~(Climate of the 20th Century (run no.1 and 2) and Scenario~~ A1B (run no.1, 2 and 3)), time periods (1961-1990, 2071-2100). Aggregated to European NUTS3 regions by share of cell coverage of regional area. Changes calculated as either

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
						of absolute changes (difference between future value (average of 2071-2100) and present value (average of 1961-1990) or relative changes (dividing absolute change by present value) by region.
		Change in annual mean surface runoff				Relative change in annual **surface runoff** in % Climate change variable (1961-1990/2071-2100) as an output of the climate model CLM averaged over models runs (Climate of the 20th Century (run no.1 and 2) and Scenario A1B (run no.1, 2 and 3)), time periods (1961-1990, 2071-2100). Aggregated to European NUTS3 regions by share of cell coverage of regional area. Changes calculated as either of absolute changes (difference between future value (average of 2071-2100) and present value (average of 1961-1990) or relative changes (dividing absolute change by present value) by region.
		Change in annual mean number of summer days				Change in annual number of **summer days** Climate change variable (1961-1990/2071-2100) as an output of the climate model CLM averaged over models runs (Climate of the 20th Century (run no.1 and 2) and Scenario A1B (run no.1, 2 and 3)), time periods (1961-1990, 2071-2100). Aggregated to European NUTS3 regions by share of cell coverage of regional area. Changes calculated as either of absolute changes (difference between future value (average of 2071-2100) and present value (average of 1961-1990) or relative changes (dividing absolute change by present value) by region.
		Change in annual mean of days with heavy rainfall				Change in annual number of **heavy rainfall** (>20mm) Climate change variable (1961-1990/2071-2100) as an output of the climate model CLM averaged over models runs (Climate of the 20th Century (run no.1 and 2) and Scenario A1B (run no.1, 2 and 3)), time periods (1961-1990, 2071-2100). Aggregated to European NUTS3 regions by share of cell coverage of regional area. Changes calculated as either of absolute changes (difference between future value (average of 2071-2100) and present value (average of 1961-1990) or relative changes (dividing absolute change by

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
						present value) by region.
EDORA	Typology data	Urban-rural typology (Dijstra-Poelman types)	2008	Dijkstra L and Poelman H, (2008) Remote Rural Regions, How proximity to a city influences the performance of rural regions, Regional Focus No1, DG Regio, European Commission	NUTS3	This typology is a modified form of the well known OECD classification. It distinguishes regions according to both (i) the proportions of their **population living in "rural"** LAU2 areas (defined as those with a population density <150 persons per KM2) and (ii) the share of its **population which can drive to a city of >150,000 inhabitants within 45 minutes**. Five types of regions are defined: 1. Predominantly Urban (PU). 21. Intermediate Accessible (IA). 22. Intermediate Remote (IR). 31. Predominantly Rural Accessible (PRA). 32. Predominantly Rural Remote (PRA).
		Combining urban-rural typology (urban-rural, structural and performance)	2010	ESPON EDORA applied research	NUTS3	Composite Type Code (Urban-Rural Typology, Structural Typology, Performance Typology)
		Performance typology (for non urban regions)	2010			The EDORA Performance Typology is applied only to non-urban regions (i.e. all regions except those defined as Predominantly Urban (PU) in the Dijkstra-Poelman Typology). Four types of "non-urban" region are distinguished: 1. Accumulating. 2. Above Average. 3. Below Average. 4. Depleting. The methodology was based upon a composite regional performance indicator derived from the following variables; (a) net migration, (b) GDP per capita, (c) average annual change in GDP, (d) average annual change in total employment, (e) and unemployment rate.. The individual indicators were first normalised (converted to z scores). The composite indicator was then calculated as the mean of the Z scores. **Accumulating regions** were defined as those with a composite indicator **>0.5, above average 0-+0.5, below average 0--0.5**, and **depleting <-0.5.**

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
		Structural typology (for non urban regions)	2010			The EDORA Structural Typology is applied only to non-urban regions (i.e. all regions except those defined as Predominantly Urban (PU) in the Dijkstra-Poelman Typology).. Four types of "non-urban" region are distinguished: 1. Agrarian economies 2. Consumption countryside 3. Diversified (with important Secondary Sector). 4. Diversified (with important Market Services Sector). A stepwise decision tree was used to define the types, as follows: **Agrarian regions** were first identified, (using a composite indicator of the importance of primary sector activity). Secondly, within the non-agrarian residual, regions in which **Consumption Countryside** development seem important were identified (using a composite indicator of access to environmental assets, tourism capacity, and farm diversification) [1]. The remaining regions were denominate as **diversified**, and, (using an indicator defined as the ratio of Secondary Sector to Market Services GVA) they were subdivided into; those in which secondary activities are important, and those in **which market services** have become dominant.
	Typology	Share of private GVA from primary sector	2006	ESPON EDORA applied research	NUTS3	GVA in primary sector / total private sector GVA *100
		Nights spent by non residents per capita	2008			Nights spent by non residents / total population *100
		Access to natural area	2008	EC (2008) Annex Map 6		No data available
		Ratio of GVA from NACE CE to GK	2007	ESPON EDORA applied research		No data available
		Share of primary sector employment in total private sector	2006			Primary sector employment / total private sector employment *100
		Annual average GDP change	1995-2006			No data available
		Ratio of GVA from	2007			No data available

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
		NACE CF to GP				
		Ratio of employment form NACE CF to GP	2007			No data available
		Share of holdings with more than 4 ESU	2007			Number of holdings > 4 ESU /total holdings * 100
		Share of GVA from primary sector	2006			GVA in primary sector / total GVA *100
		Ratio of GVA from NACE CE to GP	2007			No data available
		GDP per capita in Purchasing Power Standards (PPS)	2007			No data available
		Net migration rate	2001-2005			No data available
		Annual average employment change	1995-2006			No data available
		Share of employed people in hotels and catering	2007			People employed in hotels and catering/total people employed *100
		Share of employed people in primary sector	2006			Employed people in primary sector / total employment *100
		Ratio of employment from NACE CE to GK	2007			No data available
		Share of holdings with other gainful activity	2005	Rural Development in The EU chapter 3 (Objective 27)		No data available
		Nights spent per capita	2008	ESPON EDORA applied research		Nights spent total / total population *100
		Unemployment rate	2007-2008			No data available
		Bed place per capita	2007			Bed places / Total population
		Annual Working Units (AWU) as a share of total private employment	2007			Annual working units / Total private sector employment
		Nights spent by resident per capita	2008			Nights spent by residents / total population *100
ReRisk	Photovolta	Potential for electricity	2005	Joint Research	NUTS2	No data available

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
	ic output data	production from PV panels (kWh)		Centre's Sunbird data base		
	Fuel costs data	Fuel costs in freight transport as % of GDP	2005	DG Regio – Europe 2020 Report	NUTS2	This indicator measures which percentage of the regional gross domestic product is dedicated to fuel costs for freight transport.
	Wind Energy	Wind Energy Potential	2005	ESPON ReRisk applied research	NUTS 2	This indicator identifies those regions in Europe, which have the highest potential for producing electricity from on-shore wind power. Wind power potential is measured in **m/s**, but the ReRisk indicator also accounts for **the area size of the regions (km2)**. However, the European Environmental Agency [EEA 2009] has introduced some restrictions when calculating the maximum potential, mainly due to environmental reasons (Natura 2000, …)
	Air passenger data	Air passengers	2005	Eurostat	NUTS 0/1/2	Eurostat collects this indicator in the section on regional transport data. The ratio of passengers to total regional population has been calculated by the project team.
		% of national air passenger transport	2005	ESPON ReRisk applied research	NUTS2	
		Passenger embarked and disembarked/total regional population	2005		NUTS2	
	Ecosocial data	Working in another region	2005	Eurostat	NUTS 0/2	Both data sets (workplace in the same region and workplace in another region) are available from Eurostat in the section of "Regional employment - LFS series". The ratio was calculated by the project team. The regional data on passenger transport available from Eurostat includes the use of railways, but does not distinguish between the motives of trips, i.e. daily commuting or travel for leisure.
		Working in the same region	2005		NUTS 0/2	
		Working in another region/working in the same region	2005	ESPON ReRisk applied research	NUTS 0/2	
		Disposable income per inhabitant, net uses, based on final consumption (PPS/hab)	2004	Eurostat	NUTS 2	Data are provided by the National Statistical Institutes' Accounts Departments. Data come from many sources, including administrative data from government, censuses, and surveys of businesses and households. Sources vary from country to country and may cover a large set of economic, social, financial and environmental items, which need not always be strictly related to National Accounts. In any case, there is no one single survey source for National Accounts. (Eurostat, Households accounts ESA 95
		Disposable income, net uses, based on final consumption (PPS)	2005		NUTS 2	

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
						metadata)
		Long-term unemployment rate	2007		NUTS 0/1/2	Data are acquired by interviewing the sampled individuals directly. Three modes of data collection exist for the EU-LFS: personal visits, telephone interviews and self-administered questionnaires. Half of the Participating Countries mix the two first so that the first wave is always or mainly via personal visit while subsequent waves are interviewed by telephone if available. . (Eurostat, Regional economically active population - LFS series and LFS adjusted series metadata)
		Economic activity rate, 15 years and over	2005		NUTS0/ 1/2	
	Employment transport data	Employment in air transport	2005	Eurostat	NUTS 2 (Sweden)	Regions that have specialized in transport services, especially in road transport, may therefore be especially exposed to the impacts of rising energy prices. Raw data was again obtained from Eurostat's Structural Business Statistics. The percentage of employment in the transport sector (NACE sector I - Transport, storage and communication) was calculated by the project team.
		Employment in transport, storage and communication	2005			
		Employment in post and telecommunications	2005			
		Employment in transport sector (% of total regional employment)	2005	ESPON ReRisk applied research		
		Employment in supporting and auxiliary transport activities, activities of travel agencies	2005	Eurostat		
		Employment in water transport	2005			
		Employment in land transport, transport via pipelines	2005			
	Area population data	Population (ages / 5 years)	2005-2006	Eurostat	NUTS 2	No data available
		Population (0-14 years)	2005-2006	ESPON ReRisk	NUTS 2	No data available

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
		Age dependency ratio	2005-2006	applied research	NUTS 2	(Population aged between 0 and 14 years + population aged above 65 years) / (population aged 15-64 years)*100
		Total land area	1990-2007	Eurostat	NUTS 0/1/2/3	No data available
		Total population	2005-2008		NUTS 2	No data available
	Competitiveness data	% of GVA depending of energy intensive industries	2005	ESPON ReRisk applied research	NUTS 2	The following approach was chosen in order to determine the sectors and regions that are most **vulnerable to energy price increases**: 1. First, we estimated, for the EU 27, the sectors with the highest spending on energy products on NACE 2 digit level, and which, combined, represent 63% of industrial energy spending 2. In a second step, we calculated the ratio between "total purchases of goods and services" and the energy purchase in each sector (down to NACE 4 digit) for those EU countries, for which complete data sets were available for both categories. This made it possible to identify the subsectors and processes with the highest energy purchases, and also to determine the relative position of these sectors in each EU country in terms of energy spending. 3. Then, we identified the EU regions, in which large part of the industrial employment and gross value added (GVA) depends on these sectors with high energy spending and which may therefore be more vulnerable to energy price increases. 4. Finally, using actual consumption data from 4 Member States, we confirmed that there is a significant correlation between the industrial energy spending in the regions and their energy consumption.
		GVA in energy intensive industries	2005			
		GVA of industry (NACE C to F)	2005	Eurostat		
		Employment in industries with high energy purchases	2005	ESPON ReRisk applied research		
		% of employment in industries with high energy purchases (NACE D)	2005			
		Total GVA	2005	Eurostat		
		Total employment	2005			
		% of total employment in industries with high energy purchases (total employment)	2005	ESPON ReRisk applied research		
		% of employment in industries with high energy spending	2005			
SeGI 'Services of General Interest'	Availability, accessibility and affordability of	- percentage of renewable energy of primary energy production (%) - percentage of households with access	-	ESPON (2011): Appendix 3, SGI indicators, Applied Research 2013/1/16, Interim Report | Version	-	-

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
	services of general interest (SGI) related to NACE R2 sectors.	to electricity (%) - Ground water available for annual abstraction (m3 per inhabitant) Water collection, treatment and supply - number of units number of persons employed - Population connected to public water supply - Number of plants type of treatment) - Design capacity BOD(1 000 kg O2/dayand inhabitant - Sewage – number units and number persons employed - % of resident population connected - treatment by level of treatment(primary, secondary, tertiary) - Regional coverage rate of municipal waste collection (%) - Waste collection, treatment and disposal activities - materials recovery (number of units and persons employed) - Remediation activities and other waste		14/10/2011		

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
		management services- number of units number of persons employed (per km and per 100.000 - various transport related statistics depending on the GREECO report on transport sector				
ATTREG 'Attractiveness of European Regions and Cities for Residents and Visitors'	Migration and tourism attractiveness.	Tourist Climatic Index Synthetic environmental capital index		ESPON (2012): ATTREG The Attractiveness of European regions and cities for residents and visitors. Applied Research 2013/1/7. Final Report | Version 31 May 2012		
ESPON project 2.1.4 'Energy services, networks and territorial	Comprehensive description of the European energy economy. Mostly	- TPES / Population toe per capita) - FEC/ Population toe per capita) - FEC service and residential sector FEC		ESPON (2005): ESPON 2.1.4 Territorial trends of energy services and networks and territorial impact of EU energy policy.		

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
impact EU energy policy'	NUTS0.	total (%) - Electricity consumption/Population (kWh per capita) - TPES / GDP (toe per 000 Euro) - FEC / GDP (toe per 000 Euro) - GDP / FEC (000 Euro per toe) - Electricity consumption/GDP (kWh per 000 Euro) - GDP / Electricity Consumption (Euro per kWh) - Households energy use (toe per capita) - Average load factor (%) Proportion of electricity generated by renewables (%) - Proportion of electricity generated by liquid fossil fuels (%) *Proportion of electricity generated by solid fossil fuels (%) - Proportion of electricity generated by natural		Final Report CEEETA Research Centre for Energy, Transport and Environment Economics.		

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
		gas (%) - Shares and diversity of fuels or electricity generation - Ratio of energy production primary energy consumption - Fossil fuels dependency (%) *Annual electricity failuresminutes/year) - Crude oil refined/fossil fuels primary consumption (%) - Fuel price indices for the industrial sector (natural gas, electricity) - Fuel price indices for he domestic sectoranatural gas, electricity) - Fuel price indices for the transport sector (gasoline and diesel) - Greenhouse gas emissions (Mio tonnes CO2 equivalent) - Acidification gas emissions(Acidifying				

Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
		Potential (kt))				
SIESTA	EUROPE 2020 at the regional scale: Documentation, analysis and policy recommendations.	- Map 33. Green patent applications as a % of total patent applications. - Map 36. Regional estimation of GHG emissions. - Map 37. Variation of GHG emissions compared to 1990 levels. - Map 38. Variation of GHG emissions compared to 1990 levels. Distance to national targets. - Map 39. Share of renewable energy in gross final energy consumption. - Map 40. Share of renewable energy in gross final energy consumption. Dist. to nat. targets - Map 41. Wind energy potential. - Map 42. Solar energy potential. - Map 43. Energy intensity of the		ESPON (2012): SIESTA Spatial Indicators for a 'Europe 2020 Strategy' Territorial Analysis Applied Research 2013/1/18 Revised Inception Report | Version 30/3/2012		

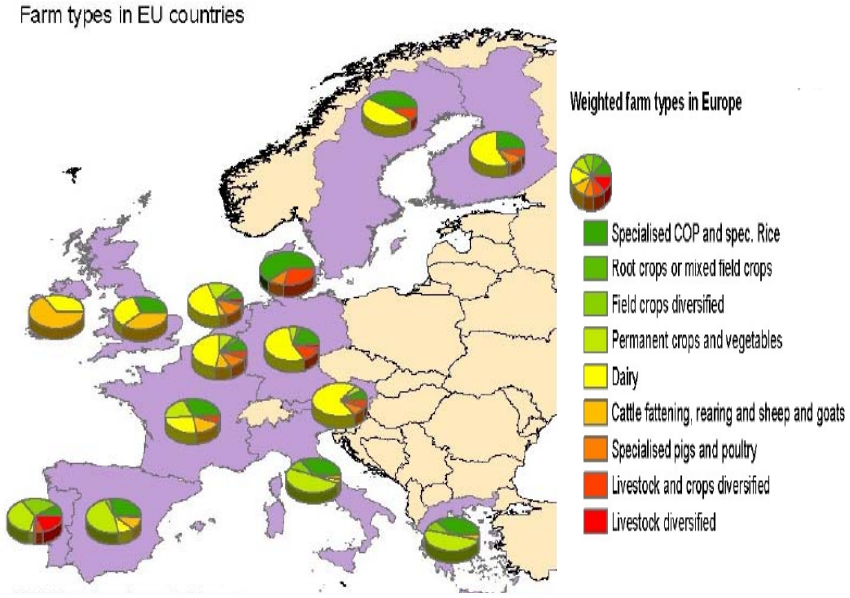
Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
		economy. - Map 44. Energy intensity of the economy. Distance to national targets. - Map 45. Energy intensity of the economy. Trend. - Map 46. Share of empl. in industries with high energy spending in total employment. - Map 47. Share of people commuting in total employment. - Map 48. Share of journeys to work by car. Urban areas. - Map 49. Rate of municipal waste collection. - Map 50. Urban waste-water treatment capacity. - Map 51. Protected areas included in the Natura 2000 network as a share of total area.				
FOCI	Functions and structure	Subjective well-being indices, urban audit		ESPON (2010): FOCI		

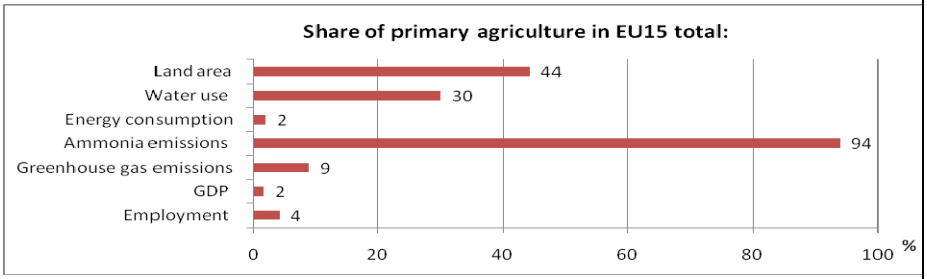
Project	Group	Indicator	Time Range	Original source	NUTS level	Metodology
	of cities and their future orientations.			Future Orientations for CIties Applied Research 2013/1/1 Final Report | Version 15/December/2010		

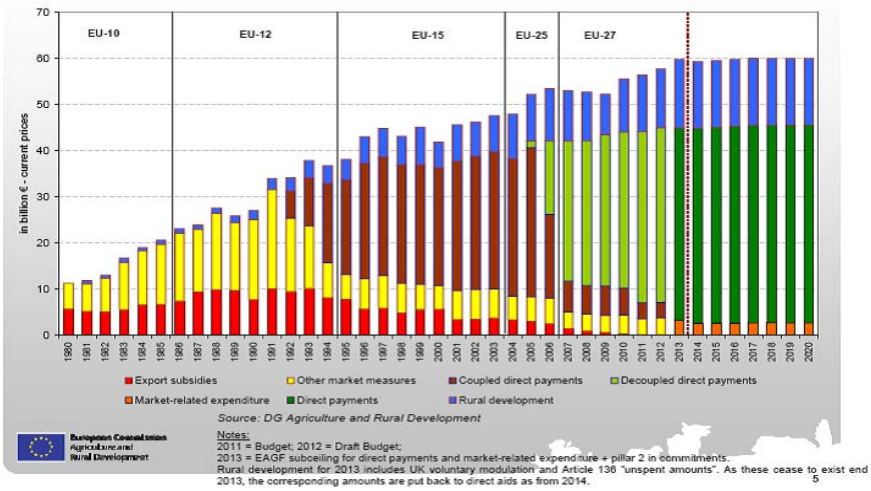
A4. Short factsheets on the sectors under examination

The following tables present some short fact sheets for those sectors under examination in GREECO that already have some preliminary results.

A4.1 Bioeconomy

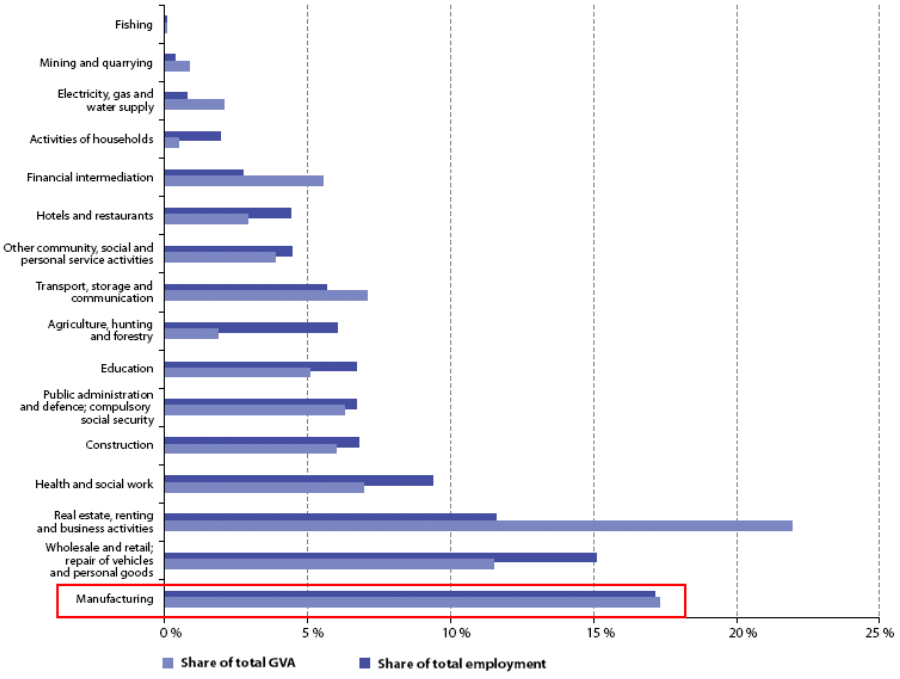
BIOECONOMY (GREEN AGRICULTURE)	
Definition of the sector	The share of agriculture in developed countries national accounts is rather low. The EU average is arround 3 % but for many countries it is below 0.5 %. In EU 15 employment in primary agricultural production is now below 5 % and in contries with industrialised farming it is well below 2 %. Consumption of food products account for between 15-20 % of household disposable income in Europe, and the share is declining. Average farm size has been increasing and today farms are on average 19 ha, this varies greatly between countries and in Sweden for instance the average is 36 ha.  The structure of agriculture is rather diverse accross Europe as depicted by the map above. Dairy production is important in northern countries as well as the UK. Medeteranian countiries have a more crop and vegetable oriented production (and relies more havily on irrigated farm systems). The largest producers in the EU are Framce, Germany, Italy, Spain, the Netherlands and the UK. Major exporters are Denmark, France, the netherlands and the UK. In addition, the impotnace of Agriculture in the economy of European countries is quite diverse with Greece, Ireland, Portugal and Spain at the top of the list. The challenge for the agri-food complex (primary production, fisheries, processing, distribution, etc.) is that production will need to increase substantially over the coming decades to support a population projected to level out somewhat above 9 billion. This means that productivity will have to increase substantially, especially in developing countries. In Europe where productivity is already high and land resources are already exploited to a great extent the buildup of pressure on land, biodiversity, water, landscape as well at the interaction with build areas, will be great challenges. Increasing production and productivity (and sustaining levels of production in already efficient regions) will also have to take place in the light of possible

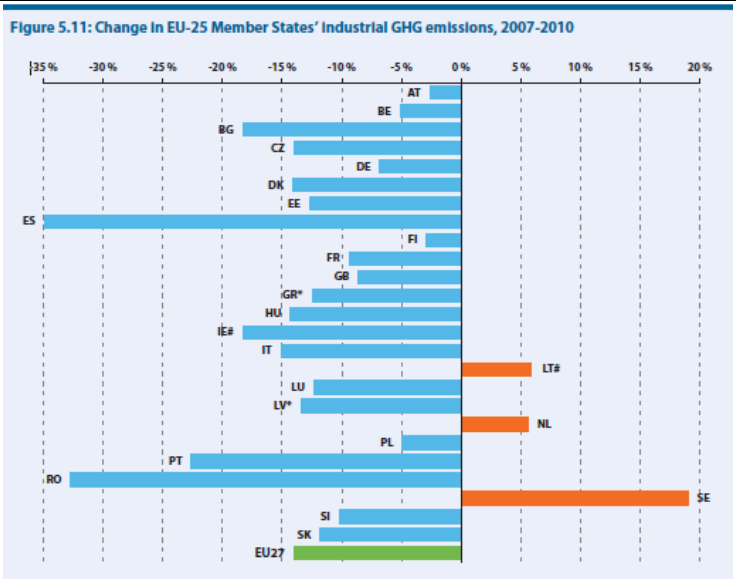
BIOECONOMY (GREEN AGRICULTURE)	
	impacts of climate change such as warming, cooling and changes in precipitation and extreme weather events; and the impacts of invasive species and new crop and livestock deceases cased by such change.
Problem statement	 The available scientific evidence suggest that business as usual will lead to future growth which is constrained by natural resource limits and which will put the future security of food and water at a risk. Therefore a green growth pathway with good policies and innovative solutions to increased productivity is needed
Green growth strategy	A green growth strategy for the sector aims to ensure that enough food is provided in a sustainable way for a growing population. This entails increasing output while managing natural resources. It also involves reducing the carbon intensity, waste and adverse environmental impacts throughout the food supply and consumption chain. Furthermore, it visions an enhanced provision of environmental services such as carbon sequestration, flood and drought control, conservation of biodiversity and attractive landscapes for living and recreation. It should be recognised that agriculture and food production can generate both environmental harm as well as positive impacts on ecosystems. Agriculture both depends on natural resources and has a great impact on them. Resource endowments and context (absorptive capacity, thresholds, soil, climate, etc.) differs widely across countries and at different stages of production and between production systems. Therefore context is critical in the discussion about green growth strategies for agriculture and food production. - Increasing productivity in a sustainable manner. Increase resource efficiency throughout the production and consumption chain, both in the way inputs are used ant waste is managed. Requires research and innovation towards new practices and needs education and information to be applied at the farms and at consumers. - Making sure markets are well functioning and provide correct signals. Correct means prices which also take into consideration externalities, both positive and negative. Prices should reflect scarcity in resources but also in resources which are historically not traded on markets (clean air, biological diversity, absorptive capacity, some sources of water, smell, animal welfare, etc.). Positive aspects of land management and biological services are also a part of green growth in agriculture and forestry and should be priced in order to secure a suitable level of provision. - Markets should also make sure that property rights are well defined and enforced. With property right there are stronger incentives to manage resources (land, forests, marine ecosystems, water, etc.) more sustainable in the long run. Open access encourage over exploitation (tragedy of the commons) and require special situations and solutions to be efficient and sustainable. In many situations well defined property rights will ensure sustainable exploitation in a more efficient way. There is a clear time dimension to green growth in agriculture where basic needs for food in developing countries are posed against more long run impacts of sustainability in how this food is produced. This poses a global issue much similar to that of carbon emissions and poverty. These issues

BIOECONOMY (GREEN AGRICULTURE)	
	call for global solutions where mechanisms of technology and knowledge transfers are utilised.
Production and consumption perspectives	- ***Waste and water***: Agriculture can impact in different ways on the good chemical and good quantitative status of groundwater and surface waters. - ***Land use:*** Agriculture is the main land user and the resulting high visibility leads to a widespread perception that "rural" matches with "farming". - ***Etc.***
Overview of EU policy	For the past 60 years, agriculture in Europe has been heavily influenced by the CAP. Although many other forces and influences have shaped agriculture (mechanisation, crop and animal modification, globalisation, etc.), it is widely accepted that specialisation, productivity increases, territorial distribution and many other aspects of European farming are heavily affected by this policy and its successive reforms. **The path of CAP expenditure 1980-2020 (in current prices)**  The emphasis on agri-environmental and rural policies is probably going to be confirmed and reinforced in the next decade. The progressive reform process undertaken by the CAP, especially starting with the 2003 mid-term review of Agenda 2000, and the current debate on CAP reform for the 2014-2020 period confirm this long-term trend. This shift in agricultural policy moves the emphasis away from commodity support towards environmental contracts, diversified production practices and rural development.
Territorial dimensions	The concept of multifunctionality was developed in a political context in the late 1990s to highlight the need to find ways to remunerate non-agricultural roles for rural development (i.e. provision of environmental public goods). Lankoski (2003) proposed a definition whereby agriculture is described as multifunctional if, besides its primary production, the activity affects social welfare by jointly producing multiple positive or negative non- commodity outputs. While multifunctionality has been traditionally associated with environmental benefits, certain authors (e.g. Lowe et al., 2002) show that multifunctional farming is concerned with generating and sustaining rural landscapes as well as social aspects of farming in rural (peripheral) areas. Nilsson et al. (2008) describe how agriculture usually contributes to sustaining economic activity and upholding populations in rural areas. This can be critical for sustaining private and public services, as well as social life, and preventing emigration. From a territorialised green growth perspective this becomes really important. OECD (2001) acknowledges that

BIOECONOMY (GREEN AGRICULTURE)	
	agriculture possesses the characteristic of a public good insofar as it contributes to rural viability and attractiveness. This may be related to the way agriculture generates employment and income in rural areas, and the extent to which it provides rural landscapes and other rural amenities.
Linkages to other sectors	The most remarkable linkage of the Bioeconomy sector is with the Renewable Energy sector, since there is (to some extent) a competition for land in resources. Due to the rise of Renewable Energy, there has been a tendency for land use substitution.
Description of the interest of the sector from a green economy perspective	A green turn of today's agriculture is of paramount importance because of the high environmental implications of conventional agriculture practices: chemical fertilisers, herbicides and pesticides; extensive farm mechanisation; high use of transportation, etc. Moreover, this shift poses the potential to restore and improve soil fertility, achieve more efficient resource use, etc. while promoting employment and growth.

A4.2. Manufacturing

MANUFACTURING	
Definition of the sector	The main difference between green manufacturing and conventional manufacturing is taht the first aims at minimizing the amount of natural resources used to produce finished goods through more efficient (energy and materials) processes, reducing the negative externalities of pollution and waste. These processes include a more efficient transport and logistics, that have a significant percentage of the total environmental impact of industry. Europe's long tradition in the Manufacturing sector is evident when looking at the economic activities distribution in the EU. In fact, this sector employs almost 20% of active population (EU27) and the highest shares of industrial employment were found in regions of Bulgaria, Czech Republic, Germany, Hungary, Poland, Romania and Slovakia, with the Slovakian region of Západné Slovensko recording the highest share at 60.2 % (Eurostat). In terms of GVA, manufacturing contributes approximatelly around 17% of total GVA. Share of total GVA and employment in 2005 (EU27).  Eurostat These features have had a strong impact on the territory and environment, due to the pressures inflicted by the sector. However, in the last decades, there has been a decoupling of growth from environmental depletion, mainly because of the following reasons: tighter environmental regulation, energy efficiency through R&D, the general replacement of heavy and more polluting types of manufacture by other more sustainable and the voluntary collaboration of companies in programs to reduce their environmental impact. Change in EU-25 Member States' industrial GHG emmisions, 2007-2010

MANUFACTURING	
	 European Competitiveness Report. Industrial competitiveness (2011) Nonetheless, manufacture is still responsible for a number of environmental problems, such as pollution, waste stock and resource depletion. (EEA). Currently, manufacturing is responsible for around 35 per cent of global electricity use, over 20 per cent of CO2 emissions and over a quarter of primary resource extraction. It also accounts for up to 17 per cent of air pollution-related health damage. Estimates of gross air pollution damage range from 1 to 5 per cent of global Gross Domestic Product (GDP) (UNEP).
Problem statement	Manufacturing is one of the most material and resource consumer sector, by the nature of the activity. The massive consumption conducted over decades, has brought the current problem of resource scarcity and depletion. The economic assessment of this fact is associated with considerable risks in operations, markets, consumers… because resources prices are and will be rising steadily. The social dimension of the problems generated by traditional industry is particularly related to human health. The spread of harmful chemicals uses threatens human health, which is increasingly more exposed to diseases from this source.
Production and consumption perspectives	As mentioned above, the environmental performance of industry has been improved in recent years: almost all countries have reduced their GHG emissions, decreased waste stocks through better recycling processes, increased material productivity and consumed resources and energy more efficiently. This advance has been mainly due to the investments in R&D and Innovation. In addition, Environmental Goods and Services Sector has become an essential activity in the greening of the manufacture. It *consists of a heterogeneous set of producers of goods and services aiming at the protection of the environment and the management of natural resources*. There is not data available for all Europe, but it is known that in some countries like Belgium, the GVA created by this sector is growing significantly (Eurostat). Also UNEPs' Green Economy Report exposes, resulting of some simulations, that investing in greening manufacturing industries will help to reduce energy consumption and emissions, reduce the upward pressure on

MANUFACTURING	
	prices of fossil fuels and – through avoided energy costs – help boost productivity and profit whilst stimulating GDP and overall employment.
Green growth strategy	In the EU, the green growth strategy for the Manufacturing sector would very much rely on the Sustainable Consumption, Production and Industry Action Plan, which is focused on the implementation of a series of measures to improve the energy and environmental performance of products throughout their life cycle, and to stimulate demand and consumption of better quality products, thus creating a 'virtuous circle'. The action plan forms part of the European Union ***Strategy for Sustainable Development*** and the ***Community Lisbon Programme for 2008-2010*** of which one of the main orientations is the promotion of an industrial policy geared towards more sustainable consumption and production. These targets may be reached by: • Extending the scope of the ***Directive on ecodesign***, which for the moment only applies to energy-using products, to all energy-related products or those products which have an impact on energy consumption during their use (window frames, water-using devices etc.); • Extending the scope of the ***Energy Labelling Directive*** to cover a wider range of products; • Revising the ***Ecolabel Regulation*** to simplify and streamline the process of obtaining an ecolabel, and to extend the product coverage; • Promoting **green public procurement**, by providing guidance and tools for public authorities to "green" their procurement practices; • Implementing incentive **measures aimed at reducing the environmental footprint** of the retail sector and its supply chain, promote more sustainable products, and better inform consumers. •
Overview of EU policy	The EU policy framework with regard to (greener) Manufacturing is broad: • Green Paper: European Contract Law for consumers and businesses [COM(2010) 348 • Green Paper on corporate social responsibility [COM(2001) 366 • Green Paper on Entrepreneurship in Europe [COM (2003) 27 • Communication (2007) 379 - Small, clean and competitive, a programme to help small and medium-sized enterprises comply with environmental legislation • Decision1639/2006/EC - Competitiveness and Innovation Framework Programme (2007-2013) • Communication (2008) 394A "Small Business Act" for Europe • Regulation (EC) No 1221/2009 - Community eco-management and audit scheme (EMAS) • Communication (2002) 347 - Corporate Social Responsibility: A business contribution to Sustainable Development • Directive 2004/35/CE Environmental liability with regard to the prevention and remedying of environmental damage • Communication (2005) 670 - Thematic Strategy on the sustainable use of natural resources • Communication (2000) 265 - Promoting sustainable development in the EU non-energy extractive industry The Commission considers however that there is a need to give further

MANUFACTURING	
	impetus to environmentally friendly production processes and energy savings. In this context, the Commission intends to act in three areas: • increase **efficient use of resources** (creating more value while using less resources); • support **eco-innovation**; • enhance the environmental potential of industry, by revising the ***EMAS Regulation*** (Community eco-management and audit scheme), by preparing industrial policies for environmental industries and by helping small and medium-sized enterprises (SMEs) to fully exploit business opportunities in the field of environment and energy.
Territorial dimensions	Manufacturing sector is present in all European territories. However, it should be noted that it is not a uniform sector and that geographic dispersion in its value chains is part of the complexity that the industry faces (UNEP). Traditionally, manufacture has had a strong impact on the territory, being the economical engine of the regions, by creating jobs and attracting other activities (supply side, R&D organisation, et.). However, for decades it has also been the main responsible for pollution and resources massive consumption.
Linkages to other sectors	Manufacture has links and relations with many other sectors, especially with the energy sector (due to high energy consumption) and with the transport sector (due to carrying industrial raw material, intermediate or final products). In addition, it should be noted the relevance of Green Research & Econ-innovation, which provides the basis for the transition towards a green(er) Manufacturing.
Description of the interest of the sector from a green economy perspective	Manufacture is one of the most polluting sectors and accounts for most of the resources and energy consumption. In such a context, green economy means a structural change of the traditional brown industry to an environmental friendlier activity. Furthermore, manufacture also comprises the production of green goods and services (EGSS), and subsequently creates new jobs and brings more sustainable goods and services into market.

Sources:

http://ec.europa.eu/enterprise/policies/industrial-competitiveness/competitiveness-analysis/european-competitiveness-report/index_en.htm

http://www.eea.europa.eu/themes/industry/intro

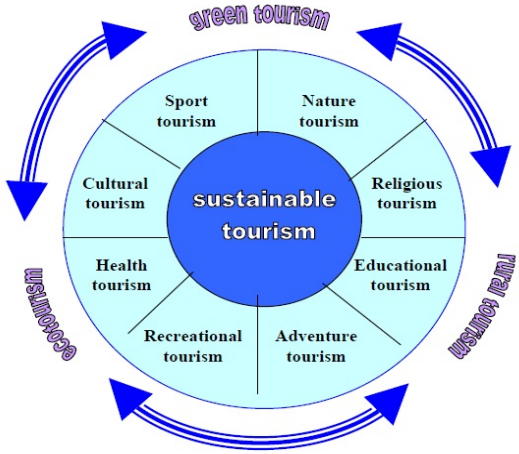
http://www.oecd.org/document/24/0,3746,en_21571361_47075996_47844824_1_1_1_1,00.html

http://www.unep.org/greeneconomy/greeneconomyreport/tabid/29846/default.aspx

http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Environmental_goods_and_services_sector

http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Sectoral_productivity_at_regional_level

A4.3. Tourism

EXPERIENCE ECONOMY (TOURISM)	
Definition of the sector	Tourism is a strong component of the service economy and has a considerable social, economic and environmental impact wherever it is developed. Tourism is defined as a resource-intensive industry; and recognized as a sector that needs to be responsible in terms of sustainability at both local and global scales. Sustainable tourism is main focus in the debate of environmentally integrated tourism development and green tourism is considered as an important component of sustainable tourism. A multiplicity of definitions exists with regard to the tourism sector within Europe. Therefore, the scope of tourism is broad and the sector can be interpreted in alternative ways:  **Source:** *Sustainable tourism based on natural and cultural heritage, DG Enterprise (2002-10-11)* **Tourism in a green economy**: refers to tourism activities that can be maintained, or sustained, indefinitely in their social, economic, cultural, and environmental contexts; also referred as "sustainable tourism". Sustainable tourism is not a special form of tourism; rather, all forms of tourism may strive to be more sustainable. **Sustainable tourism**: meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to management of all resources in such a way that economic, social and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity and life support systems. A clear distinction should be made between the tourism concepts and their significance in greening of the industry should be recognized. Some of these tourism concepts are mentioned below: **Eco tourism**: is defined as a type of tourism with a purpose. The concept is often confused with sustainable tourism. Whilst eco-tourism is a form of tourism (like sports, health, beach, cultural or adventure tourism), the concept of sustainable development should be applied to all these forms of tourism. If the principles of sustainability are applied, then the type of tourism can be called sustainable tourism - therefore it can apply to all tourism activities. The specific definition as to what Eco tourism refers to in practice can vary greatly from one country to another. **Business tourism**: refers to meetings, incentives, conventions and exhibitions with an aim to underpin tourist visitation for numerous destinations. Destination countries have made substantial investments to provide the meeting facilities and accommodation needed for business events (Mair, J. and Jago, L. 2010). The global economic importance of this

EXPERIENCE ECONOMY (TOURISM)	
	sector is difficult to define since global figures are not available. **Agri tourism**: refers to trends in growing urbanization and agricultural diversification that indicate rural areas are increasingly losing residents, but "gaining" short-term visitors in return. City-residents wish to visit "the countryside to reconnect with nature, thus creating demand for agri-tourism businesses. **Tourism in the EU** Despite the increasing competition in overall world tourism, Europe is still the number one tourist destination and it has the highest density as well as diversity of tourist attractions. The tourism sector accounts for about 5% of the European Union's GDP and employment while providing jobs for an estimated 12 to 14 million Europeans. Additionally, employment in the tourism sector has grown over the past decade and been greater than in the wider economy. (EU COM Enterprise and Industry 2012). Europe is the largest tourism region in the world, hosting 53 % of international tourist arrivals. The primary target actors of the sector have been accommodation, food & drink establishments and destination managers**,** such as local authorities. Within the EU27, there are 1.7 million enterprises classified as hotels and restaurants, employing over 9 million people and generating annual turnover of EUR 430 billion. Five European countries rank in the world's top-ten by international arrivals: France, Spain, Italy, United Kingdom and Germany. The average long-term growth rate in the European tourism sector is 2.8 % (European Joint Research Center, the reference document for the tourism sector).
Problem statement	Tourists have a large environmental footprint compared with residents, travelling long distances and concentrating in destination "hotspots" where they can give rise to local environmental pressures through demand for development, water and energy, and generation of waste. Tour operators and destination managers such as local authorities can influence tourist behavior and the environmental condition of destinations, for example through the provision of infrastructure and services. They also have considerable influence over small tourism enterprises. Resource consumption per guest is high in accommodation and food & drink establishments while the eco-efficiency of such establishments varies widely, indicating high potential for improvement through dissemination of best practice (European Joint Research Center, the reference document for the tourism sector).
Production and consumption perspectives	**Energy and GHG emissions** *Air transport* Tourism is estimated to contribute up to 5.3% of global anthropogenic greenhouse gas emissions with transport accounting for about 75% of this figure. The challenge of climate change is evident across tourism. Air transport industry is one of the main factors for tourism development. *Territorial features* Especially, coastal and marine environments are among the most popular areas for outdoor recreation and tourism. Coastal areas have also been identified as the most vulnerable to climate change, as a result of extreme events and sea-level rise. It will be increasingly important for coastal tourism destination countries to understand their vulnerability to climatic change and to plan appropriate adaptation. Adaptation of tourism sector is a topic for decision makers in the public and private sectors concerned with climate, as well as those involved in tourism-dependent business communities. *Accommodation* After transport, accommodation is the most energy intensive component of

EXPERIENCE ECONOMY (TOURISM)	
	the tourism industry, through its demand for heating or cooling, lighting, cooking (in restaurants), cleaning, pools and in tropical or arid regions; the desalination of seawater. **Natural Resource Consumption** *Water Consumption* When compared to agriculture or urban domestic use, water use by tourism, on a global basis, is far less important than agriculture. However, in some countries and regions, tourism can be the main factor in water consumption directly affecting water quality; for instance through the discharge of untreated sewage or freshwater abstraction. *Waste management* In the Mediterranean region, it is commonplace for hotels to discharge untreated sewage directly into the sea (WWF 2004), with 60% of water used in tourism resulting in sewage in need of disposal. In the European Mediterranean, only 30% of municipal wastewater from coastal towns receives any treatment before discharge. *Loss of biodiversity* There are many examples where large-scale tourism has had detrimental effects on biodiversity, including coral reefs, coastal wetlands, rainforests, arid and semiarid ecosystems and mountainous areas (UNWTO 2010d). **Governance** *Managing cultural heritage* There are examples of communities overrun by large numbers of visitors, commercialization of traditions and threats to cultural survival from unplanned and mismanaged tourism. Tourism destinations are occasionally built by outsiders (usually with government approval) in areas that indigenous or traditional communities consider to be theirs. The developments at these locations are usually neither desired nor locally validated. These situations lead to conflicts which make cooperation and mutual benefits nearly impossible to achieve while affecting the local communities and the tourism destination.
Green growth strategy	The Green Growth strategy for the Tourism sector need to develop back to back with policy and regulations aimed at protecting the environment, controlling detrimental practices, etc. (below, an insight into the EU's policy framework). In any case, it should be highlighted that there is no "one size fits all" strategy for greening tourism. Each strategy should be "place-based" and developed taking into considerations the unique asset base of each location, as well as, the current environmental status.
Overview of EU policy	There is limited number of tourism related policies and /or programmes in the Commission which can be viewed at: http://ec.europa.eu/enterprise/sectors/tourism/promoting-eu-tourism/tourism-related-policies/index_en.htm A communication document on the renewed EU Tourism Policy Framework was initiated by DG Enterprise in 2010. The *Europe 2020 Strategy* positions the development of the competitiveness of the European Tourism sector as one of the actions of high importance which should contribute towards setting up the "framework for a modern industrial policy, to support entrepreneurship, to guide and help industry to become fit to meet these challenges, to promote the competitiveness of Europe's primary, manufacturing and service industries and help them seize the opportunities of globalization and of the green economy".

EXPERIENCE ECONOMY (TOURISM)	
	Legislative/ regulatory framework Green tourism is a new topic for the EU and tourism is mainly discussed within the concept of sustainable development in relation to greening of the sector. In 2010, the European Commission released a Communication document titled *"Europe, the world's No 1 tourist destination – a new political framework for tourism in Europe".* The document brings together the discussions on tourism policy making and economic competitiveness while emphasizing that sustainability should be the key principle in achieving these objectives. The role of knowledge economy in facilitating environmentally and socially responsible innovative commercial actions in international markets is highlighted as well. The Treaty of Lisbon sets a new legal basis dedicated to tourism and indicates that the EU shall complement the action of the Member States in the tourism sector, in particular by promoting the competitiveness of Union undertakings, aiming to reinforce the EU as the foremost tourist destination of the world. The document can be accessed at: http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A7-2011-0265+0+DOC+PDF+V0//EN On 13.04.2012, the European Commission published a consultation document and seeking comments on creating European tourism quality label covering sustainability issues and relating to environmental impact of tourism. The document can be accessed at: http://ec.europa.eu/enterprise/sectors/tourism/files/public-consultation-etq/etq_consultation-only_03042012_en.pdf
Territorial dimensions	Territorial aspects of the sector are related to the identification of territorial problems (as mentioned above in the problem statement) and potentials. Developing the endogenous capacity is of importance in utilizing a high quality environment as a territorial capital and as a service (e.g. recreation, agriculture, tourism, etc) Touristic destinations in Europe are characterized by a high level of diversity in geographic, socio-economic and environmental conditions. The territorial approach to tourism reflects this diversity and in the meantime raises important policy challenges in relation to the need of designing and implementing policies which are tailored to local needs and conditions.
Linkages to other sectors	From a sectoral perspective, green tourism is a cross-cutting theme as it relates to energy and GHG emissions, waste management, water consumption, loss of biodiversity, effective management of cultural heritage, transport, land use and urban planning. The sectors' connection to other sectors means that changes in practices can also stimulate changes in many different public and private actors.
Description of the interest of the sector from a green economy perspective	The role of tourism sector is well acknowledged in the transformation into a green economy due to its potentials as identified below: -Green tourism has the potential to create new jobs due to its sizing and growth of sector -Investing in greening of tourism can reduce costs (energy savings etc.) -There is a strong interest for responsible tourism and corporate social responsibility -"Conscious consumption" as a new consumer trend is rising. Tourists are demanding the greening of tourism and willing to pay more to support and experience green initiatives. -With the informed and green choices of consumers, more businesses want to be perceived as green. Thus, the private sector can be mobilized to support green tourism *(Tourism in the UN Green Economy Report, 2011).*

Sources:

-UNEP and UNWTO prepared a chapter on tourism in the green economy report which draws attention to the investments in greener and sustainable tourism as a means to create jobs and reduce poverty while also improving environmental outcomes. Document can be accessed at: http://www.unep.org/greeneconomy/Portals/88/documents/ger/GER_11_Tourism.pdf

-The Journal of Sustainable Tourism (JOST) has been the only journal devoted completely to sustainable tourism research. This snapshot of the sector briefly gathers information from the JOST, OECD Tourism trends 2010, World Tourism Organization (WTO), European Travel Commission and related United Nations Environment Programme (UNEP) Publications.

OECD Tourism Trends 2010:
http://www.planbleu.org/portail_doc/OCDE_tourism_trends2010.pdf

World Tourism Organization (WTO): http://www2.unwto.org/

European Travel Commission: http://www.etc-corporate.org/

United Nations Environment Programme/green economy:
http://www.unep.org/greeneconomy/

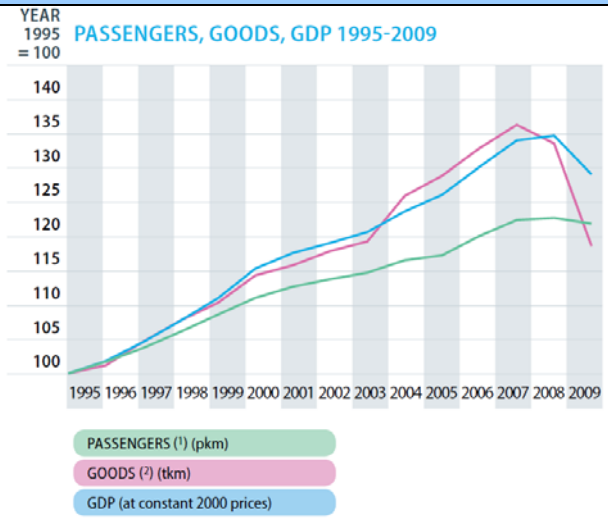
-The facts in the document are taken from *Tourism in the UN Green Economy Report 2011,* Climate Change and Tourism Policy in OECD Countries, 2010 and European Joint Research Center- the reference document for the tourism sector, 2011

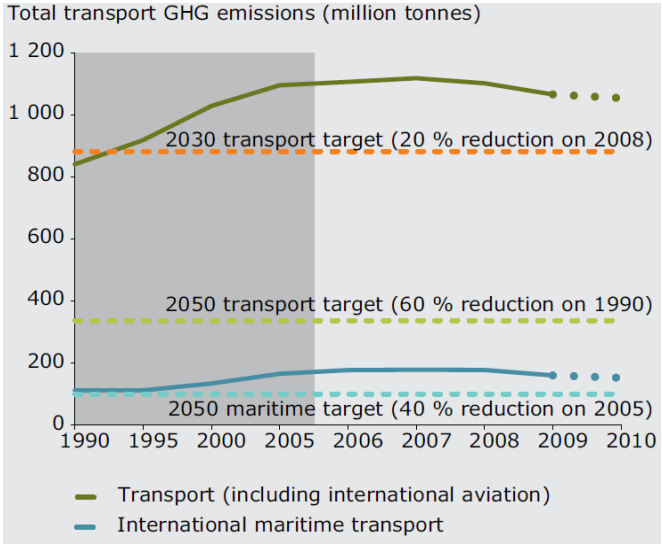
http://susproc.jrc.ec.europa.eu/activities/emas/documents/TOURISM_BP_REF_DOC_2012.pdf

-Green business model innovation in the tourism and experience economy, Nordic Innovation Publication 2012/ May 2012:
http://www.nordicinnovation.org/Global/_Publications/Reports/2012/2012_08%20Green%20business%20model%20innovation%20in%20the%20tourism%20and%20experience%20economy_Case%20examples_web.pdf

A4.4. Transport

Transport	
Definition of the sector	In order to enable an integrated view on transport and green economy, the understanding of the transport sector in GREECO is rather broad. This understanding is more comprehensive than a restricted analysis of the economic sector as defined in NACE sector H Transportation and storage. To structure the analysis, the transport sector is decomposed in four elements within GREECO: (1) vehicle production, (2) transport infrastructure provision, (3) transport operation and (4) passenger travel and freight transport. *Vehicle production.* This element of the transport sector includes the production of different types of vehicles for different transport modes which is part of the manufacturing sector (NACE codes C29 - Manufacture of motor vehicles, trailers and semi-trailers and C30 - Manufacture of other transport equipment). To give some figures on the economic importance of vehicle production: There are about 250 automobile production sites in ESPON space offering almost 2.7 million jobs for people directly making the vehicles. In Europe, more than 18 million passenger cars are produced annually of which almost 90 percent are produced in ESPON space. *Transport infrastructure provision*. The planning, construction and maintenance of transport infrastructure for all modes of transport is an inherent element of the transport sector. It belongs partly to the construction sector (NACE code F42.1 - Construction of roads and railways) and partly to public and private services. The paved road network in EU27 has a length of about 5 million km, the rail network is more than 200,000 km, the inland waterway network about 40,000 km. *Transport operation.* This element of the transport sector includes all activities that are offering different kind of transport related services. It includes first the provision of transport services, e.g. by public transport operators, taxis, air carriers, shipping companies and other freight and postal carriers, and other transport related services such as maintenance and repair of vehicles, petrol stations etc. This element of the transport sector is widely represented in the NACE sector H Transporting and storage. In EU27, there are about 9 million jobs available in this kind of transport operations producing an turnover of about 1200 billion Euro in 2008 (European Commission, 2011a). *Passenger travel and freight transport.* This element represents the demand side of the transport sector. It includes the use of the transport system for personal travel and freight transport. In Europe, transport demand increased continuously and was closely linked to overall economic growth (Figure 1) and is in total more than 6,000 billion passenger km. Household consumption for all kind of transport purposes was about 890 billion Euro in 2009 (European Commission, 2011a). *Transport development, EU27 1995-2009 (European Commission, 2011a)*

Transport	
	
Problem statement	Passenger travel and freight transport accounts for one third of European energy consumption. Of this, road transport is responsible for more than 80 percent of the energy consumption. Biofuels are currently only about 6 percent of all energy. Whereas total greenhouse gas emissions in EU27 was reduced by about 10 percent from 1990 to today, transport's greenhouse gas emission has increased by one third. Today's share of total EU27 greenhouse gas emission is about 26 percent, but was only about 17 percent in 1990. The increase is mainly due to strong increases in road transport and also in civil aviation. The transport sector generates emissions of different pollutants and noise. Whereas emissions are being clearly reduced through EU regulations, traffic noise continues to be a problem. Exposure to population, in particular in urban areas, and related health effects are the outcome. Increasing landscape fragmentation created by new transport infrastructure is a side-effect of linking peripheral regions and of densification of transport links in other regions. There are enormous environmental risks induced through the transportation of hazardous goods. Accidents of oil tankers or other ships, lorries or freight trains might cause huge damage to the environment.
Production and consumption perspectives	Without political interventions, the transport sector would grow in an unsustainable way, i.e. emissions of pollutants, greenhouse gas emissions would rise if not controlled by regulations and/or increased mobility costs. UNEP (2011) sees that without political interventions the main risk is in a world-wide massive increase in the number of private cars. However, the main problem is an internal goal conflict within the transport sector. Any policy packages that would reduce the overall growth of mobility and the external effects of transport would potentially have an impact on the economic performance of the sector. It has to be sorted out within the sector analysis on transport within GREECO whether a greening of the transport sector would also have economic benefits or whether this would lead to economic problems of the vehicle industry and the transport operation sector as claimed by transport lobby organisations.
Green growth strategy	A green growth strategy for the transport sector was proposed by UNEP (2011). For the greening of the transport sector, a fundamental shift in investment strategies is required. It should be based on three elementary principles: 1) *Promotion of access instead of mobility*. This means to avoid or reduce

<table>
<tr><th colspan="2">Transport</th></tr>
<tr><td></td><td>trips through the integration of land use and transport planning to promote more compact or mass transit corridor cities and regions and by enabling more localised production and consumption patterns.
2) Shift to less harmful modes of transport. This includes in particular public and non-motorised transport for passenger travel and rail and water transport for freight. This should be enabled by shifts of financing priorities and coupled with strong economic incentives such as taxes, charges and subsidy reforms.
3) Improvement of vehicles towards lower carbon intensity and pollution. The development and widely application of green transport technology fostered by appropriate regulations for fuel and vehicles is seen as a priority to reduce air pollution and greenhouse gas emissions.
UNEP expects that investment in public transportation, infrastructure for walking and cycling, and vehicle efficiency improvements will improve well-being and generates considerable value to regional and national economies by exceptional economic returns.</td></tr>
<tr><td>Overview of EU policy</td><td>There are several EU policies at work for the transport sector. The most important current document is the White Paper Roadmap to a Single European Transport Area (European Commission, 2011b) as it sets the environmental targets to be reached. See for instance, Figure 2 for the greenhouse gas reduction targets for transport for the years 2030 and 2050.
Transport greenhouse gas emissions and reduction targets (European Environmental Agency, 2011, based on European Commission, 2011b)
 

In addition, there are several EU directives, regulations and initiatives for greening the transport sector which will be analysed in the transport sector analysis of GREECO.</td></tr>
<tr><td>Territorial dimensions</td><td>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.
More specifically, all elements of the transport sector have a strong territorial dimension. The production of transport vehicles is organised in spatial clusters with strong intraregional linkages and also interregional logistic chains, but also with many regions not involved in this economic sector at all. The provision of transport infrastructure is to link different regions and to enable mobility and freight transport. Transport infrastructure is also to some</td></tr>
</table>

Transport	
	extent responsible for the economic success of regions and subsequently for the development of territorial cohesion in Europe. The way and magnitude, transport operators are developing their services is clearly based on the territorial situation. Also with respect to transport demand, different types of territories offer different potentials to move towards more green ways of mobility. 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 differ across different types of territories.
Linkages to other sectors	The transport sector is interlinked with all other sectors to be analysed in GREECO as all sectors have transport demand. For the bioeconomy sector and manufacturing, it is mainly the demand for freight transport to carry input and intermediate materials and products. For the energy sector, waste and water management and the building and construction sector, transport of raw materials and waste is crucial. For the experience economy the question is more how to get people from their place of residence to the places of interest. Somehow different is the link to green research and eco-innovation. Here, the transport sector will benefit from research into new vehicle materials and technologies, into new more sustainable forms of transport operation and into transport logistics and new forms of transport demand management.
Description of the interest of the sector from a green economy perspective	There is a strong need, but also a large potential to reduce energy use and greenhouse gas emission from the transport sector. The greening of the transport sector is one of the keys of the development towards a green economy. The transport sector is a strong economic sector which has a tremendous importance in some European regions. 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.

Sources:

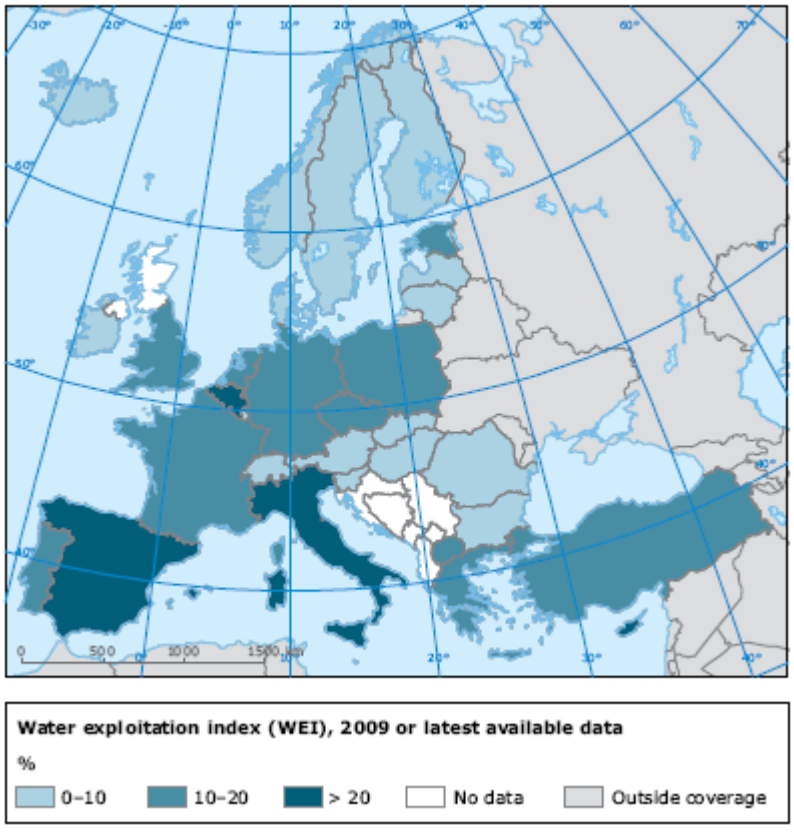
European Commission (2011a): *EU Transport in Figures 2011.* Luxembourg: Publications Office of the European Union. http://ec.europa.eu/transport/publications/statistics/doc/2011/pocketbook 2011.pdf

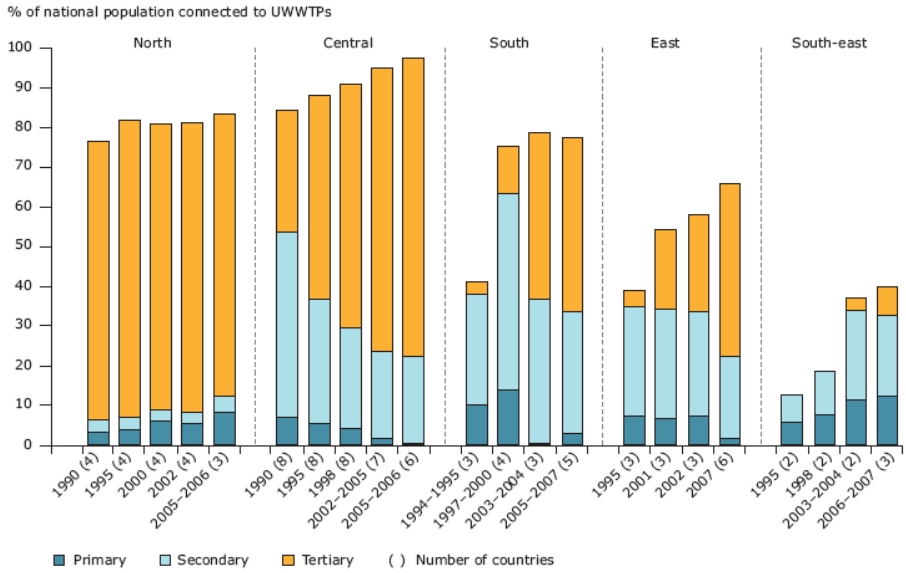
European Commission (2011b): Transport White Paper 2011. Roadmap to a Single European Transport Area - Towards a Competitive and Resource Efficient Transport System. Luxembourg: Publication Office of the European Union. http://ec.europa.eu/transport/strategies/2011_white_paper_en.htm

European Environment Agency (2011): *Laying the foundations for greener transport. TERM 2011: Transport indicators tracking progress towards environmental targets in Europe*. Copenhagen: EEA. http://www.eea.europa.eu/publications/foundations-for-greener-transport/at_download/file

UNEP – United Nations Environmental Programme (2011): *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication.* Nairobi: UNEP. www.unep.org/greeneconomy

A4.5 Water management

WATER SECTOR	
Definition of the sector	Overexploitation of freshwater use is an increasing problem in Europe. Water scarcity is especially present in Southern Europe. At least 17 % of the EU territory had been affected by water scarcity and the EC has estimated that the cost of droughts in Europe over the previous 30 years reached EUR 100 billion. Many water bodies across Europe will not achieve the WFD targets of good water ecological status set by 2015 (EEA, 2012a). Total water abstraction is app. 10 % of Europe's total freshwater resource is abstracted annually (EEA website). Five European countries can be considered water-stressed (>20 %); Cyprus, Belgium, Italy, Malta and Spain. However, it needs to be highlighted that the national values of Water Exploitation Index do not necessarily reflect the extent of over-exploitation of water resources in sub-national regions, or seasonal variation in water availability and water use (EEA, 2012a). **Map 8.1 Water exploitation index (based on 2009 or latest available data)**  In addition to having an impact on the ecological status of ecosystems, over-exploitation also reduces the ecosystem's capacity to absorb other pressures — such as pollution, damming (e.g. fragmentation), dredging and other anthropological modifications, and the predicted impacts of climate change. In southern Europe, domestic water use has increased since the early 1990s by 12 %. Turkey above 50 %. Public water demand in eastern Europe has declined by 40 % which can be explained by higher water prices and economic downturn. Also in western Europe the demand is decreasing,

	although less significant. In that case the change is also driven by changes in awareness and behaviour. (EEA, 2012a) Tertiary wastewater treatment can be considered the norm in northern and central Europe although large differences among regions exist. During the last two decades, waste water treatment has improved throughout Europe. About 80 % of the population is connected to waste water treatment in Northern and Southern European countries. The Central European countries have an even higher connection rate, at 90 %. The percentage of the population connected to wastewater treatment in the southern, south-eastern and eastern Europe has increased during last ten years, but is still relative low compared to the central and northern Europe. On the basis of data reported in 2006-2007, about 65 % of total population is connected to wastewater treatment in the countries of Eastern Europe. Average connection in South-Eastern Europe (Turkey, Bulgaria and Romania) is about 40 % (EEA website) **Figure 2.1 Regional variation in wastewater treatment between 1990 and 2007**  **Note:** Regional percentages have been weighted by country population. *North*: Norway, Sweden, Finland and Iceland; *Central*: Austria, Denmark, England and Wales, Scotland, the Netherlands, Germany, Switzerland, Luxembourg and Ireland. For Denmark no data has been reported to the joint questionnaire since 1998. However, according to the European Commission, Denmark has achieved 100 % compliance with secondary treatment and 88 % compliance with more stringent treatment requirements (with respect to load generated) under the UWWTD (EC, 2009). This is not accounted for in the figure. *South*: Cyprus, Greece, France, Malta, Spain and Portugal (Greece only up to 1997 and then since 2007); *East*: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovenia, and Slovakia; *South-east*: Bulgaria, Romania and Turkey. **Source:** EEA-ETC/WTR (CSI 024) based on data reported to OECD/EUROSTAT Joint Questionnaire 2008. www.eea.europa.eu/data-and-maps/indicators/urban-waste-water-treatment/urban-waste-water-treatment-assessment-1.
Problem statement	The annual demand for water in Europe is expected to rise with 50 % from 2005 to 2010-2030. Under the business-as-usual scenario, water use remains unsustainable and leves of both surface and groundwater decline (UNEP, 2011). Insufficient sanitation and lack of clean drinking water leads to significant social costs and economic inefficiencies. Leakage in public water supply systems results in loss of purified drinking water but also means wasting the energy and material resources (EEA, 2012b).

WATER SECTOR	
Production and consumption perspectives	A range of factors influence public water abstraction rates and volumes; population, household size, tourism, income levels, technology and lifestyle.
Green growth strategy	No information on such plan.
Overview of EU policy	a. **Roadmaps, white/green papers, etc**. - The 'Blueprint to Safeguard European Waters' (due late 2012) will set out the policy *Towards efficient use of water resources in Europe* process to implement resource efficiency from the water perspective and will be the water milestone on the 2011 Roadmap to a resource efficient Europe.. - As part of the actions included in the White Paper on adapting to CC, the *Guidance document on adaptation to climate change in water management* aims to ensure that the River Basin Management Plans are climate-proofed. - 'Roadmap to a resource efficient Europe' recognise water as a e a vital element in various economic sectors and a basis to the role of natural resources in underpinning the functioning of the European economy b. **legislative/ regulatory framework** The EU water policy is guided by three main directives: - The Water Framework Directive (WFD) (2000/60/EC) concerning water resources management. - Drinking Water Directive (98/83/EC, revision of the 80/778/EEC) - Urban Waste Water Treatment Directive (UWWTD) (91/271/EEC) concerning urban waste-water treatment c. **Policy options** *Water pricing* - The WFD requires Member States to take account of cost recovery of water services (including environmental and resource costs) from users including farmers, industry and ordinary household consumers, based on the polluter-pays principle. *Taxes* - water abstraction taxes can be found in several Member States (for example, Denmark, Germany and the Netherlands). i. Command and Control regulation. Economical and incentive-based vs. behavioral/awareness, certification. - The European water stewardship scheme (EWS) addresses operational evaluation of sustainable water management, including issues such as impacts on local river basins, integrated response solutions and risk management. ii. Policy differences across Europe iii. "Levels" of policy application/intervention (EU/National/Regional) The EU water policy has regional aspects. For instance, the Water Framework applies a river basin approach to governance and planning. A river basin management plan shall be established for each river basin in the EU. In terms of territorial governance the river basin districts are the main

WATER SECTOR	
	units and the national boundaries will in some cases be crossed. Under the UWWTD the relevant authorities in each MS are required to, bi-annually, report on the disposal of UWW and sludge.
Territorial dimensions	The fresh water resources are unevenly distributed across Europe. The water conditions vary between different geographical areas and also population densities as well as agricultural/ industrial utilisation vary widely among Member States (Eurostat).
Linkages to other sectors	Water is vital for all economic sectors. Some of the strongest linkages can be found in agriculture, energy and industry. In Europe as a whole, agriculture uses around one third of freshwater abstraction. Another third is used for cooling in energy production, while public water supply uses approximately one quarter. The remainder is used by industry. (EEA, 2012a) Water plays an important role in energy generation, notably for hydropower, desalination and as a coolant in power stations. Also the water supply and sanitation sector requires large amounts of energy. Recognising the close links between water and energy highlights a number of green investment opportunities (UNEP, 2011). At the regional level this applies, for example, to coordinating river basin management plans and national renewable energy action plans under the Renewables Directive. In addition, the water-energy link includes agriculture and landuse sector as the cultivation of crops consumes a lot of water and can be a source of pollution. Therefore, the water-energy-food nexus is of high importance (EEA, 2012b). There is a close connection between water security and biodiversity. When water security is threatened, the biodiversity is usually in danger too. There may be considerable opportunities to improve biodiversity outcomes by investing in water security (UNEP, 2011).
Description of the interest of the sector from a green economy perspective	Freshwater resources are crucial to human health and the European economy. Also supplying household water requirements, the energy, agriculture, industrial and tourism sectors depend on reliable freshwater resources. With the current development of wastewater infrastructure e.g. in eastern and south-eastern Europe, there is an opportunity to integrate modern techniques and operation practices that achieve both optimal energy use and higher treatment levels and use those investments to increase efficiency. (EEA, 2012b) According to UNEP GE report, the sanitation sector requires more investment than the drinking water sector as the number of households without access to adequate sanitation services is much higher. There are huge potentials for eco-innovation for water efficiency. The uptake of water efficiency techniques and household appliances can be further developed. Moving towards a green economy generally involves a commitment charge for the full costs of resource use. This involves a moral dilemma as access to clean water and adequate sanitation services is a human right (UNEP, 2011).

Sources:

EEA, 2012 (2012a), *Environmental Indicator Report 2012, Ecosystem Resilience and Resource Efficiency In a Green Economy In Europe*,

EEA, 2012 (2012b), *Towards efficient use of water resources in Europe*, EEA report No 1/2012

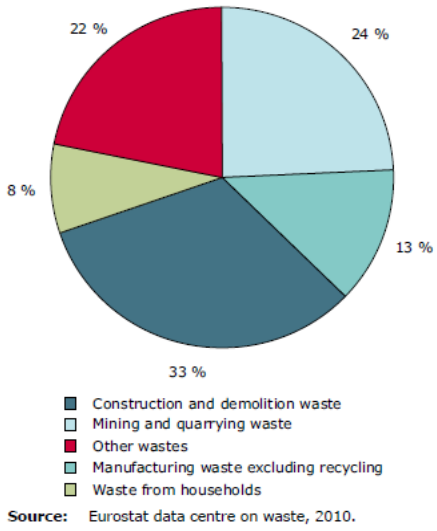
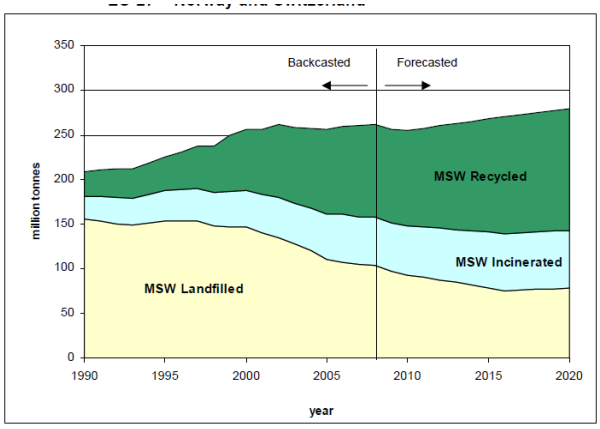
EEA, websites:

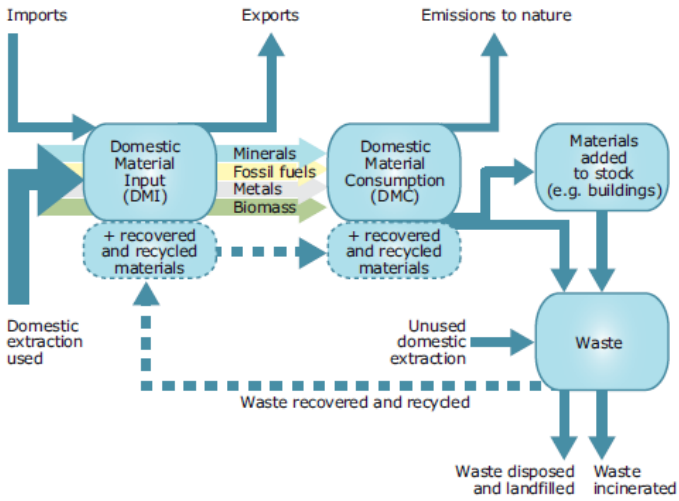
http://www.eea.europa.eu/data-and-maps/indicators/urban-waste-water-treatment/urban-waste-water-treatment-assessment-2

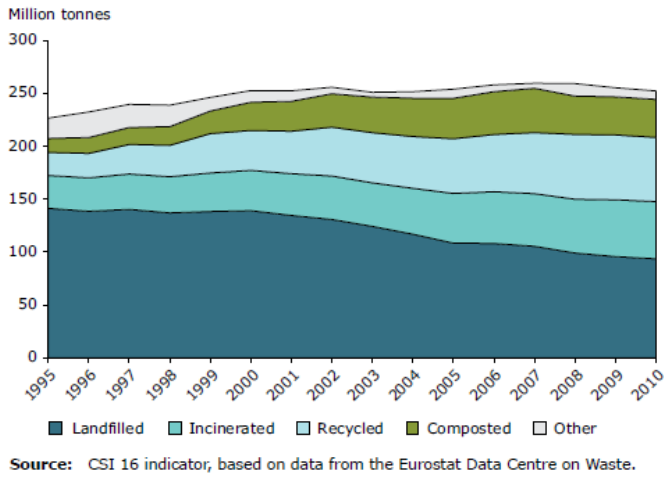
http://www.eea.europa.eu/themes/water/water-resources/water-abstraction

UNEP, 2011, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*

A4.5 Waste management

WASTE SECTOR	
Definition of the sector	Similar to the UNEP scope of understanding, in GREECO the waste sector will mainly include Municipal Solid Waste (MSW) but also significant waste streams like packaging waste, Construction and Demolition (C&D) waste. *Total waste generation in the EU, EFTA, Turkey and Croatia by source, 2006*  **Source:** Eurostat data centre on waste, 2010. The idea that waste which is not recovered, recycled reused is a waste of material resource will underpin the analysis of the sector. Ways to do this will represent a part of the intersection of greening the waste sector. GREECO will also rely on EU's efforts to become a recycling society and subject its policy efforts to the waste hierarchy (prevention, reduction, recycling, recovery and disposal). There are green economy opportunities at every stage of the hierarchy. The increasing volume of generated waste is a major problem. Besides being a squander of resource generated waste can have a negative environmental impact and is a source of significant GHG emissions. *Projected generation of management of MSW in EU-27, Norway and CH*  Source: ETC/SCP Working paper, 2011, Projection of Municipal Waste Management and GHG

WASTE SECTOR	
Problem statement	If left untreated waste can lead to serious environmental damage. Waste management represents a huge potential for development of green economy through development of activities at all stages of the waste hierarchy. As of 2006 the recycling sector employed about 500,000 people in the EU and had a turnover of 24 billion EUR. The total number of EU-27 jobs in the waste management and recycling sector has been estimated at some 1.8 million (Ernst and Young, 2006). Moreover, the European waste management and recycling sector has a global market share of 50% (EC, 2007)
Production and consumption perspectives	Resource use and waste generation are closely linked. It has been proven that efforts to minimise waste within companies leads to better resource management. *Links between the material resources and waste generation in an economy*  Source: EEA Waste is generated at all stages of the material cycle: extraction; production and distribution; consumption; and even treatment. (SOER, 2010). Different types of waste are generated at different stages. Together with the nominal increase of generated quantities, management of waste in the EU has improved over the years and mainly thanks to stringent policies. For example, 40 % of municipal waste in 2008 was recycled or composted compared to 17 % in 1995 in the EU plus Norway and Switzerland. 59 % of packaging waste is now recycled, and 12 out of 19 countries recycle or recover more than half of their construction and demolition waste. (State of the Environment Report, 2010) Despite the progress, according to SOER 2010, for total waste, as of 2006, disposal was still dominant (51.5 %) over recycling (43.6 %), whereas less than 5 % is sent to incineration. The disposal rate ranged from more than 98% in Bulgaria and Romania to less than 10% in Denmark and Belgium. (Eurostat, 2009b). Waste can cause serious environmental and health problems. It can also be a threat to biodiversity through littering. Life-cycle analyses have shown that recycling has overall environmental benefits over landfilling for many waste types (WRAP, 2010). The shift from landfill to more recycling and recovery that has taken place in many countries for a number of waste streams in the last 10–15 years has clearly reduced the pressures of waste on the environment. According to

WASTE SECTOR	
	national reporting to the United Nations Framework Convention on Climate Change (UNFCCC), GHG emissions from the waste sector — mainly landfills and waste incineration without energy recovery — in the EU-27 plus Norway and Switzerland fell by 37 % between 1995 and 2008, due mainly to reduced methane emissions from landfills (EEA, 2010c). *Development of municipal waste management EU-27, 1995-2010*  **Source:** CSI 16 indicator, based on data from the Eurostat Data Centre on Waste.
Green growth strategy	Most mentioned EU policy documents below have strong green growth dimensions although it is not mentioned explicitly.
Overview of EU policy	**EU Policy** • Thematic Strategy on the Prevention and Recycling of Waste (2005) • Waste Framework Directive • Waste Landfill Directive 1999/31/EC • Packaging Directive 94/62/EC • Sewage sludge Directive 86/278/EEC • Waste Shipment Regulation (EEC) No 259/93 • End-of-Life Vehicles Directive 2000/53/EC • Waste from Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC • Restriction of the use of some hazardous substances in electrical and electronic equipment Directive 2002/95/EC • Mining Waste Directive 2006/21/EC • Waste Incineration Directive 2000/76/EC **Emphasis of future EU policy** • Full implementation of existing legislation; • Simplification and modernisation of legislation: remove unnecessary admin burden • Introduction of life-cycle thinking into waste policy. Minimization of the environmental impact through the life cycle; • Promotion of waste prevention

- Better knowledge and information;
- Development of common reference standards for recycling; (REC)

Different countries apply different sets of policy instruments in waste management.

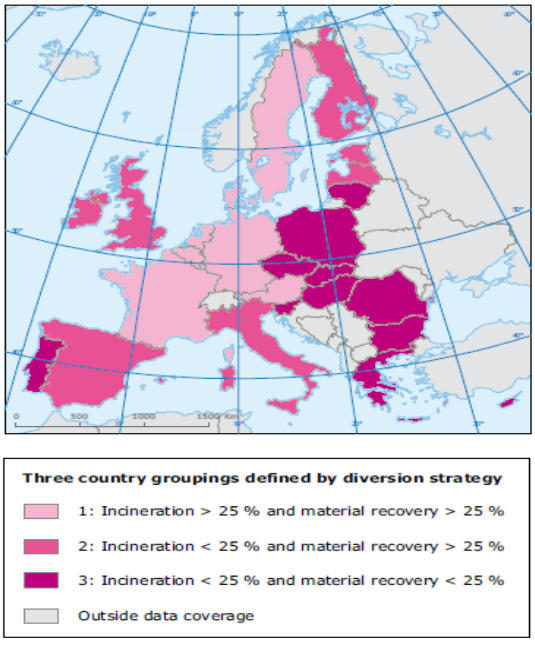
Table: Packages of measures in selected countries

	EE	FI	FL	DE	HU	IT
User charge for waste management	√	√	√	√	√	√
Environmental product charges					√	
Landfill tax	√	√	√			√
Incineration tax			√			
Landfill ban	√	√	√	√	√	√
Separate collection of biowaste	√	√	√	√	√	√
Producer responsibility/ voluntary agreement for waste paper		√	√	√		
Producer responsibility for packaging waste	√	√	√	√	√	√

Source: ETC of Resource and Waste Management

Overall countries in the EU can be divided in several groups from the point of view of their strategy to divert waste from landfilling. This denotes differences of waste management history, difference of priorities and waste management systems as well as in implementation of EU legislation.

Three country groupings defined by strategy for diversion of MSW from landfilling



WASTE SECTOR	
Territorial dimensions	**Territorial aspects** Integrated waste management systems are usually regional. The regional 'approach' has developed through the years as it has been demonstrated that the biggest economies of scale can take place on such a level. Additionally, municipalities are in charge of waste management and they usually group together in regional companies or associations. Benefits include possibilities to afford modern and compliant facilities and possibilities to pool human and financial resource together. **Drivers and enablers** • Landfill tariffs and gate fees • Landfill tax on BMW • Prohibition in untreated waste in landfill • BMW generation per capita (-) • Separate collection per fractions • Full cost collection tariffs • Share of MSW landfilled • Dedicated incineration capacity • Incineration gate fees (-) • MBT capacity • Compost capacity (ETC/RWM, Diverting waste from landfill, 2009)
Linkages to other sectors	**Agriculture** - Proper management of waste resulting from agricultural and farming processes is necessary to ensure that, i.e. ensuring that nitrates is not leaked into soil and water which is a main source for pollution, eutrophication. Bio waste can also be used for producing bio gas **Tourism** – Adequate waste collection and recycling has to be in place in all tourist resorts and settlements. More frequent service in peak season. **Green transport** - The more public transport is used the fewer cars are produced, the less waste is generated and treated. Clean/hybrid collection trucks would fall in the category of adapted goods – less polluting and more resource efficient. **Building** – through prevention of generation but also management of C&D waste. **Industry** – through waste prevention, treatment of generated waste, industrial ecology **Green research** – through research on treatment measures, prevention approaches, produkt design, etc.
Description of the interest of the sector from a green economy perspective	The sector represents huge green economy potential through resource conservation; waste reduction; waste collection and segregation; waste reuse; waste recycling; energy recovery; landfill avoidance; construction and maintenance of waste infrastructure and application of 3R technologies and associated activities (UNEP, 2011)

Sources:

EEA, 2012 (2012a), *Environmental Indicator Report 2012, Ecosystem Resilience and Resource Efficiency In a Green Economy In Europe*,

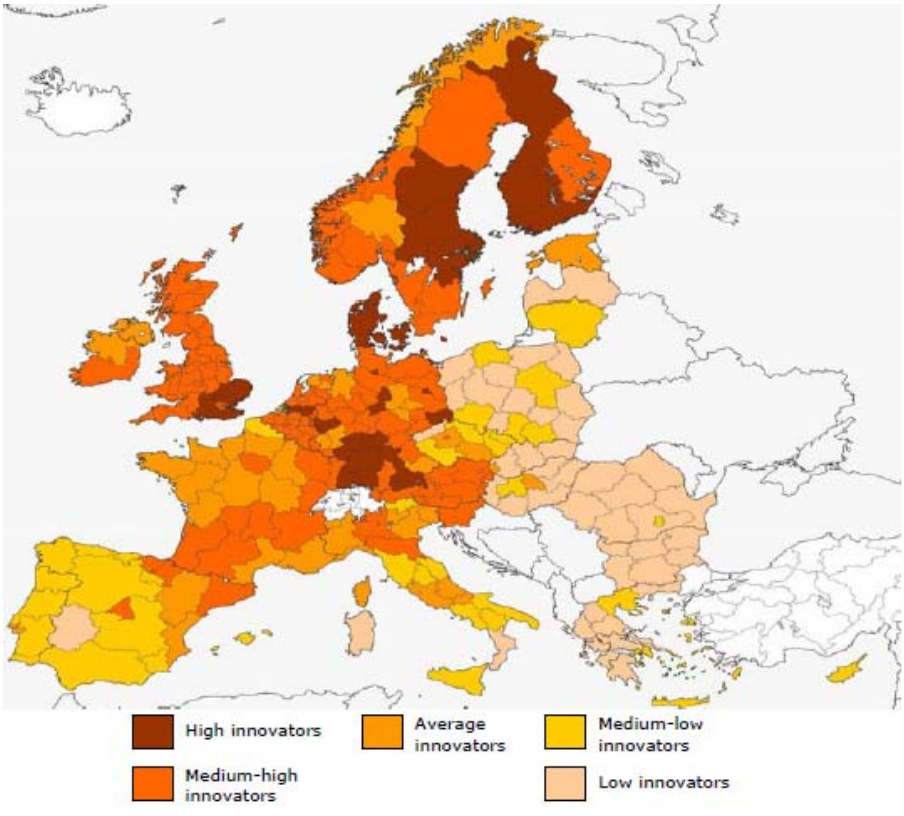
EEA, 2009, Diverting waste from landfill, Effectiveness of waste management Policie In the EU

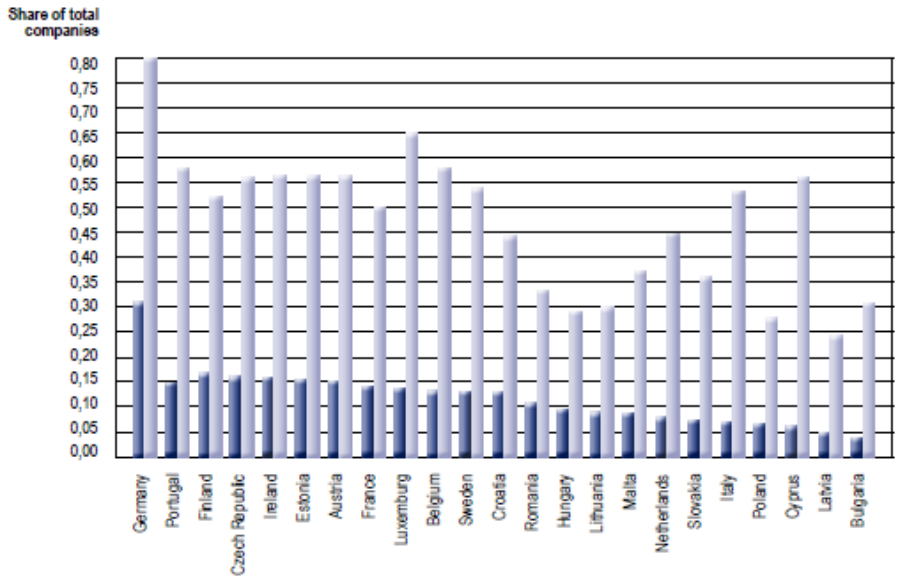
EEA, 2010, The European Environment, State and Outlook, Material Resources and Waste

ETC/SCP, 2011, Projection of Municipal Waste Management and GHG

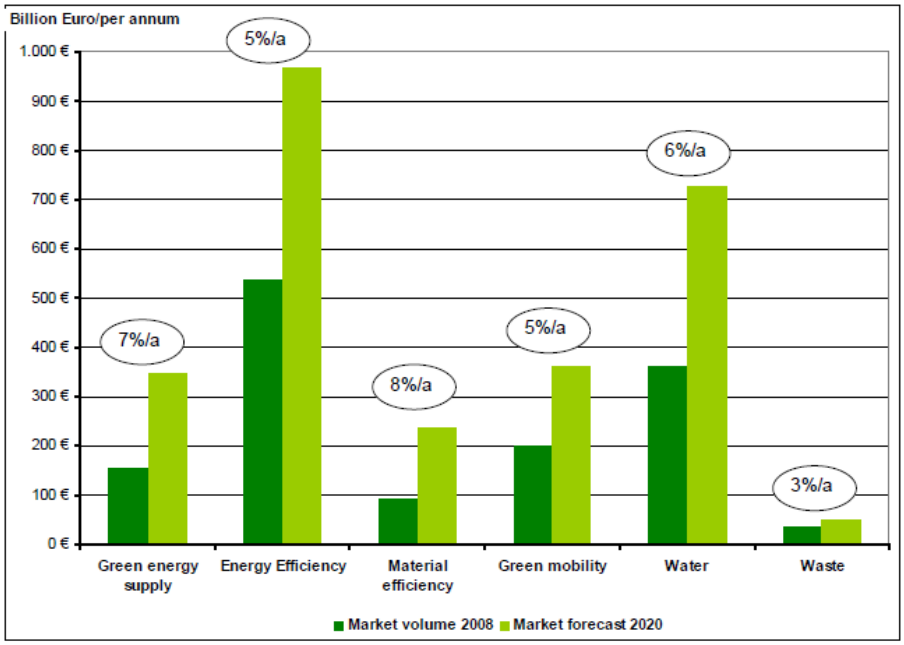
UNEP, 2011, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication,*

A4.6. Green research & eco-innovation

GREEN RESEARCH & ECO-INNOVATION	
Definition of the sector	In the EU, Eco-Innovation has been defined as „*any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources*". Along these lines, Green Research & Eco-innovation development is not just sector specific, but has an impact (potentially) in all sectors. That is why the Green Research & Eco-innovation sector is, by definition, a cross-cutting sector. It should also be noted that this sector has a differentiated structure: - On the one hand, it is a sector per-se comprising, research organisations and companies devoted to eco-innovation. - On the other hand, there are eco-innovation activities within vertical sectors. That is to say, companies which would fall under another sector classification, could (and do) have departments dealing with Green Research & Eco-innovation. Besides, the EU is well placed to take up its role in the global transition towards a more sustainable economy. It should be highlighted that European environmental policies and increasing environmental challenges have led to the emergence of a significant and competitive environmental goods and services sector in Europe, e.g. eco-industries are already a significant economic sector, with an estimated annual turnover of about 2.5 % of the EU's gross domestic product (GDP). However, there is considerable diversity in regional innovation performances, which emphasizes the need for policies to reflect regional contexts and for better data to assess regional innovation performances. 

GREEN RESEARCH & ECO-INNOVATION	
Problem statement	In addition to the regional disparities in eco-innovation performance, the main challenge related with Green Research & Eco-innovation is that it requires policy support to fully develop its potential. This gap exists in both the scale of eco-innovative activities, with large differences between countries, sectors, and companies. As stated by the European Commission, "*Eco-innovation needs to be accelerated in a way that boosts resource productivity, efficiency, competitiveness and helps to safeguard the environment*".
Production and consumption perspectives	The eco-industries sector in the EU has been growing by around 8 % a year. Moreover, the share of innovating companies reducing material use per unit of output has increased from 2006 to 2008:  This sector employs around 1.5 % of all Europeans in employment and around 600 000 additional jobs were created between 2004 and 2008. Finally, if the uptake and dissemination of eco-innovations would be improved, this will lead to improved environmental performance and resilience across the economy being at the same time cost-effective and good for business and society as a whole.
Green growth strategy	When it comes to Green Research & Eco-innovation cross-cutting sector, its green growth strategy would go hand in hand with the policies and action plans for promoting eco-innovation, but also sustainable development, because the sector will provide the technological basis required to achieve a more resource efficient and environmentally sound development.
Overview of EU policy	EU environmental legislation has traditionally been one of the most important drivers for eco-innovation (e.g. in areas such as water, air pollution, waste management, recycling, and climate change mitigation), since it can also direct research and development efforts and set the pace of technological change. However, regulatory frameworks may become a barrier to eco-innovation if they rely on insufficiently ambitious or outdated standards or technologies. Nonetheless, the Eco-Innovation Action Plan, launched in December of 2011, endorses the significance of eco-innovation for supporting the transition towards "smart, sustainable and inclusive growth". It confirms the important role eco-innovation has to play in achieving the aims set out in the

GREEN RESEARCH & ECO-INNOVATION	
	Europe 2020 Strategy, and especially the flagships on "A resource-efficient Europe" and "Innovation Union". This Action Plan, together with the Europe 2020 Strategy and its seven Flagship Initiatives to boost sustainable growth (below), will facilitate the successful development of the sector: • Smart growth 1. Digital agenda for Europe 2. Innovation Union 3. Youth on the move • Sustainable growth 4. Resource efficient Europe 5. An industrial policy for the globalisation era • Inclusive growth 6. An agenda for new skills and jobs 7. European platform against poverty Furthermore, the Commission will under take a screening of the regulatory framework in the environmental area to identify possible gaps, implement new rules and review existing ones in order to provide a coherent legislative framework that promotes eco-innovation.
Territorial dimensions	The disparities in eco-innovation performances within EU regions, has already been mentioned. This is partially due to the fact that the role of the regional and local level in pursuing eco-innovations is especially relevant (e.g. success of green districts in Stockholm or strong support for industrial symbiosis in Denmark and the UK). In addition, regional relations and partnerships, also play a fundamental role in this sector, i.e. the important role of national / regional cluster policies in development of "green clusters" or "eco-clusters" in Europe.
Linkages to other sectors	As mentioned before, the Green Research & Eco-innovation sector is a very cross-cutting sector. In this context, there are major differences in the rate of technical change and the organisation of innovation activities across industries. In some industries technical change is happening at a fast pace, whereas in others it is slow and gradual, and in some industries innovation is carried out by a small number of actors where in others it is distributed across a wider population of firms. Despite this variability, each sector shows specific patterns of behaviour (that is why experts have demanded a sectoral system of innovation approach in order to develop better-targeted innovation policies). It should be noted that these sectoral patterns, are not independent of the national or supranational situation. National innovation performance depends on how characteristics of a national economy, such as its National Innovation System, fiscal policies, or labour market institutions interact with Sectoral Innovation Systems (SIS) and on the sector structure of the economy, i.e. its specialisation profile. When it comes to the main areas (sectors) for Green Research & Eco-innovation in the EU, these are waste management (30 %), water supply (21%), wastewater management (13 %) and recycled materials (13 %), as summarized in the graph below.

GREEN RESEARCH & ECO-INNOVATION	
	
Description of the interest of the sector from a green economy perspective	All in all, the Green Research & Eco-innovation sector is a major building block for the transition towards a green(er) economy in the EU, due to its cross-sectoral nature and because it can overcome current environmental challenges while creating jobs and wealth.

Sources:

COM (2011) 571 final - Roadmap to a Resource Efficient Europe

COM (2011) 899 final - Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP)

Europe 2020: http://ec.europa.eu/europe2020/index_en.htm

European Eco-innovation Observatory: http://www.eco-innovation.eu

Regional Innovation Scoreboard (RIS) 2009

UNEP, 2011, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication, www.unep.org/greeneconomy

A5. Short factsheets on GREECO case study areas

The following tables show a preliminary characterisation of the case study areas to be analysed in GREECO project.

A5.1. Austria – Burgenland

Burgenland, NUTS 2 (AT11)					
Location within Europe	**Nordic**	**Western**	**East-Central**	**Mediterranean**	
			X		
ESPON Typology	**Border**	**Sparsely populated**	**Metropolitan**	**Mountain**	
	X	-	-	Partly, AT111 is moderately mountainous regions under urban influence	
	Island	**Coastal**	**Industrial transition**	**Outermost**	
	-	-	X (AT111 = A3, region with internal industrial structural change; rest not covered)	-	
Size	**Inhabitants (nb.)**	**Density (nb./ km$^{2)}$**	**Surface (km^2)**	**Pop. growth rate, 1990-2010 (increase/decrease/stable)**	
	285,000	72	3,966	Increase of about 5 %	
Socio-economic level	**GDP per head**	**Index of unemployment**	**Share of high educated inhabitants**	**Degree of urbanization and main urban centers**	
	20,790	6 %			

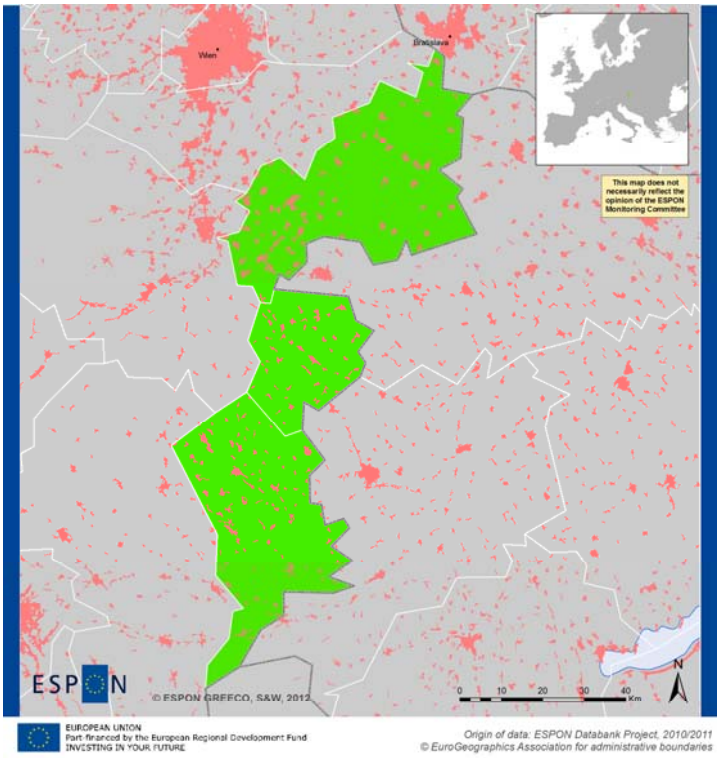
Sectors of the green economy in the region (2 – highly represented; 1 – represented; 0 – lack)	**Bioeco-nomy**	**Energy**	**Manufac-turing**	**Trans-port**	**Water and waste**	**Experience economy**	**Building**	**Green research**
	2	2	1	1	1	2	1	2

Cohesion policy (2014-2020) type	**More developed region**	**Transition region**	**Less developed region**

Governance considerations		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.
Factors of green economy development	**Enabling conditions**	Strong governmental support for development of renewable energies. Objective is to become energy autarkic with renewable energies and to export such energy to other regions. Implementation via a "Regional strategy for wind parks". Development of the largest wind park in central Europe by Austrian Wind Power.
	Driving forces	Development of eco-energy tourism. Territorial capital in form of agricultural land (> 40 % of total area) and high wind potential. Network of six technology centres, one of them leading in renewable energy issues and European Centre for renewable energies (EEE). Polytechnic with one focus on energy and environment.

Burgenland, NUTS 2 (AT11)	
Description of the region and its interest from a green economy point of view	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.

Map:

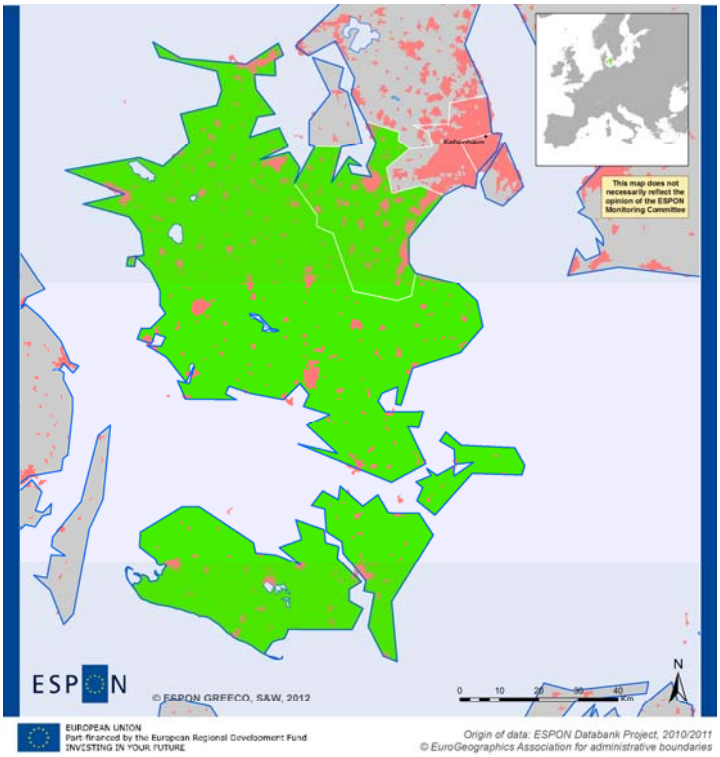


A5.2. Denmark - Sjaelland

<table>
<tr><td colspan="10">Sjaelland, NUTS 2 (DK021, DK022)</td></tr>
<tr><td colspan="2" rowspan="2">Location within Europe</td><td>Nordic</td><td colspan="2">Western</td><td colspan="2">East-Central</td><td colspan="2">Mediterranean</td></tr>
<tr><td>X</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td colspan="2" rowspan="4">ESPON Typology</td><td>Border</td><td colspan="2">Sparsely populated</td><td colspan="2">Metropolitan</td><td colspan="2">Mountain</td></tr>
<tr><td>X</td><td colspan="2"></td><td colspan="2">X
(1 of 2)</td><td colspan="2"></td></tr>
<tr><td>Island</td><td colspan="2">Coastal</td><td colspan="2">Industrial transition</td><td colspan="2">Outermost</td></tr>
<tr><td>X</td><td colspan="2">X</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td rowspan="2">Size</td><td>Inhabitants (nb.)(2010)</td><td>Density (nb./ km²⁾</td><td colspan="2">Surface (km²)</td><td colspan="4">Pop. growth rate, 1990-2010 (increase/decrease/stable)</td></tr>
<tr><td>820,564</td><td>112.8</td><td colspan="2">7273.2</td><td colspan="4">8%</td></tr>
<tr><td rowspan="2">Socio-economic level</td><td colspan="2">GDP per head (2009)</td><td colspan="2">Index of unemployment (2010)</td><td colspan="2">Share of high educated inhabitants (2010)</td><td colspan="2">Degree of urbanization and main urban centers (2010)</td></tr>
<tr><td colspan="2">€29,600</td><td colspan="2">15-24: 15.3%
25+: 5.3</td><td colspan="2">25.2% of labour force</td><td colspan="2">Mainly rural and semi
Roskilde, Ringsted</td></tr>
<tr><td rowspan="2">Sectors of the green economy in the region
(2 – highly represented;
1 – represented; 0 – lack)</td><td>Bioeconomy</td><td>Energy</td><td>Manufac-turing</td><td>Trans-port</td><td>Water and waste</td><td>Experience economy</td><td>Building</td><td>Green research</td></tr>
<tr><td>2</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>2</td><td>1</td></tr>
<tr><td colspan="2" rowspan="2">Cohesion policy (2014-2020) type</td><td colspan="3">More developed region</td><td colspan="2">Transition region</td><td colspan="2">Less developed region</td></tr>
<tr><td colspan="3">X</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td colspan="2">Governance considerations</td><td colspan="8">The NUTS2 region Zealand consists of 17 municipalities (LAU2). Most of the local authority drivers are controlled by the municipalities, but the region council has a strong coordinating role. The NUTS2 region is split in two NUTS3 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.</td></tr>
<tr><td rowspan="2">Factors of green economy development</td><td>Enabling conditions</td><td colspan="8">The region and the municipalities have focused policies on development of renewable energy, bioeconomy and green experience economy. A comprehensive industrial development support programme “Growth forum” has a strong emphasis on “clean-tech”.
Attempts to development of university network in the west and the south. In the south a strategic attempt to develop attractiveness for space requiring green technology experimental innovation. Continued industrial ecology development strategy deployed in the west with remarkable results.
Spatial planning and town development as to transport patterns and access to nature amenities.
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.</td></tr>
<tr><td>Driving forces</td><td colspan="8"></td></tr>
</table>

Sjaelland, NUTS 2 (DK021, DK022)	
Description of the region and its interest from a green economy point of view	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 with low levels of education and income. Relatively strong and further growth potential in renewable energy, bioeconomy, and green experience economy. Very good wind energy potential. Clean-tech positions and growth potentials in the north-east.

Map:



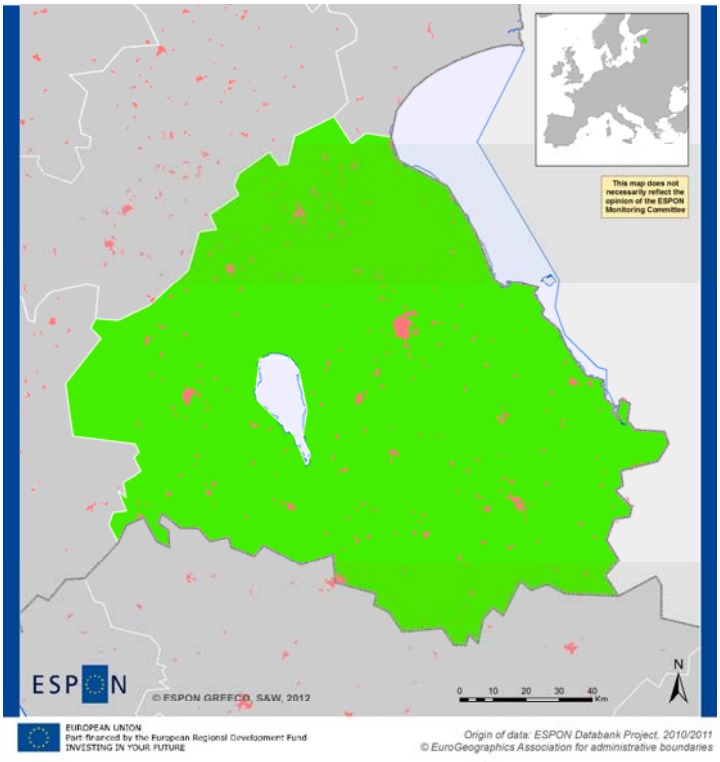
Sjælland Case Study

A5.3. Estonia - Lõuna-Eesti

<table>
<tr><th colspan="9">Lõuna-Eesti, NUTS 2 (EE008)</th></tr>
<tr><td colspan="2" rowspan="2">Location within Europe</td><td>Nordic</td><td colspan="2">Western</td><td>East-Central</td><td colspan="3">Mediterranean</td></tr>
<tr><td></td><td colspan="2"></td><td>X</td><td colspan="3"></td></tr>
<tr><td colspan="2" rowspan="4">ESPON Typology</td><td>Border</td><td colspan="2">Sparsely populated</td><td>Metropolitan</td><td colspan="3">Mountain</td></tr>
<tr><td>X</td><td colspan="2"></td><td>X</td><td colspan="3"></td></tr>
<tr><td>Island</td><td colspan="2">Coastal</td><td>Industrial transition</td><td colspan="3">Outermost</td></tr>
<tr><td></td><td colspan="2">X (lake)</td><td>X</td><td colspan="3"></td></tr>
<tr><td rowspan="2">Size</td><td>Inhabitants (nb.)</td><td>Density (nb./ km$^{2)}$</td><td colspan="2"><b>Surface (km^2)</td><td colspan="4">Pop. growth rate, 1990-2010 (increase/decrease/stable)</td></tr>
<tr><td>572.000</td><td>36</td><td colspan="2">15.799</td><td colspan="4">population decreased by 11% (1990-2003)</td></tr>
<tr><td rowspan="2">Socio-economic level</td><td colspan="2">GDP per head</td><td>Index of unemployment</td><td colspan="2">Share of high educated inhabitants</td><td colspan="3">Degree of urbanization and main urban centers</td></tr>
<tr><td colspan="2">11.900 (National, 2011)</td><td>7,1% (National 2011)</td><td colspan="2">40% The share of the population aged 30-34 years who have successfully completed university</td><td colspan="3">73% urban population Tartu (100.000 inh.)</td></tr>
<tr><td rowspan="2">Sectors of the green economy in the region (2 – highly represented; 1 – represented; 0 – lack)</td><td>Bioeco-nomy</td><td>Energy</td><td>Manufac-turing</td><td>Trans-port</td><td>Water and waste</td><td>Experience economy</td><td>Building</td><td>Green research</td></tr>
<tr><td>2</td><td>1</td><td>1</td><td>1</td><td>1</td><td>2</td><td>2</td><td>1</td></tr>
<tr><td colspan="2" rowspan="2">Cohesion policy (2014-2020) type</td><td colspan="2">More developed region</td><td colspan="2">Transition region</td><td colspan="3">Less developed region</td></tr>
<tr><td colspan="2"></td><td colspan="2">X</td><td colspan="3"></td></tr>
<tr><td colspan="2">Governance considerations</td><td colspan="7">Starting point: Centralised, but ideas of decentralization.</td></tr>
<tr><td rowspan="2">Factors of green economy development</td><td>Enabling conditions</td><td colspan="7">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 Growth, and therefore would take advantage of exchanging knowledge and experiences by joining forces through concrete projects.
See below for more detail on: Resources, technical knowledge and innovation activities in relation to the mentioned Green Economy drivers mentioned below enables the inclusion of the topics.</td></tr>
<tr><td>Driving forces</td><td colspan="7">Energy supply and development with focus on how local/regional renewable resources such as biomass, wind, and biogas can be expanded and improved. Maritime/Fish/Fish farming is an issue very relevant for a region due to the lake, 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/Innovation is, just as planning, a theme relating to new approaches to fisheries, biomass usage, other types and improvements of existing energy generation based on renewable resources are depending on new approaches. Experience/Tourism are clearly issues with green transition potentials. In most cases the emphasis is on the unique characteristics of the</td></tr>
</table>

Lõuna-Eesti, NUTS 2 (EE008)		
		region with a combination of sea, islands, agriculture, forestry, and old towns and villages showing the region's history. Especially issues such as organic farming and fisheries combined with short or long term tourism are emphasized as providing large potentials. In this connection for instance restoration of historic building and thereby ensuring links to the past are emphasized as important issues. But also new approaches to tourism in connection with the access to the sea are among the mentioned issues. Pollution and improvements of the environment has already been mentioned above as input both to energy production and expansion of tourism. Transport is a topic which include several types of focus, for instance better use of local and regional means of transportation by improving the infrastructure for bicycling, use of ferries instead of lorries and cars for transport of persons and goods in the region. And first of all a focus on the development of a highly needed infrastructure that enables transport based on locally produced electricity and biogas. Building/Construction is another topic for instance in relation to improved constructions, use of local building materials, better insulation, lowering energy consumption and restoration of existing housing among the most frequent issues. Also Agriculture/Forestry are issues related to especial organic farming, energy production through better use of the generated biomass, and the potentials for combining primary production with leisure activities and tourism. Other topics relevant for this case are: Waste/Water, Recycling and Health. is only directly mentioned in two of the projects, but it is quite clear that concerns regarding public health are underlying several of the projects.
Description of the region and its interest from a green economy point of view		See above.

Map:

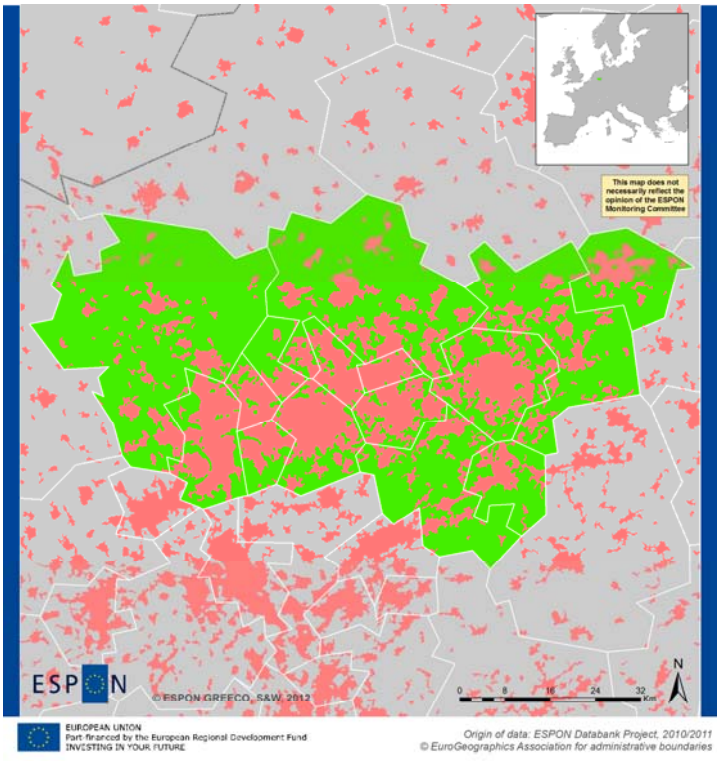


A5.4. Germany – Ruhr

<table>
<tr><td colspan="9">Ruhr Area, consisting of 15 NUTS-3 regions
(DEA12, DEA13, DEA16, DEA17, DEA1F, DEA31, DEA32, DEA36,
DEA51, DEA52, DEA53, DEA54, DEA55, DEA56, DEA5C)</td></tr>
<tr><td colspan="2" rowspan="2">Location within Europe</td><td>Nordic</td><td colspan="3">Western</td><td colspan="2">East-Central</td><td>Mediterranean</td></tr>
<tr><td></td><td colspan="3">X</td><td colspan="2"></td><td></td></tr>
<tr><td colspan="2" rowspan="4">ESPON Typology</td><td>Border</td><td colspan="3">Sparsely populated</td><td colspan="2">Metropolitan</td><td>Mountain</td></tr>
<tr><td>- (only DEA1F)</td><td colspan="3">-</td><td colspan="2">X (3 Big Metropolitan Region)</td><td>-</td></tr>
<tr><td>Island</td><td colspan="3">Coastal</td><td colspan="2">Industrial transition</td><td>Outermost</td></tr>
<tr><td>-</td><td colspan="3">-</td><td colspan="2">X (mostly A1: Region with industrial branches losing importance)</td><td>-</td></tr>
<tr><td rowspan="2">Size</td><td>Inhabitants (nb.)</td><td>Density (nb./ km²⁾</td><td colspan="3">Surface (km²)</td><td colspan="3">Pop. growth rate, 1990-2010 (increase/decrease/stable)</td></tr>
<tr><td>5,150,307</td><td>1,173</td><td colspan="3">4435</td><td colspan="3">Decrease of about 5 %</td></tr>
<tr><td rowspan="2">Socio-economic level</td><td colspan="2">GDP per head</td><td colspan="2">Index of unemployment</td><td colspan="2">Share of high educated inhabitants</td><td colspan="2">Degree of urbanization and main urban centers</td></tr>
<tr><td colspan="2">28,500</td><td colspan="2">11 %</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td rowspan="2">Sectors of the green economy in the region
(2 – highly represented ;
1 – represented ; 0 – lack)</td><td>Bioeco-nomy</td><td>Energy</td><td>Manufac-turing</td><td>Trans-port</td><td>Water and waste</td><td>Experience economy</td><td>Building</td><td>Green research</td></tr>
<tr><td>0</td><td>2</td><td>1</td><td>1</td><td>2</td><td>1</td><td>2</td><td>1</td></tr>
<tr><td colspan="2" rowspan="2">Cohesion policy (2014-2020) type</td><td colspan="3">More developed region</td><td colspan="2">Transition region</td><td colspan="2">Less developed region</td></tr>
<tr><td colspan="3">x</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td colspan="2">Governance considerations</td><td colspan="7">Complex governance situation. Ruhr area consists of 15 NUTS-3 regions. 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 as well as the Federal State (NUTS-0).</td></tr>
<tr><td rowspan="2">Factors of green economy development</td><td>Enabling conditions</td><td colspan="7">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 for green transition of the economy, in particular for energy savings and renewable energy development. Cooperative strategy of Ruhr cities towards a sustainable urban and regional development.</td></tr>
<tr><td>Driving forces</td><td colspan="7">Existence of some "natural" territorial capital, mainly in the rural parts (forests, agricultural land), but also in the high-density cores (open space, Ruhr landscape park). Brownfields as territorial capital for development of green economic activities. Multiple forms of agglomeration economies and existence of several (eco) innovation clusters. Strong university base with high-tech orientation and attached technology centres and parks.
Innovation City Ruhr as a prominent demonstration example of the transformation of</td></tr>
</table>

Ruhr Area, consisting of 15 NUTS-3 regions (DEA12, DEA13, DEA16, DEA17, DEA1F, DEA31, DEA32, DEA36, DEA51, DEA52, DEA53, DEA54, DEA55, DEA56, DEA5C)		
		the economy and the building stock to increase sustainability. Application of the region to become "European Green Capital" 2015. Initiatives to apply for a "Climate Expo 2020".
Description of the region and its interest from a green economy point of view		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.

Map:



Ruhr Area Case Study

Settlement area

A5.5 Hungary - South Transdanubia

South Transdanubia (Dél Duantúl), NUTS 2 (HU23)									
Location within Europe		**Nordic**	**Western**	**East-Central**	**Mediterranean**				
				X					
ESPON Typology		**Border**	**Sparsely populated**	**Metropolitan**	**Mountain**				
		2 out of 3			Moderately mountainous				
		Island	**Coastal**	**Industrial transition**	**Outermost**				
				X					
Size	**Inhabitants (nb.)**	**Density (nb./ km$^{2)}$**	**Surface (km^2)**	**Pop. growth rate, 1990-2010 (increase/decrease/stable)**					
	940,585	66.6 (2010)	14,168.6	Decrease (reduced by app 50 000 between 2002 and 2010)					
Socio-economic level	**GDP per head**		**Index of unemployment**	**Share of high educated inhabitants**	**Degree of urbanization and main urban centers**				
	6 550 (in current EUR)		9,82 (in %)	11,72 (Share of HRST in Economically Active Population) (in %)	Mainly smaller settlements**(See below)*. Main Urban centers: Pécs 157 721 Kaposvár 67 979 Szekszárd 33 720 Komló 25 299 fő Siófok 24 347 fő				
Sectors of the green economy in the region (2 – highly represented; 1 – represented; 0 – lack)	**Bioeco-nomy**	**Energy**	**Manufac-turing**	**Trans-port**	**Water and waste**	**Experience economy**	**Building**	**Green research**	
	2	1	0	0	1	1	0	1	
Cohesion policy (2014-2020) type	**More developed region**		**Transition region**		**Less developed region**				
					X				
Governance considerations	- 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 Regional Development Agency is the managing body of the Regional Operational Programme of the Structural Funds. - 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.								

South Transdanubia (Dél Duantúl), NUTS 2 (HU23)		
Factors of green economy development	**Enabling conditions**	- **Regional policies:** - *South Transdanubian Operational Programme* - *Regional Innovation Strategy* (2004) which has the objective of the „creation and development of a competitive and innovative enterprise sphere, that is capable to generate high income, and achieve rapid and at the same time sustainable development". - *Strategic development programme for business services in the South Transdanubian Region, rehabilitation of brown field and urban areas* (2006). - *Hungary-Croatia IPA Cross-Border Cooperation Programme*
	Driving forces	**- Territorial capital: renewable stock, (eco)innovation clusters, etc.** - The area is rich in surface and sub-surface water, as well as thermal water sources, while the Danube and Dráva Rivers deliver significant water quantities. - The bio-economy sector has a prominent role. - The largest stock of renewable energy in the region is biomass (energy plantations, bio-ethanol and bio-diesel feedstock). Large areas in the region are suitable for bio-mass production. - Geo-thermal characteristics are outstanding in South Transdanubia, along with the opportunity for utilising solar energy (primarily using solar collector systems). (OP) - The region has high tourism capital where significant attractions are territorially concentrated such as; Lake Balaton, monuments, thermal baths, wine tourism. The potential for tourism has not been fully taken advantage of. - There are two universities in the region. The University of Pécs is the largest provincial university centre in Hungary in terms of the number of students (34,000), and has significant research capacities in certain fields. - The University of Pécs affiliated research centres and knowledge clusters includes the Biotechnology Innovation Base (an accredited cluster with 19 biotech companies). The Biosciences Centre was recently established. - Energy efficiency projects have recieved support from the innovation program. - **Consumption patterns (behavioural aspects)** - The level of innovation and the R&D expenditure is low in the region. However, the regional innovation agency (DDRIÜ) is very efficient in promoting innovation linkages and co-operation, as well as inter-regional horizontal linkages in the field of policy development. This is the only RIA in Hungary with a representation office in Brussels. - Foreign direct investment to the region is very low. In terms of attracting foreign investments, ST is the least favourable region in Hungary. - The education level of the population in the region has improved continuously during past decades, exceeding the national average. On the other hand, there is a low level of skilled workers. This is a consequence of the lack of skilled labour. - The region has big cultural assets, maliny concetrated in Pecs, and some of the main opportunities are related to knowledge generation. - **In-flows from external territories: imports, foreign direct investment, etc.** - By receiving the major part of the support programmes managed by the National Office for Research and Technology and of the R&D programmes of the European Union, the universities of the region have greatly contributed to the improvement of the basic indices of innovation in ST in recent years. The share of central budget in innovation financing was the highest in Hungary over the period of 2004-2008. The central financial in-flow has in the recent years have raised the share of R&D expenditure to app. 0.5% of GDP.
Description of the region and its interest from a green economy point of view		ST 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. The proportion of organisations active in ecological research within the R&D sector is 17.3%. In the field of waste utilisation, there are 2 sorting

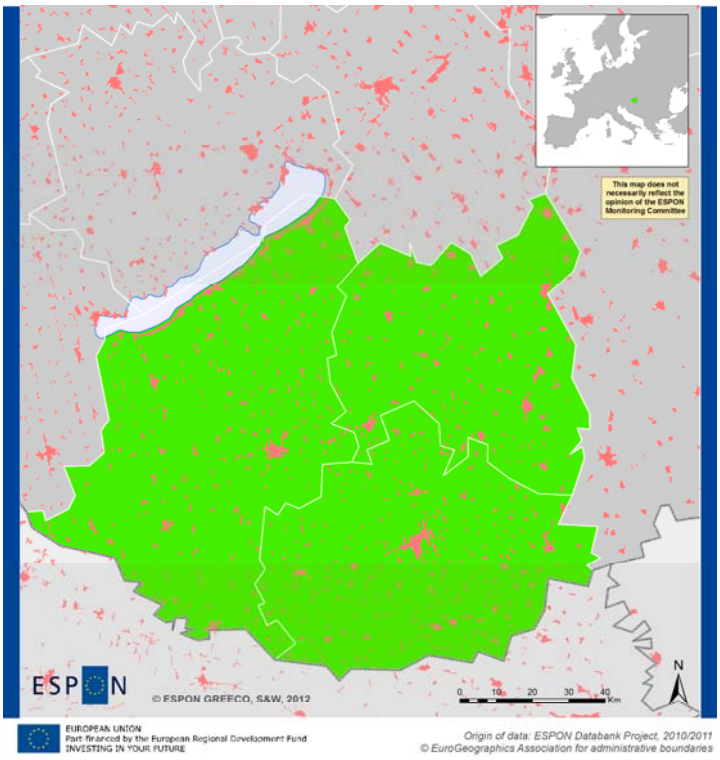
South Transdanubia (Dél Duantúl), NUTS 2 (HU23)	
	plants, 2 rubber grinding mills, 3 electronics waste processing facilities, as well as 7 plastic processing plants operating in the region. The region lags substantially behind European Union expectations in the field of wastewater treatment and purification. 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%. (OP) There is big potential for improvements in this field which would have a positive impact on public health and also have a positive affect on the green economy. The cultural and landscape-natural features of the South Transdanubia region are favourable for the development of tourism.

*

Table No. 1: Main characteristics of the urban network in the region

Category of settlement	Number of towns	Distribution of the region's population
Small town with less than 10 thousand people	19	10%
Medium town with between 10 to 30 thousand people	12	19%
Large town with more than 30 thousand people	2	10%
Large town with more than 100 thousand people: Pécs (without conurbation)	1	17%

Map:



Sources:

Eurostat, regional indicators (Size)

Regional Innovation Monitor: http://www.rim-europa.eu/index.cfm?q=p.home

South Transdanubia Operational Programme 2007-2013

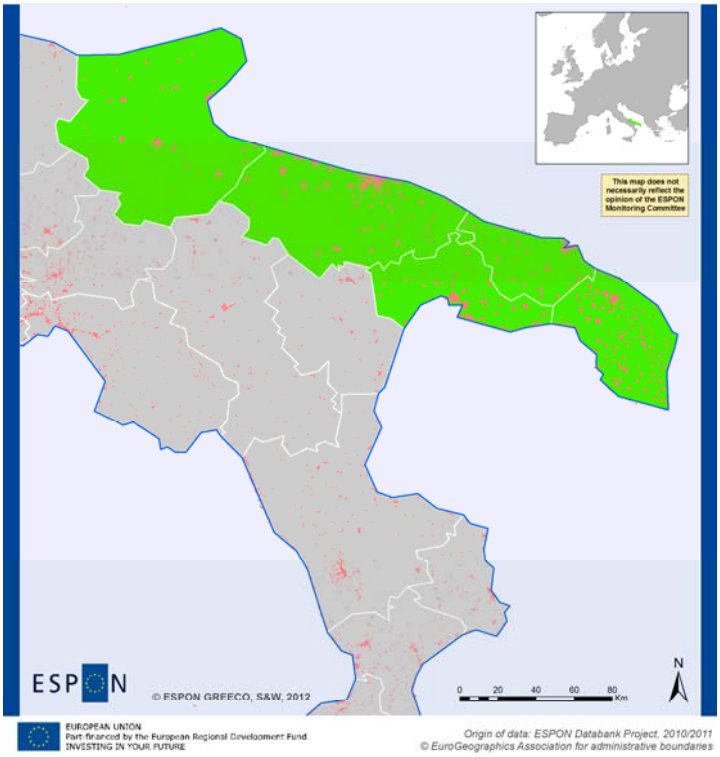
Pascal Observatory, http://pure.pascalobservatory.org/sites/default/files/RP_-_South_Transdanubia.pdf

A5.6. Italy - Puglia

<table>
<tr><th colspan="9">Puglia, NUTS 2 (ITF41, ITF42, ITF43, ITF44, ITF45)</th></tr>
<tr><td rowspan="2" colspan="2">Location within Europe</td><td colspan="2">Nordic</td><td colspan="2">Western</td><td colspan="2">East-Central</td><td>Mediterranean</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td>X</td></tr>
<tr><td rowspan="4" colspan="2">ESPON Typology</td><td colspan="2">Border</td><td colspan="2">Sparsely populated</td><td colspan="2">Metropolitan</td><td>Mountain</td></tr>
<tr><td colspan="2">X
(4 of 5)</td><td colspan="2"></td><td colspan="2">X
(2 of 5)</td><td>X
(4 of 5)</td></tr>
<tr><td colspan="2">Island</td><td colspan="2">Coastal</td><td colspan="2">Industrial transition</td><td>Outermost</td></tr>
<tr><td colspan="2"></td><td colspan="2">X</td><td colspan="2">X
(1 of 5)</td><td></td></tr>
<tr><td rowspan="2">Size</td><td>Inhabitants
(nb.)</td><td>Density
(nb./ km^2</td><td colspan="2">Surface
(km^2)</td><td colspan="5">Pop. growth rate, 1990-2010
(increase/decrease/stable)</td></tr>
<tr><td>4.091.259</td><td>211,02</td><td colspan="2">19.358</td><td colspan="5">Slight increase</td></tr>
<tr><td rowspan="2">Socio-economic level</td><td colspan="2">GDP per head</td><td colspan="2">Index of unemployment</td><td colspan="3">Share of high educated inhabitants</td><td>Degree of urbanization and main urban centers</td></tr>
<tr><td colspan="2">16.500</td><td colspan="2">12,56
(%)</td><td colspan="3">9,96
(% of knowledge workers)</td><td>Bari.</td></tr>
<tr><td rowspan="2">Sectors of the green economy in the region
(2 – highly represented;
1 – represented; 0 – lack)</td><td>Bioeco-nomy</td><td>Energy</td><td>Manufac-turing</td><td>Trans-port</td><td>Water and waste</td><td>Experience economy</td><td>Building</td><td>Green research</td></tr>
<tr><td>1</td><td>2</td><td>X</td><td>0</td><td>2</td><td>1</td><td>0</td><td>0</td></tr>
<tr><td colspan="2" rowspan="2">Cohesion policy (2014-2020) type</td><td colspan="3">More developed region</td><td colspan="3">Transition region</td><td>Less developed region</td></tr>
<tr><td colspan="3">X</td><td colspan="3"></td><td></td></tr>
<tr><td colspan="2">Governance considerations</td><td colspan="8">Puglia is a NUTS 2 region 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.
In the case of Puglia, regional authorities develop policy initiatives with the support of the recently created Regional Agency for Technology and Innovation (ARTI). The regional administration is the key organisation in Apulia for the promotion of regional innovation.</td></tr>
<tr><td rowspan="2">Factors of green economy development</td><td>Enabling conditions</td><td colspan="8">Policies and Governance:
- Recently, strategies dealing with research (fundamental to facilitate the green economy transition) have been launched: (i) Framework Programme Agreement - National Operational Programme (NOP) "Research and Competitiveness" Puglia 2007-2013 and (ii) Regional strategy for research and innovation in Apulia region
- There is a Strong political agenda related to consumption patterns and accordingly, recycling and recovery rates are growing.
It also should be 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.</td></tr>
<tr><td>Driving forces</td><td colspan="8">In a preliminary assessment, it has been identified that Puglia has the following competitive advantages for the green economy transition, due to its inherent regional characteristics. In special, Puglia has a great potential for renewable energy (solar in particular, it is the leading Italian region). Moreover, Puglia has important cultural assets</td></tr>
</table>

Puglia, NUTS 2 (ITF41, ITF42, ITF43, ITF44, ITF45)		
		and numerous beach resorts, which facilitate the growth of the tourism (Experience Economy). In addition, recently there has been progress in terms of innovation capacity and increasing awareness about innovation issues in regional policy-making.
Description of the region and its interest from a green economy point of view		Puglia is a region located in south-east Italy with a population of about 4m inhabitants. 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. In addition, Regional authorities have recently promoted several initiatives in support of innovation activity, with a focus on the creation of technological districts and investment in human capital. It also should be noted that Puglia is a region with problems related to waste management, even if recycling and recovery rates are increasing. For this reason, the Water and Waste sector has the opportunity to grow. All in all, Puglia's interest lies in the fact that it has a certain capacity to carry out the green economy transition, but this transition has not truly started yet.

Map:



Sources:

Source for population (inhabitants and growth rate): Eurostat Regional Statistics.

Source (except for degree of urbanization): Regional Innovation Monitor. Values averaged over 2005-2010.

A5.7. Malta

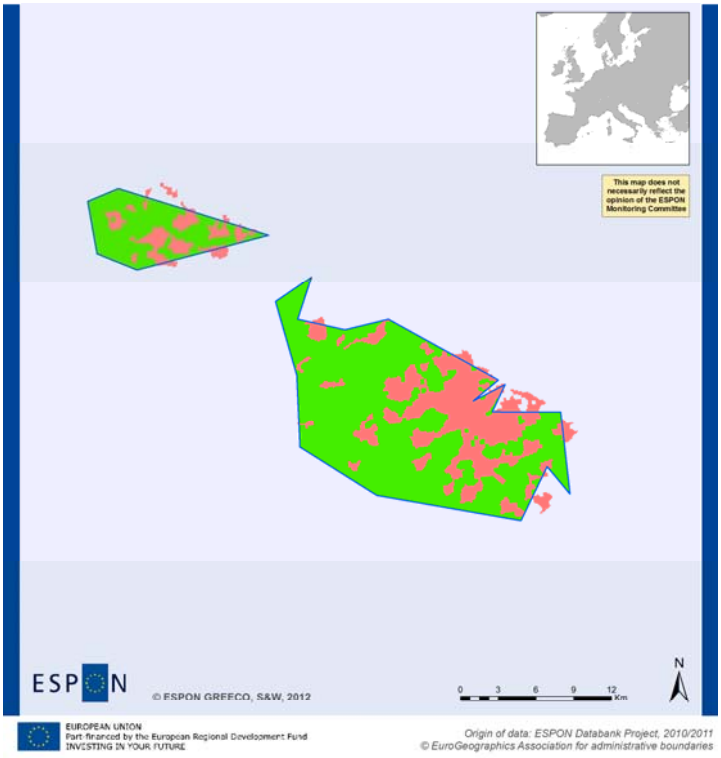
<table>
<tr><th colspan="9">Malta, NUTS 2 (MT)</th></tr>
<tr><td rowspan="2" colspan="2">Location within Europe</td><td colspan="2">Nordic</td><td colspan="2">Western</td><td colspan="2">East-Central</td><td>Mediterranean</td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td>X</td></tr>
<tr><td rowspan="4" colspan="2">ESPON Typology</td><td colspan="2">Border</td><td colspan="2">Sparsely populated</td><td colspan="2">Metropolitan</td><td>Mountain</td></tr>
<tr><td colspan="2">X</td><td colspan="2"></td><td colspan="2">X</td><td></td></tr>
<tr><td colspan="2">Island</td><td colspan="2">Coastal</td><td colspan="2">Industrial transition</td><td>Outermost</td></tr>
<tr><td colspan="2">X</td><td colspan="2">X</td><td colspan="2">X</td><td></td></tr>
<tr><td rowspan="2">Size</td><td>Inhabitants (nb.)</td><td>Density (Nb./ km$^{2)}$</td><td colspan="2"><b>Surfach (km^2)</td><td colspan="4">Pop. growth rate, 1990-2010 (increase/decrease/stable)</td></tr>
<tr><td>417 617</td><td>1316</td><td colspan="2">316</td><td colspan="4">Increase</td></tr>
<tr><td rowspan="2">Socio-economic level</td><td colspan="2">GDP per head</td><td colspan="2">Index of unemployment</td><td colspan="2">Share of high educated inhabitants</td><td colspan="2">Degree of urbanization and main urban centers</td></tr>
<tr><td colspan="2">19 200</td><td colspan="2">6,9%</td><td colspan="2">30,2%</td><td colspan="2">High degree of urbanization; Valetta, Sliema, Qormi, Birkirkara</td></tr>
<tr><td rowspan="2">Sectors of the green economy in the region
(2 – highly represented;
1 – represented; 0 – lack)</td><td>Bioeco-nomy</td><td>Energy</td><td>Manufac-turing</td><td>Trans-port</td><td>Water and waste</td><td>Experience economy</td><td>Building</td><td>Green research</td></tr>
<tr><td>2</td><td>1</td><td></td><td>2</td><td>1</td><td>2</td><td>2</td><td>1</td></tr>
<tr><td rowspan="2" colspan="2">Cohesion policy (2014-2020) type</td><td colspan="2">More developed region</td><td colspan="3">Transition region</td><td colspan="2">Less developed region</td></tr>
<tr><td colspan="2"></td><td colspan="3">X</td><td colspan="2"></td></tr>
<tr><td colspan="2">Governance considerations</td><td colspan="7">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 centralized country. The whole territory is NUTS 2 region.</td></tr>
<tr><td rowspan="2">Factors of green economy development</td><td>Enabling conditions</td><td colspan="7">Policies and Governance
Malta has the ambition to turn the island of Gozo into an eco-island by 2020.
An Environmental Corporate Responsibility Office has been set up by the Office of the Prime Minister to promote awareness and environmental best practices. A 'Green Leader' is to be appointed in each ministry to encourage environmentally-friendly and resource efficiency measures.
Green Economy related environment and resource efficiency measures include the subsidies and grants for solar water heaters and photovoltaic systems for home appliances.
An updated National Action Plan for Green Public Procurement covers sixteen product groups ranging from textiles to office IT equipment, and from air-conditioning to food and catering.</td></tr>
<tr><td>Driving forces</td><td colspan="7">Malta has the following advantages with regards to the transition to a green economy:
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</td></tr>
</table>

Malta, NUTS 2 (MT)		

		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.
		• **Innovation**
		  • The National Strategic Plan for Research and Innovation 2007-2010 identified Energy and Environment as a priority research area.
		  • 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.
		• **Investments**
		  • 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.
		• **Green Jobs**
		  • The green sector requires two types of workers: scientists and environmental experts, and lowly qualified workers, with some basic training. In order to fill the low-skilled jobs in the green industry, short job-oriented courses are needed.
		  • 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.

Description of the region and its interest from a green economy point of view		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.

Map (EU Scale)



Dél-Dunántúl Case Study

Settlement area

Sources:

Eurostat 2011

PPS per inhabitant, Eurostat, 2009

Eurostat 2010

Eurostat, 2010

http://www.eco-gozo.com/

Monitoring Member States' policy developments on resource-efficiency/environment in Europe 2020

EC, 2010. Annual Environmental Policy Review 2009

Second National Communication

Eco-innovation observatory, 2010

Environmental Policy Review, 2009

European innovation observatory, 2010

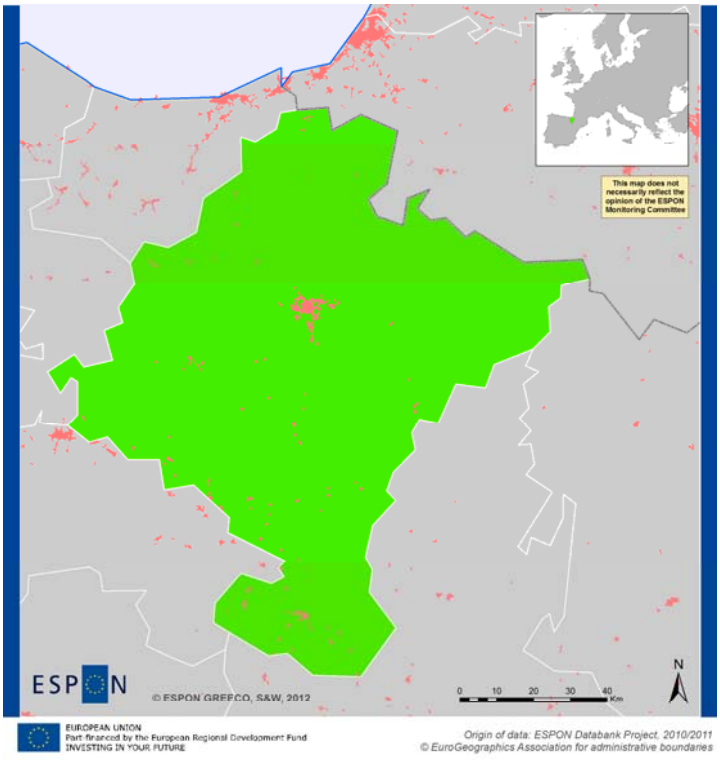
EU Employment Observatory Review The employment dimension of economy greening, 2009

A5.8. Spain – Navarra

<table>
<tr><th colspan="10">Navarra, NUTS 2 (ES22)</th></tr>
<tr><td colspan="2" rowspan="2">Location within Europe</td><td>Nordic</td><td colspan="2">Western</td><td colspan="2">East-Central</td><td colspan="3">Mediterranean</td></tr>
<tr><td></td><td colspan="2"></td><td colspan="2"></td><td colspan="3">X</td></tr>
<tr><td colspan="2" rowspan="3">ESPON Typology</td><td>Border</td><td colspan="2">Sparsely populated</td><td colspan="2">Metropolitan</td><td colspan="3">Mountain</td></tr>
<tr><td>X</td><td colspan="2"></td><td colspan="2">X</td><td colspan="3">X</td></tr>
<tr><td>Island</td><td colspan="2">Coastal</td><td colspan="2">Industrial transition</td><td colspan="3">Outermost</td></tr>
<tr><td colspan="2"></td><td colspan="2">X</td><td colspan="2">X</td><td colspan="3"></td></tr>
<tr><td rowspan="2">Size</td><td>Inhabitants (nb.)</td><td>Density (nb./ km$^{2)}$</td><td colspan="2"><b>Surface (km^2)</td><td colspan="5">Pop. growth rate, 1990-2010 (increase/decrease/stable)</td></tr>
<tr><td>642.051</td><td>60,0 (data for 2010)</td><td colspan="2">10.390,4</td><td colspan="5">Increase</td></tr>
<tr><td rowspan="2">Socio-economic level</td><td colspan="2">GDP per head</td><td colspan="2">Index of unemployment</td><td colspan="3">Share of high educated inhabitants</td><td colspan="2">Degree of urbanization and main urban centers</td></tr>
<tr><td colspan="2">28.600</td><td colspan="2">6,66 (%)</td><td colspan="3">20,5 (% of knowledge workers)</td><td colspan="2">Pamplona and Tudela.</td></tr>
<tr><td rowspan="2">Sectors of the green economy in the region (2 – highly represented; 1 – represented; 0 – lack)</td><td>Bioeco-nomy</td><td>Energy</td><td>Manufac-turing</td><td>Trans-port</td><td>Water and waste</td><td>Experience economy</td><td>Building</td><td>Green research</td></tr>
<tr><td>1</td><td>2</td><td>1</td><td>0</td><td>0</td><td>1</td><td>0</td><td>2</td></tr>
<tr><td colspan="2" rowspan="2">Cohesion policy (2014-2020) type</td><td colspan="3">More developed region</td><td colspan="3">Transition region</td><td colspan="2">Less developed region</td></tr>
<tr><td colspan="3">X</td><td colspan="3"></td><td colspan="2"></td></tr>
<tr><td colspan="2">Governance considerations</td><td colspan="8">Spain is a highly decentralised country, where autonomous communities have the authority for policy making, as long as it does not contradict 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.</td></tr>
<tr><td rowspan="2">Factors of green economy development</td><td>Enabling conditions</td><td colspan="8">- Policies and Governance: It is a region with high environmental awareness and subsequently, has one of the completest environmental legislative frameworks in Spain. In addition, in 2010 Navarra published MODERNA, a strategic plan to define a new model of economic development for Navarre in the medium and long term.</td></tr>
<tr><td>Driving forces</td><td colspan="8">In a preliminary assessment, it has been identified that Navarra has the following competitive advantages for the green economy transition, due to its inherent regional characteristics:
- Territorial capital:
o First, it has great renewable energy potential. In fact the windmills have a prominent role.
o Next, the cluster presence is very relevant in the region for several sectors: agriculture-food, innovation, ICT, automotive, solar energy, etc.
o It has some of the best considered universities in Spain and 12 research organisations.
o Due to its landscapes and natural areas it also poses a high asset with regard to tourism. In fact, a relevant share of “rural-tourism” is already taking place in Navarra.
- Many of the companies located in Navarra are foreign multinationals, bringing</td></tr>
</table>

Navarra, NUTS 2 (ES22)		
		the subsequent foreign investments into the region - Innovation: It is one of the most R&D investing regions in Spain. It has Technology Action Plans in place to achieve the objective of becoming one of the 50 most innovative regions in the EU. In this context it also has grants' programmes to finance R&D. - Navarra has a privileged position (compared with the rest of Spain) in terms of population with tertiary education.
Description of the region and its interest from a green economy point of view		Navarra is an interesting case study region because it has somehow already started the green(er) economy transition, by publishing MODERNA (a new economic model for Navarray), investing in wind energy, in (eco)innovation and by strengthening its legislative framework. 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. That is to say it has both relevant enabling conditions and drivers for the transition. Moreover, it also has a wide variety of sectors prone to become green(er). Last, but not least, Navarra has its own Statistic Institute, which indicates that the availability of regional data is very likely. For all the above reasons Navarra has been considered an interesting case study to picture the green economy transition in GREECO.

Map:



Sources:

Source for population (inhabitants and growth rate): INE – Spanish National Statistic Institute.

Source for area and density: Eurostat Regional Statistics.

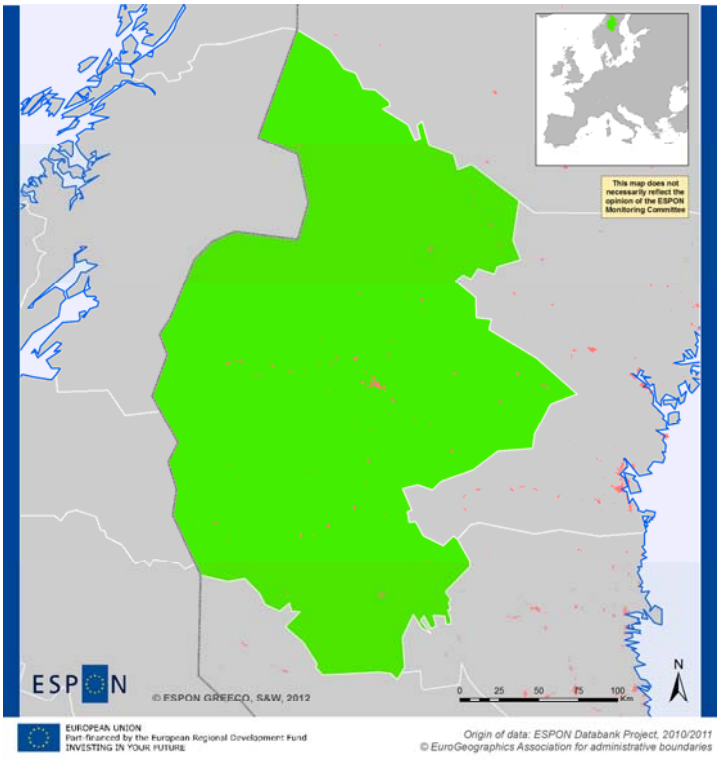
Source (except for degree of urbanization): Regional Innovation Monitor. Values averaged over 2005-2010.

A5.9. Sweden - Jämtland

Jämtland , NUTS 3 (SE322)								
Location within Europe	**Nordic**		**Western**		**East-Central**		**Mediterranean**	
	X							
ESPON Typology	**Border**		**Sparsely populated**		**Metropolitan**		**Mountain**	
	X		X				X	
	Island		**Coastal**		**Industrial transition**		**Outermost**	
Size	**Inhabitants (nb.)**	**Density (nb./ km$^{2)}$**	**Surface (km^2)**		**Pop. growth rate, 1990-2010 (increase/decrease/stable)**			
	126 299	2,55	49 443		Decrease ca 7% : 135 726 -> 126 299			
Socio-economic level	**GDP per head**	**Index of unemployment**	**Share of high educated inhabitants**		**Degree of urbanization and main urban centers**			
	32 000	7,3	20,08		Predominantly rural Östersund 44 327 inhabitants			
Sectors of the green economy in the region (2 – highly represented; 1 – represented; 0 – lack)	**Bioeco-nomy**	**Energy**	**Manufac-turing**	**Trans-port**	**Water and waste**	**Experience economy**	**Building**	**Green research**
	2	2	1	(2)	(1)	2	(1)	1
Cohesion policy (2014-2020) type	**More developed region**		**Transition region**		**Less developed region**			
	X							
Governance considerations	National government (Sweden)- County board (Jämtland)-municipalities (within Jämtland) Some policies as well as all laws etc. are from Swedish government. County board as well as local municipalities decide on many issues (local taxes, planning, etc.)							
Factors of green economy development – **Enabling conditions**	Policies: Influence the production and consumption side. Sweden have 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 behavior for consumers (fuels for cars, heating of homes, management of household waste, etc.)							
Factors of green economy development – **Driving forces**	Territorial capital: 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. Territorial assets: Include the possibility to use mountainous area for winter sports and develop greener tourism. Also other types of recreational tourism (throughout the year). The area around Åre is one of Sweden's biggest mountainous recreational areas. Faces challenges in the light of climate change. Innovations: There is an ongoing collaboration between the university and local entrepreneurs to develop clean tech, especially in the field of transport and fuels.							
Description of the region and its interest from a green economy point of view	Sparsely populated area with some problems of outmigration. Rich in resources and potential for developing both traditional and "new" forms of activities within the green economy. 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). Also very active in structural funds programs and development of networks for regional development and innovation. Can provide a good example of how to develop green economies in remote and (large) sparsely populated areas.							

Jämtland , NUTS 3 (SE322)	
	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.

Map:



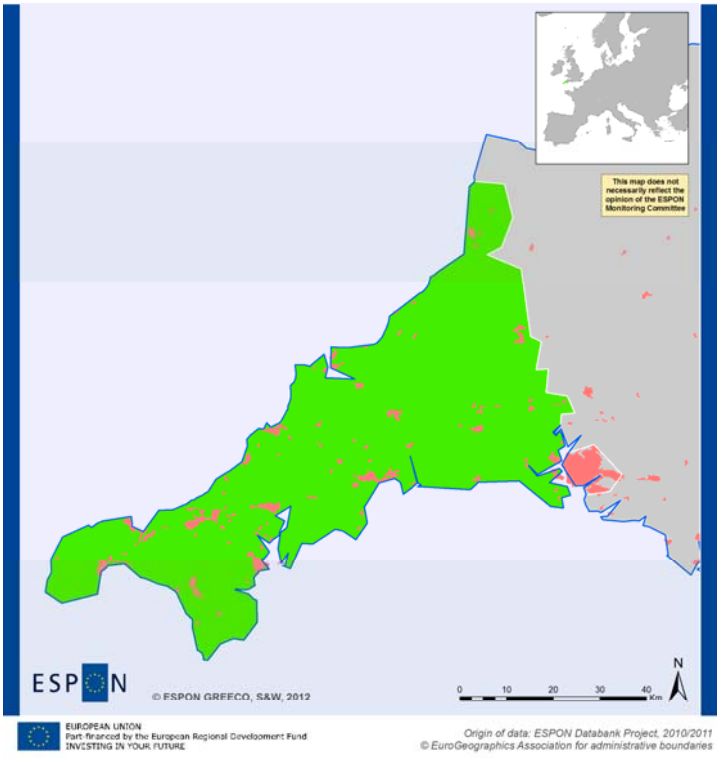
Jämtlands län Case Study

Settlement area

A5.10. United Kingdom – Cornwall

Cornwall and Isles of Scilly, NUTS 2 (UKK3)								
Location within Europe		**Nordic**	**Western**		**East-Central**		**Mediterranean**	
ESPON Typology		**Border**	**Sparsely populated**		**Metropolitan**		**Mountain**	
		Island	**Coastal**		**Industrial transition**		**Outermost**	
Size	**Inhabitants (nb.)**	**Density (nb./ km$^{2)}$**	**Surface (km^2)**		**Pop. growth rate, 1990-2010 (increase/decrease/stable)**			
	535,365	150.1	3,566.1		14%			
Socio-economic level	**GDP per head (2009)**	**Index of unemployment (2010)**	**Share of high educated inhabitants (2010)**		**Degree of urbanization and main urban centers**			
	€16,500	15-24 yrs: 24% 25+ yrs: 5.5%	28.6% of active population		Bodmin, Penzance			
Sectors of the green economy in the region (2 – highly represented; 1 – represented; 0 – lack)	**Bioeco-nomy**	**Energy**	**Manufac-turing**	**Trans-port**	**Water and waste**	**Experience economy**	**Building**	**Green research**
	2	1	1	1	1	2	1	1
Cohesion policy (2014-2020) type		**More developed region**		**Transition region**			**Less developed region**	
				X				
Governance considerations		The NUTS2 and NUTS3 region Cornwall and Isles of Scilly (unit: Council of Cornwall) consists of the two LAU1 territories Cornwall and the Isles of Scilly.						
Factors of green economy development	**Enabling conditions**	Signatory to the Covenant of Mayors. Strategic choice of green economy driver: "Low carbon" as a catalyst for economic development. Domestic energy and behavioural change programme. Support for renewable energy and environmental technologies using national and EU funding. Public sector procurement policies.						
	Driving forces	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. Spatial planning and town development. More general enablers of industrial development: Connectivity programme: Broadband, ports and airports.						
Description of the region and its interest from a green economy point of view		Green potentials include the valuable landscape (and seascape) amenities. Cornwall is a great tourism destination. About a fourth of the employment depends on tourism. Very good wind energy potential, but with potential conflicts with landscape interests. The economy 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.						

Map (EU Scale)



Cornwall and Isles of Scilly Case Study

Settlement area

A6. General Policy review (work in progress)

In recent years, the concept of the Green Economy has emerged as a potential remedy to some of the key market and institutional failures that characterize the conventional development model, and as a more effective pathway to advancing economic, social, and environmental goals. In addition, Green Economy will be one of two specific themes discussed at the Earth Summit 2012 (Rio+20), the other being the institutional framework for sustainable development. While broad consensus on how to define the Green Economy is still emerging, it is nonetheless possible to survey the policy landscape of relevance.

A6.1. Topic: Sustainable Development Strategies

Policy / Action	Objectives	Significance for the Green Economy Transition
The Lisbon Treaty	The Lisbon Strategy emphasises the objectives of growth and jobs, setting out a large number of measures and goals in a wide range of different areas. While to date territorial cohesion is not explicitly considered within the objectives of the Lisbon Strategy, its evaluation stresses the relevance of the territorial approach and the role of the regional and local administrative levels in achieving the Lisbon's objectives. The Lisbon Strategy is a dynamic strategy in which sustainability has been taken on board (climate change, energy, financial and social sustainability). With the adoption of the Lisbon Treaty, territorial cohesion is added to the goals of economic and social cohesion. This new element adds and underlines a number of issues: - It emphasizes the territorial dimension of access to services of general economic interest; - It underlines the importance of environmental sustainability; - It underscores the importance of functional geographies, of the problems of territories with specific geographical features, of the role of city, and of local development approaches; - It strengthens the role of territorial cooperation and highlights the potential of macro-regional strategies.	The Lisbon Strategy aims at improving the competitiveness of the European economy in parallel with a clear commitment to the European social model and to the management of environmental pressures and conflicts. All the above being key issues of the Green Economy Transition. In addition, it also highlights the need for a territorial approach for achieving the sustainability goal. A multi-level and coordinated approach between the European, national and regional/local levels, in line with the subsidiarity principle, is seen as a key factor of success for territorial governance, an issue that is central and cross-cutting in the implementation of the Territorial Agenda

Policy / Action	Objectives	Significance for the Green Economy Transition
	The Lisbon Treaty (2007) made sustainable development a key objective for the EU and, in 2010, the EU renewed a number of environmental Directives to ensure they comply with the Lisbon Treaty.	
Gotteborg objectives	The Gothenburg Strategy defines a number of key environmental objectives and target dates, both political and legislative. Major priorities include climate change, sustainable transport, public health and natural resources management. These areas are most relevant to the territorial challenges and priorities set in the Territorial Agenda.	All in all, the Gothenburg Strategy has very similar priorities, when compared to Green Economy (e.g. decrease environmental depletion, foster sustainability, etc.). In addition, if we consider sustainable transport and natural resources management, these topics would be very much related to two of the eight priority sectors within GREECO: Transport and Manufacture.

Policy / Action	Objectives	Significance for the Green Economy Transition
EU Strategy for Sustainable Development	The EU's climate change and energy policies are evidence of the impact that sustainable development strategy has had on the political agenda. Moreover, the EU has started to integrate the sustainability dimension in many other policy fields also. The main goals of the EU SDS may be summarized as follows: - Contributing to a rapid shift to a low-carbon and low-input economy, based on energy and resource-efficient technologies and sustainable transport, as well as, shifting towards sustainable consumption behaviour; - Intensifying environmental efforts for the protection of biodiversity, water and other natural resources; - Promoting social inclusion. The most vulnerable in society are at risk of being the most badly hit by the economic crisis and its effects may linger longest for them unless effective measures are provided. - Strengthening the international dimension of sustainable development and intensifying efforts to combat global poverty.	GREECO understands the Green Economy as an operationalisation of the Sustainability principles, the policy context of Sustainable Development is (production, consumption, resource efficiency, research and development…) is a corner stoner for the project.
Europe 2020 strategy	Europe 2020 is the EU's growth strategy for the coming decade. In a changing world, we want the EU to become a smart, sustainable and inclusive economy. These three mutually reinforcing priorities should help the EU and the Member States deliver high levels of employment, productivity and social cohesion. Its main targets may be summarized as follows: - Employment: 75% of the 20-64 year-olds to be employed - R&D: 3% of the EU's GDP to be invested in R&D - Climate change / energy: (i) greenhouse gas emissions 20% (or even 30%, if the conditions are right) lower than 1990, (ii) 20% of energy from renewables, (iii) 20% increase in energy efficiency - Education: Reducing school drop-out rates below 10% at least 40% of 30-34–year-olds completing third level education - Poverty / social exclusion: at least 20 million fewer people in or at risk of poverty and social exclusion	The Europe 2020 Strategy builds on lessons learned from the Lisbon Strategy, recognising its strengths (the right goals of growth and job creation, etc.) but addressing its weaknesses (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. That is why, even if the Europe 2020 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.

Policy / Action	Objectives	Significance for the Green Economy Transition
Roadmap to a Resource-Efficient Europe	This Roadmap is one of the Flagship Initiatives of the Europe 2020 Strategy (Sustainable Growth) and sets the milestones, which illustrate what will be needed to put us on a path to a resource efficient and sustainable growth. As such, the main objective is "making Europe resource efficient" through transforming the economy: - Sustainable consumption and production - Turning waste into a resource - Supporting research and innovation - Environmentally harmful subsidies and getting the prices right	Our economy will require a fundamental transformation within a generation – in energy, industry, agriculture, fisheries and transport systems, and in producer and consumer behaviour. Preparing that transformation in a timely, predictable and controlled manner will allow us to further develop our wealth and wellbeing, whilst reducing the levels and impact of our resource use. In this context the Resource Efficiency Initiative is fully aligned with GREECO's objectives.
Innovation Union	Innovation Union is another of the Flagship Initiatives of the Europe 2020 Strategy (Smart Growht). Innovation provides real benefits for citizens, consumers, and workers. It speeds up and improves the way we conceive, develop, produce and access new products, industrial processes and services. It is also the key not only to creating more jobs, building a greener society and improving our quality of life, but also to maintaining our competitiveness on the global market. The Innovation Union plan contains over thirty actions points, with the aim to achieve three major goals: - Make Europe into a world-class science performer; - Remove obstacles to innovation – like expensive patenting, market fragmentation, slow standard-setting and skills shortages – which currently prevent ideas getting quickly to market; and - Revolutionize the way public and private sectors work together, notably through Innovation Partnerships between the European institutions, national and regional authorities and business.	On the one hand, innovation is a key facilitator of the Green Economy Transition, through knowledge, skills and more efficient technologies and processes. On the other hand, eco-innovation (i.e. Green Research & Eco-innovation), will be one of the eight priority sectors analyzed within GREECO research.

A6.2. Topic: Territorial Development

Policy / Action	Objectives	Significance for the Green Economy Transition
European Spatial Development Perspective (ESDP)	The ESDP aims at the long term sustainability of Europe´s land use. Along these lines the objectives of the ESDP are in line with the three following fundamental goals of European policy: - economic and social cohesion; - conservation of natural resources and cultural heritage; and - more balanced competitiveness of the European territory.	These strategies foster sustainable and smart development, knowledge based economy, networks, along with economic and social cohesion through territorial strategies. Since GREECO is focused on the territorial dimension of the Green Economy Transition, these strategies somehow provide the framework, or context, to promote Green Economy, by taking regional particularities into account (on the contrary to place-blind approaches).
Territorial Agenda of the European Union (TAEU)	The Ministers of the European Union responsible for spatial planning and development, on the occasion of the Informal Ministerial Meeting on Urban Development and Territorial Cohesion, held under the German EU Presidency in Leipzig on 24 / 25 May 2007, agreed on the Territorial Agenda of the European Union (TA). This agreement culminated a process of cooperation between the Ministers aimed at establishing a common policy framework for addressing territorial matters within the European Union.	
First Action programme for the implementation of the Territorial Agenda of the European Union	The first Action Programme for the implementation of the Territorial Agenda of the European Union, was lead by is lead by five guiding principles: *(i) solidarity between regions and territories:* The adoption of this principle reinforces solidarity between States and regions and expresses the commitment to apply a cohesive and integrated approach adapted to territorial diversity when influencing or deciding on the priorities and funding of territorial and urban development policies at European Union, national, regional and local levels *(ii) multi-level governance:* The adoption of this principle expresses the commitment to structure proper channels of communication, participation and cooperation in order to make the territorial assessment, planning and management a fully democratic, transparent and efficient process	

Policy / Action	Objectives	Significance for the Green Economy Transition
	(iii) integration of policies: The adoption of this principle expresses the acknowledgement of the specific responsibilities of sectoral policy-makers and the will to cooperate with and influence them in order to ensure a stronger territorial and urban focus when conceiving and delivering the thematic policies. The goal is to better fine-tune specific thematic actions, to facilitate their coordination and to reduce undesired externalities. *(iv) cooperation on territorial matters:* The adoption of this principle recognises the importance to develop and support interregional, transnational and cross-border cooperation initiatives, aimed to actively promote territorial integration. Territorial cooperation must consider the territorial and urban dimensions of economic and social development and include the EU neighbouring countries, namely in the context of EU Programmes for European Territorial Cooperation *(v) subsidiarity:* The adoption of this principle states that the full and efficient achievement of the aims of the Territorial Agenda can best be pursued according to the institutional arrangements within each Member State, through a strong involvement of national, regional and local powers and stakeholders and a dialogue with the European Commission and the other European institutions.	
Territorial Agenda of the European Union 2020	The Ministers of the European Union responsible for spatial planning and development, on 19th May 2011, agreed on the Territorial Agenda of the European Union 2020. The main objective of the TA2020 is to provide strategic orientations for territorial development, fostering integration of territorial dimension within different policies at all governance levels and to ensure implementation of the Europe 2020 Strategy according to territorial cohesion principles. The objectives of the EU defined in the Europe 2020 Strategy for smart, sustainable and inclusive growth can only be achieved if the territorial dimension of the strategy is taken into account, as the development opportunities of the different regions vary.	

A6.3. Topic: Regional Policy

Policy / Action	Objectives	Significance for the Green Economy Transition
Cohesion Policy 2007-2013	Cohesion Policy has one single objective: to **promote the** harmonious development of the Union and its regions. The policy supports this development with a clear investment strategy that **increases competitiveness, expands employment and improves well-being, and protects and enhances the environment.** This approach provides a close link to the Europe 2020 objectives of smart, inclusive and sustainable growth. While the overall objective is the same in all Member States and regions, Cohesion Policy provides more support for the less developed EU regions in line with the Union's strong commitment to solidarity and its Treaty aim of reducing regional disparities in levels of development. Cohesion Policy will continue to **foster territorial cooperation i**n its three dimensions (cross-border, trans-national, and inter-regional). Urban problems either related to environmental degradation of social exclusion deserve a particular response and a direct involvement of the level of governments directly concerned.	
The European Fund for Regional Development (EFRD)	The ERDF aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions: **- Convergence objective** is to promote growth-enhancing conditions and factors leading to real convergence for the least-developed Member States and regions. **- Regional Competitiveness and Employment objective** aims at strengthening competitiveness and attractiveness, as well as employment, through a two-fold approach. First, development programmes will help regions to anticipate and promote economic change through innovation and the promotion of the knowledge society, entrepreneurship, the protection of the environment, and the improvement of their accessibility. Second, more and better jobs will be supported by adapting the workforce and by investing in human resources. **- European Territorial Co-operation objective** will strengthen cross-border co-operation through joint local and regional initiatives, trans-national co-operation aiming at integrated territorial development, and interregional co-operation and exchange of experience.	The ERDF action is designed to reduce economic, environmental and social problems and to correct imbalances between regions. In such a context the ERDF may facilitate the Green Economy Transition, differentiating the support provided depending on the region, that is to say: (i) by triggering Green Economy in the pre-transition regions and (ii) by supporting it in the transition regions.
The European Social Fund (ESF)	The ESF aims at improving employment and job opportunities in the European Union. It intervenes in the framework of the Convergence and Regional Competitiveness and Employment objectives.	The ESF supports the lifelong learning schemes, access to employment, social integration of disadvantaged people, etc. Even if it is not explicitly addressing the green job creation, the employment opportunities and social inclusion objectives go hand in hand with the Green

Policy / Action	Objectives	Significance for the Green Economy Transition
		Economy Transition.
Cohesion Fund	The Cohesion Fund is aimed at Member States whose Gross National Income (GNI) per inhabitant is less than 90% of the Community average. It serves to reduce their economic and social shortfall, as well as to stabilise their economy. It supports actions in the framework of the Convergence objective.	To date, the Cohesion Fund is aimed at reducing inequalities in less developed regions and at fostering their economic growth (green or not). However, it provides an excellent basis to promote the economic recovery and growth in this regions by means of a Green Economy Transition.

A6.4. Relevant sectoral policies (work in progress)

Sector	Policy / Action
Bioeconomy	Common Agricultural Policy (CAP)
	Common Fisheries Policy (CFP)
	(UN-REDD)
	EU Forest Action Plan
Energy	***General***
	Council Regulation (EU, Euratom) No 617/20101 of 24 June 2010 concerning the notification to the Commission of investment projects in energy infrastructure within the European Union and repealing Regulation (EC) No 736/96
	Commission Regulation n°833/2010 of 21 September 2010 implementing Council Regulation n°617/2010 concerning the notification to the Commission of investment projects in energy infrastructure within the European Union
	Directive 94/22/EC of the European Parliament and of the Council of 30 May 1994 on the conditions for granting and using authorizations for the prospection, exploration and production of hydrocarbons
	Regulation (EC) No 663/2009 of the European Parliament and of the Council of 13 July 2009 establishing a programme to aid economic recovery by granting Community financial assistance to projects in the field of energy
	Regulation (EU) No 1233/2010 of the European Parliament and of the Council of 15 December 2010 amending Regulation (EC) No 663/2009 establishing a programme to aid economic recovery by granting Community financial assistance to projects in the field of energy
	Renewable energy
	Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

Sector	Policy / Action
	Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport
	Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market
	Communication from the Commission to the European Council and the European Parliament of 10 January 2007, "An energy policy for Europe" [COM(2007) 1 final - Not published in the Official Journal].
	Communication from the Commission of 19 October 2006 entitled: Action Plan for Energy Efficiency: Realising the Potential [COM(2006) 545 – Not published in the Official Journal].
	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 10 November 2010 – Energy 2020 A Strategy for competitive, sustainable and secure energy [COM(2010) 639 final - Not published in the Official Journal].
	Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC [Official Journal L 114 of 27 April 2006].
	Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC [See amending act].
	Communication from the Commission of 7 December 2005 – Biomass Action Plan [COM(2005) 628 final – Official Journal C 49 of 28.02.2005].
	Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 13 November 2008 – 'Offshore Wind Energy: Action needed to deliver on the Energy Policy Objectives for 2020 and beyond' [COM(2008) 768 final – Not published in the Official Journal].
	Decision No 1230/2003/EC of the European Parliament and of the Council of 26 June 2003 adopting a multiannual programme for action in the field of energy: "Intelligent Energy -- Europe" (2003-2006) [Official Journal L 176 of 15.7.2003].
	Communication from the Commission to the Council and the European Parliament of 6 October 2006: "Mobilising public and private finance towards global access to climate-friendly, affordable and secure energy services: The Global Energy Efficiency and Renewable Energy Fund" [COM(2006) 583 final - Not published in the Official Journal].

Sector	Policy / Action
Experience economy	To be determined.
Building / construction	The Construction Products Regulation (305/2011/EU - CPR)
	Energy Efficiency in Buildings Directive 2002/91 of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings and its amendments repealed by its recast directive: Directive 2010/31 of the European Parliament and of the Council of 17 May 2010 on the energy performance of buildings and its amendments (the recast Directive entered into force in July 2010, but the repeal of the current Directive will only take place on 1/02/2012)
	Council Directive 85/337/EEC of 27 June 1985, on the assessment of the effects of certain public and private projects on the environment.
	Directive 2001/42/EC of the European Parliament and of the Council of 27 of June 2001 on the assessment of the effects of certain plans and programmes on the environment.
Manufacturing	Directive 2004/35/CE Environmental liability with regard to the prevention and remedying of environmental damage
	Communication (2005) 670 - Thematic Strategy on the sustainable use of natural resources
	Communication (2008) 397 - Action Plan for sustainable consumption and production (SCP) and sustainable industrial policy (SIP)
	Communication (2007) 379 - Small, clean and competitive, a programme to help small and medium-sized enterprises comply with environmental legislation
	Communication (2000) 265 - Promoting sustainable development in the EU non-energy extractive industry
Green Research & Eco-innovation	Communication (2004) 38 - Stimulating Technologies for Sustainable Development: An Environmental Technologies Action Plan for the European Union
	Directive 2009/125/EC - Establishing a framework for the setting of ecodesign requirements for energy related products
	Decision nº 1639/2006/CE - Establishing a Competitiveness and Innovation Framework Programme (2007 to 2013)

Sector	Policy / Action
	Regulation EC nº 66/2010 - EU Ecolabel
	COM(2011) 899 final - Eco-innovation action Plan
Water and Waste	Thematic strategy on sustainable use of natural resources
	IPPC Directive (96/61/EC)
	Water Framework Directive (2000/60/EC)
	Drinking water directive (98/83/EC)
	Urban waste water treatment directive (91/271/EEC)
	Nitrates Directive (91/676/EEC)
	Groundwater Directive (2006/118/EC)
	Marine Strategy Framework Directive (2008/56/EC)
	Common Agricultural Policy (CAP)
	Thematic strategy on sustainable use of natural resources
	Thematic strategy on prevention and recycling of waste
	IPPC Directive (96/61/EC)
	Waste Framework Directive (2008/98/EC)
	Waste Landfill Directive (1999/31/EC)
	Waste Incineration Directive (2000/76/EC)

Sector	Policy / Action
	Packaging and packaging waste Directive (94/62/EC)
	WEEE Directive (2002/96/EC)
	End of Life Directive (2000/53/EC)
Transport	Directive 2009/33/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of clean and energy-efficient road transport vehicles (Text with EEA relevance).
	Communication from the Commission to the European Parliament, the Council and the European Economic and Social Committee of 28 April 2010 - A European strategy on clean and energy efficient vehicles [COM(2010)186 final – Not published in the Official Journal].
	Commission Communication of 17 June 2009 – "A sustainable future for transport: Towards an integrated, technology-led and user friendly system" [COM(2009) 279 final– Not published in the Official Journal].
	Commission Green Paper dated 25.9.2007 "Towards a new culture for urban mobility" [COM (2007) 551 final - not published in the Official Journal].
	Commission White Paper of 28 March 2011: "Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system" [COM (2011) 144 final – Not published in the Official Journal].
	White Paper submitted by the Commission on 12 September 2001: "European transport policy for 2010: time to decide" [COM(2001) 370 final - Not published in the Official Journal].
	Decision No 661/2010/EU of the European Parliament and of the Council of 7 July 2010 on Union guidelines for the development of the trans-European transport network.
	Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport.
	Communication from the Commission to the European Parliament and the Council, of 20 November 2002, "A European Union strategy to reduce atmospheric emissions from seagoing ships" [COM (2002) 595 final, Volume I - Not published in the Official Journal].
	Directive 2002/84/EC of the European Parliament and of the Council of 5 November 2002 amending the Directives on maritime safety and the prevention of pollution from ships.

Sector	Policy / Action
	Regulation (EC) No 443/2009 of the European Parliament and of the Council of 23 April 2009 setting emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles (Text with EEA relevance).
	Regulation (EU) No 510/2011 of the European Parliament and of the Council of 11 May 2011 setting emission performance standards for new light commercial vehicles as part of the Union's integrated approach to reduce CO2 emissions from light-duty vehicles (Text with EEA relevance).
	Regulation (EC) No 595/2009 of the European Parliament and of the Council of 18 June 2009 on type-approval of motor vehicles and engines with respect to emissions from heavy duty vehicles (Euro VI) and on access to vehicle repair and maintenance information and amending Regulation (EC) No 715/2007 and Directive 2007/46/EC and repealing Directives 80/1269/EEC, 2005/55/EC and 2005/78/EC (Text with EEA relevance).

A6.5. Linking sustainability to sectoral policies

Within GREECO, Green Economy is to be understood as an operationalisation of Sustainable development. Sustainable development (SD) has become the core on the political agenda of both international organisations and national government. When it comes to the EU, all EU Member States (and many other countries) have adopted some form of a national SD strategy or are in the process of its preparation. In addition, numerous regions and municipalities follow strategic frameworks more or less explicitly linked to SD (e.g. Regional or Local Agenda 21). In this context, SD has over years influenced numerous thematic or sectoral strategies at all political-administrative levels, in areas such as climate change and energy, biodiversity, transport, land use and agriculture, urban development, natural resources, poverty reduction, or health. In addition, it is also linked to currently popular concepts such as resource efficiency, governance, societal well-being or quality of life. In fact, most sustainability issues are cross-sectoral and, as such, require responses from a number of different sectors and government departments. Below, an overview of examples of how different policy areas (horizontal axis) could contribute to sustainable development issues[2] (vertical axis):

Policy Areas / **Issues**	**Agriculture and Fisheries** (*Bioeconomy*)	*Energy*	**Tourism, etc.** (*Experience Economy*)	**Industry** (*Manufacturing, Building / Construction*)	*Green research & Eco-innovation*	**Environment** (*Water & Waste*)	*Transport*	**Develop.**	**Economics and Industry**	**Finance**	**Foreign Affairs**	**Social and Interior**
1. Economic development, sustained and sustainable economic growth	Sustainable agriculture	Energy efficiency	Ecotourism	Sustainable production. Sustainable construction.	Technology base and entrepreneurship	Decouple economic growth from waste generation.	Transport intensity	Growth and fair distribution of its benefits	Competition and fraud control	Incentivesfor re-investing profits	Partnerships, peaceful cooperation agreements	Gender equity, non-discrimination
2. Poverty / social exclusion	Employment	No energy poverty	Employment				Affordable accessibility fo non-car owners	Poverty reduction, food self sufficiency	Full employment	Income distribution		Access to health care for poor. Poverty eradication

[2] *Source:* Adaptation of the table from "Peer Review Improvement through Mutual Exchange on Sustainable Development: A guidebook for peer reviews of national sustainable development strategies (2006)". Please note that the policy areas where the eight priority sectors of GREECO would fall under, are highlighted in **green**.

Policy Areas / Issues	Agriculture and Fisheries (Bioeconomy)	Energy	Tourism, etc. (Experience Economy)	Industry (Manufacturing, Building / Construction)	Green research & Eco-innovation	Environment (Water & Waste)	Transport	Develop.	Economics and Industry	Finance	Foreign Affairs	Social and Interior
3. Ageing of society					Redirecting money from education to care		Safeguarding elderly mobility		Regulating working conditions	Secure pensions	Immigration?	Elderly participation opportunities
4. Public Health	Healthy diets	Clean household energy	Healthy lifestyle	Reduce work accidents	Public health education	Clean water	Reduce accidents and pollution	Sanitation, clean water supply	Affordable pharmaceuticals	Incentives for healthy jobs and lifestyles	Peace	Full health care cover affordable
5. Climate Change and Energy	Use of waste energy, energy plants	Energy sector energy efficiency	Awareness, efficiency orientation. GHG emission reduction.	Energy efficiency (in buildings) Emission & waste reduction	Awareness, efficiency orientation,efficiency technologies, sustainable fossil substitutes	Efficiency orientation,efficiency technologies	Stabilise transport emissions and volumes	Support for decentralised and non-fossil energy supply	GHG emission trends, energy intensity trends	Energy taxation	Energy supply security	Risk preparedness, public support for the poor
6. Consumption and production patterns	Resource intensity of food production	Energy intensity of production and consumption	Planning and management to reduce consumption of resources	Sustainable consumption and production.	Innovation towards sustainability in demand and suppy	Water intensity	Transport intensity of consumer goods (like food miles)	Sufficient and secure supply of safe food and drinking water	Resource intensity of production, standard of living	Disposable income and minimum income		Dignified minimum income levels
7. Management of natural resources	Soil fertility preservation, ground water protection	Reducing consumption of non-renewables	Biodiversity and ecosystem services.	Resource efficiency and productivity Material reuse	Resource use efficiency technologies, new use patterns, biodiversity preservation	Reduction of water pollution. Prevention and recycling of waste.	Energy efficiency, no more biotope fragmentation	Sustainability standards for business (domestic and foreign)	Minimising resource consumption, dematerialisation	Resource taxes	Fair prices, peaceful exchange	Access to natural resources

Policy Areas / Issues	Agriculture and Fisheries (*Bioeconomy*)	*Energy*	Tourism, etc. (*Experience Economy*)	Industry (*Manufacturing, Building / Construction*)	*Green research & Eco-innovation*	Environment (*Water & Waste*)	*Transport*	Develop.	Economics and Industry	Finance	Foreign Affairs	Social and Interior
8. Transport	Food miles	Transport means of energy carriers	Public transport		Substituting communication for transport, transport efficiency	Safe transport	Average speed of transport, speed limits, congestion charges	Access to public infrastructure and markets	Vulnerability due to transport dependency, transport intensity of supply	Transport charges, taxes, etc.	Maritime safety	Accessibility, public mobility
9. Good governance	Subsidies	Stable, but steadily increasing prices						Accountability	Level of corruption and corruptibility	Tax loopholes, effective taxation	Fair partnerships	Equity of rights and civil protection

A7. An example of renewable resource accounting at the NUTS3 level (DRAFT PAPER)

A7.0 Introduction

A7.1 Wind Energy Potential in Europe

The overall goal for the exercise is to develop a GIS based model with flexible parameters, which can be used to assess a specific region's current utilization of its potential wind energy. The model is based upon different GIS layers, from which the input values on these layers can be changed as the current technological, political and economic situation changes. The evaluation of wind energy potential combines the physical wind energy potential (primarily based upon average wind speed) with other parameters, which will affect how much wind energy can be taken advantage of. These additional parameters include the costs for wind energy, land use and planning restrictions, and nature reservations.

The model for the analysis of wind energy potential in Europe is seen as both an assessment and a planning tool. The model can be used to determine how much of our wind resources can and are being utilized in order to make an assessment over how "green" the individual regions and states are. As a planning tool, the model can be used to help determine the best and most logical areas for wind energy development, as well as to help assess how planning and support decisions will affect the actual wind energy potential in a specific region.

A7.2 Evaluation Methodology

A7.2.1 The analysis process

The evaluation of the wind energy potential is conducted through a multi-layer GIS raster based analysis. The process involves combining the physical wind potential with land use planning and environmental restrictions as well as economic considerations. Each aspect is represented by a specific raster layer, where the individual raster cells in the layer have a specific value as being either promoting or restrictive to wind energy. These layers are combined to provide an analysis on the wind energy potential. The advantage for using a multi-layer based analysis is that the individual layers it provides a simple, quick and flexible spatial analysis of wind energy potential and current utilization. The individual layers can be updated as changes or improvements in the physical data occur, or as social, political or economic conditions change.

The analysis process is illustrated in Figure 1. The analysis begins with the average wind velocity in Layer 1. The average wind velocity layer represents the total wind energy reserves available for Europe. However, these reserves can be divided up in to ***proven reserves***, where wind is available under current conditions, and ***marginal reserves***, where wind is not environmentally, politically, socially or economically available. The rest of the analysis focuses on the separation of the proven and marginal wind reserves.

The first step is to convert the wind velocity to the projected production for each area, with the unit being in MWh per installed MW (Layer 2). The process then goes through a number of steps which in essence delineates where wind is and is not economically or environmentally possible to take advantages of (Layers 3 – 6). These layers contain a weighting factor from 0 to 1, with 0 representing the areas where wind production is not possible and 1 where 100% of the area can be used for wind production. Finally, the data derived through this process can be then compared with the actual production data to determine how much of a region's proven wind reserves are being utilized, and the amount of growth in wind generation that will be possible. The following section describes each step in the analysis procedure.

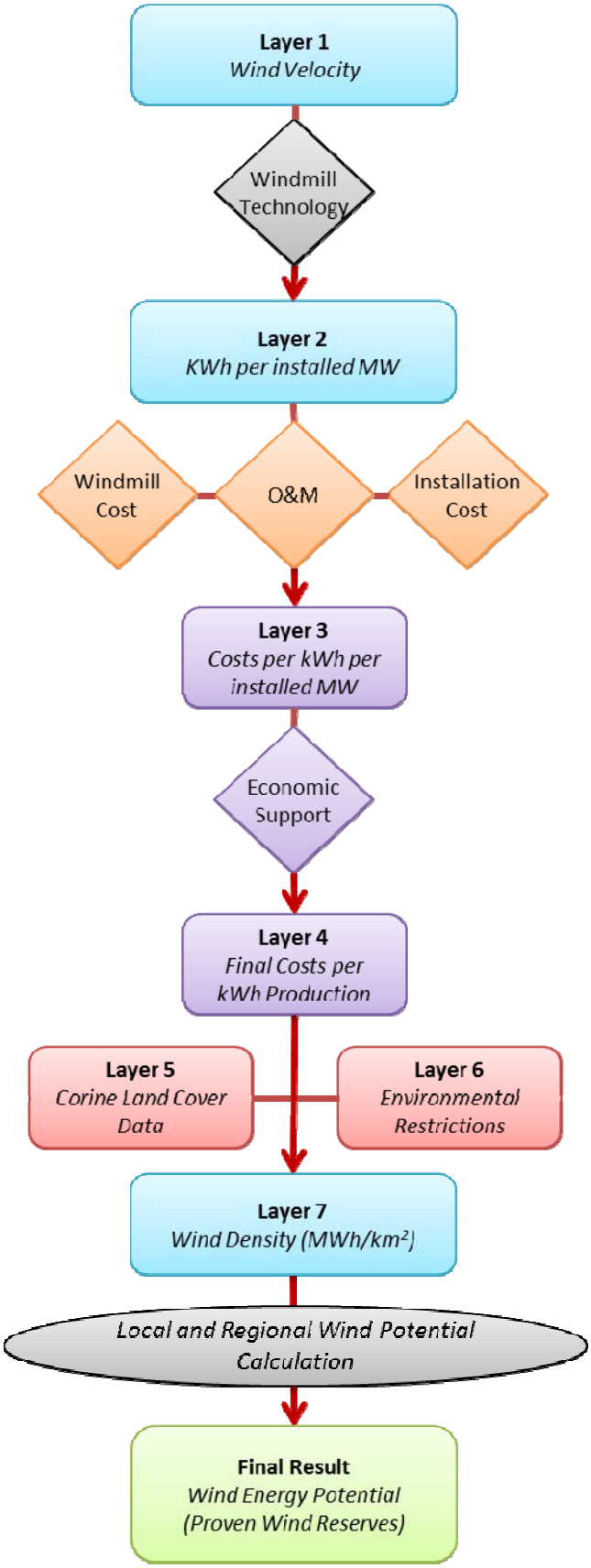


Figure 1. ***Diagram of the GIS raster based analysis. The red lines and arrows show the forward process towards the final assessment.***

The evaluation of wind energy continues based upon the economics of wind power (Fig. 1). Layer 6 is a product of the physical wind density (Layer 2) combined with the current wind technology and costs, as well as access to infrastructure (Layer 5). This produces a raster layer on wind cost per kWh. This layer shows the estimated price for wind power production in any specific area, and allows for the analysis as to whether wind is or is not economically viable. If the wind reserves are economically marginal, then they are masked out.

The next step in the evaluation is the consideration of local decisions that influence the wind power potential, including political decisions on wind. Here, local planners can make economic/political decisions which alter in inputs in layers 2, 3 and 4, which can in turn alter the wind potential for a local area (Fig. 1). In addition, local and national decisions can be made upon economic support (Layer 7) for wind power production. These considerations will affect whether the wind energy reserves in a specific area remain proven or marginal.

A7.2.2 Layer Evaluation Process

A7.2.2.1 Evaluation of Wind Velocity Data (Layer 1):

The evaluation of the physical wind velocity for European countries in this study is based upon the European Environmental Agency's (EEA) technical report "Europe's onshore and offshore wind energy potential: An assessment of environmental and economic constraints" (EEA 2009). The average wind speed calculated in the EEA technical report is based upon wind speed data from the European Centre for Medium-range Weather Forecast (ECMWF). The wind speed data was collected at 10m height, and averaged for the period 2000-2005 for the map. This data was available in 0.25° grids (approximately 15x20 km). As the ECMWF does not collect wind data for other heights, the average wind speeds must be converted to hub height (80m for on-shore and 120m for off-shore). The conversion process considered topography, terrain roughness in order to extrapolate the wind speed from 10m height to hub height. The Corine Land Cover database was used to help estimate surface roughness. As the Corine raster database is in 250x250m grids, the resultant average wind speed map contains raster values of the same size, even though the wind measurement data is on a scale of almost 100 times that. For specific details of the wind speed extrapolation from 10m to hub height, please see the EEA technical report (EEA 2009).

The EEA wind map also removed a number of areas for off-shore wind potential due to political, environmental and technical limitations. These areas included nature reserves (including Natura 2000 areas), development restrictions, military areas, oil and natural gas exploration, shipping routes and sea depths of more than 50m (EEA 2009).

A7.2.2.2 Evaluation of Wind Capacity per Installed MW (Layer 2):

This layer is an assessment of how much wind energy a single windmill can produce per installed capacity with respect to its geographic location. This is calculated from the power velocity curves, which show the amount of energy is produced at different wind speeds for existing wind turbines (EEA 2009). These curves are then combined with average wind speed data, where there is a generalized yearly wind speed distribution (the amount of time different wind speeds are observed for a specific average wind speed). This produces a load hour amount for each wind speed. This is multiplied by a factor for down-time due to maintenance. The factors are 0.81 (indicating 19% down-time) for off-shore mills and 0.83-0.90 (indicating 10-17% down-time) for on-shore, with the difference depending upon how easy the access to the wind mills is (with a factor of 0.90 being in lowland areas with easy access) (EEA 2009).

A7.2.2.3 Costs per kWh (Layer 3):

This layer represents the costs associated with the purchasing, installation and operation and maintenance during the lifetime of the turbine. This cost is combines with the wind potential data in Layer 2 in order to give an estimate of the costs per kWh of total wind production (see Figure 1). The purchasing are determined by the overall windmill market and do not vary significantly geographically. On-shore installation costs do not vary significantly, apart from mountainous areas, where the terrain is rougher and access to the electricity grid could be longer. However, often it is in this remote, rugged terrain that has the lowest gross wind resources. Installation costs for off-shore wind mills, however, vary significantly. These costs are dependent upon distance from the shore, from the nearest grid connection, and the depth of the water. In off-shore production, connection to the grid represents a substantial cost in any project; it is estimated that off-shore grid connection costs represent an average of 25% of the total costs for establishing an off-shore wind park (EEA 2009).

In this study, the costs are estimated based upon the data presented in the EEA technical report (EEA 2009). The EEA based its estimates on the average price and installation costs for turbines, with the costs on-shore being 1000 €/kW installed capacity, and 1200-2000 €/kW for off-shore windmills. The difference in the costs is the extra foundation and installation costs required for off-shore windmills, with the deeper the water, the more expensive installation will be (EEA 2009). In waters over 30m depth, the costs approach 2000 €/kW, which is nearly double that of on-shore windmills. These costs can be projected over the estimated lifetime of the windmills – 20 years – either with or without a discount rate added to the costs. In this study, no discount rate was used.

Operational and maintenance costs for this study are based upon the EEA technical report, which estimates these to be 0.012 to 0.015€/kWh for both on-shore and off-shore (EEA 2009). This averages to be about 4% of the total costs over the estimated 20 year lifespan of the windmills. These estimates are based upon the past experiences in Denmark, Great Britain, Germany and Spain.

A7.2.2.4 Total Costs per kWh wind production (Layer 4):

The total costs for wind production is based directly on the results from Layer 3. However, this layer also includes the subsidies that national governments provide for wind-produced electricity. By including the subsidies, it can be determined for which geographical areas wind production then becomes economically viable compared to the price of other electricity generation sources. According to the EEA Wind Energy Technical Report, this price level in 2009 was at 0.06 €/kWh (EEA 2009).

Once the costs are calculated, the areas where the costs exceed the competitive price level - 0.06 €/kW used in this study - are removed from consideration, as they represent marginal wind resources at this time. Those areas where the cost is under the completive price level represent the economically proven wind resources. The removal of the marginal wind resources is done by giving these raster cells a weighting of 0, where as the economically proven wind resources are given a weighting of 1.

A7.2.2.5 Evaluation of Land Cover (Layer 5):

This layer is considered a restrictive layer; the purpose of this layer is to mask out the on-shore areas which windmills cannot be established (Fig. 1). The different land cover types are all given an individual weighting factor between 0 and 1, depending on how much of the land area can be used for placement of wind mills. A weighting factor of 1 means that 100% of the area can be used to meet the windmill density used in the calculation in Layer 2, whereas 0 means that it is not possible to establish windmills on that type of land cover. The land cover for this project is based upon generalized land use as mapped out on the Corine Land Cover database (Bossard et al. 2000). The land cover data used is the latest database from 2011. The land cover is divided up into 44 different classifications. Table 1 shows the different classifications used and their individual weighting factors.

Local political and environmental decisions can influence this layer through the land cover weighting factors (Fig. 1). For example, if a municipality decides that wetlands can have windmills, they can change the weighting factor from 0 to 1, allowing for windmill development in these areas. In addition, the weighting factor can be changed to values between 0 and 1 based upon local land use decisions. For example, it could be decided locally that some percentage of forested land could have wind mills erected on it, but not all. This would be based upon strategic decisions at the local and even national level.

Table 3. ***Land cover classification and weightings, based upon the CORINE land cover database (Bossard et al. 2000).***

	Level 1	Level 2	Level 3	Weighting
1	Artificial surfaces	Urban fabric	Continuous urban fabric	**0**
2	Artificial surfaces	Urban fabric	Discontinuous urban fabric	**0**
3	Artificial surfaces	Industrial, commercial and transport units	Industrial or commercial units	**0.1**
4	Artificial surfaces	Industrial, commercial and transport units	Road and rail networks and associated land	**0.1**
5	Artificial surfaces	Industrial, commercial and transport units	Port areas	**0.1**
6	Artificial surfaces	Industrial, commercial and transport units	Airports	**0**
7	Artificial surfaces	Mine, dump and construction sites	Mineral extraction sites	**1**
8	Artificial surfaces	Mine, dump and construction sites	Dump sites	**1**
9	Artificial surfaces	Mine, dump and construction sites	Construction sites	**1**
10	Artificial surfaces	Artificial, non-agricultural vegetated areas	Green urban areas	**0**
11	Artificial surfaces	Artificial, non-agricultural vegetated areas	Sport and leisure facilities	**0**
12	Agricultural areas	Arable land	Non-irrigated arable land	**1**
13	Agricultural areas	Arable land	Permanently irrigated land	**1**
14	Agricultural areas	Arable land	Rice fields	**1**
15	Agricultural areas	Permanent crops	Vineyards	**1**
16	Agricultural areas	Permanent crops	Fruit trees and berry plantations	**1**
17	Agricultural areas	Permanent crops	Olive groves	**1**
18	Agricultural areas	Pastures	Pastures	**1**
19	Agricultural areas	Heterogeneous agricultural areas	Annual crops associated with permanent crops	**1**
20	Agricultural areas	Heterogeneous agricultural areas	Complex cultivation patterns	**1**
21	Agricultural areas	Heterogeneous agricultural areas	Land principally occupied by agriculture, with significant areas of natural vegetation	**1**
22	Agricultural areas	Heterogeneous agricultural areas	Agro-forestry areas	**1**
23	Forest and semi natural areas	Forests	Broad-leaved forest	**0**
24	Forest and semi natural areas	Forests	Coniferous forest	**0**

25	Forest and semi natural areas	Forests	Mixed forest	**0**
26	Forest and semi natural areas	Scrub and/or herbaceous vegetation associations	Natural grasslands	**1**
27	Forest and semi natural areas	Scrub and/or herbaceous vegetation associations	Moors and heathland	**1**
28	Forest and semi natural areas	Scrub and/or herbaceous vegetation associations	Sclerophyllous vegetation	**1**
29	Forest and semi natural areas	Scrub and/or herbaceous vegetation associations	Transitional woodland-shrub	**0**
30	Forest and semi natural areas	Open spaces with little or no vegetation	Beaches, dunes, sands	**0**
31	Forest and semi natural areas	Open spaces with little or no vegetation	Bare rocks	**1**
32	Forest and semi natural areas	Open spaces with little or no vegetation	Sparsely vegetated areas	**1**
33	Forest and semi natural areas	Open spaces with little or no vegetation	Burnt areas	**1**
34	Forest and semi natural areas	Open spaces with little or no vegetation	Glaciers and perpetual snow	**0**
35	Wetlands	Inland wetlands	Inland marshes	**0**
36	Wetlands	Inland wetlands	Peat bogs	**0**
37	Wetlands	Maritime wetlands	Salt marshes	**0**
38	Wetlands	Maritime wetlands	Salines	**0**
39	Wetlands	Maritime wetlands	Intertidal flats	**0**
40	Water bodies	Inland waters	Water courses	**0**
41	Water bodies	Inland waters	Water bodies	**0**
42	Water bodies	Marine waters	Coastal lagoons	**1**
43	Water bodies	Marine waters	Estuaries	**1**
44	Water bodies	Marine waters	Sea and ocean	**1**

A7.2.2.6 Environmental Restrictions (Layer 6):

This layer represents the areas which environmental restrictions prevent the establishment of wind energy in order to take advantage of wind energy. These restrictions occur at the national and international level. For the purpose of this study, the environmental restrictions are based upon EU Natura 2000 sites, which represent the nature protection areas aimed at protecting Europe's most threatened habitats and species. These sites are managed by the individual member states, and do not prevent development. However, because these are sites of specific protection of sensitive ecosystems, it is presumed that because windmills could have a negative impact on these sensitive ecosystems, wind energy would not be able to be utilized in these areas. Therefore, all Natura 2000 area, both on-shore and off-shore are given a zero weighting value, removing the wind potential from consideration in these areas. However, because the administration of these sites is at the nation state level, local decisions could be made on certain types of Natura 2000 sites, where windmills are shown to have little or no impact on the sensitive ecosystem, to allow the development of wind energy at these specific sites. Thus, flexibility within this layer will allow for future local accommodation to the environmental restrictions with respect to the Natura 2000 sites.

2.2.7 Wind Density (Layer 7):

This layer represents how much wind power can be produced per square kilometre. This layer is based upon the calculations from Layer 2 (in kWh/installed MW). However, the areas which are not economically or environmentally viable (the restrictive layers 4, 5, and 6) are removed

from consideration through a simple multiplication of the weighting factor from these layers; a weighting of 0 in essence results in a wind density value of 0.

The remaining rasters in the layer will have a positive value based upon the physical wind potential in kWh/installed MW. This is then converted based upon the turbine size and the number of windmills which can be installed on each square kilometre of land. For this study, the wind density is calculated based upon the EEA technical report (EEA 2009). The turbine size for the calculations assumes an average rated turbine capacity of 2MW on land and 2 to 6 MW off-shore, increasing to 10MW by 2030. The turbine density is set at 5 turbines per km^2 on-shore, and 1.2 turbines per km^2 for off-shore. The windmill density factor is then included in the calculations, giving a wind density unit of MWh/km^2.

A7.2.2.8 Local Decisions:

Local decisions play an important role in the Layers 4, 5, 6 and 7. These layers can be affected by policy decision which can significantly alter the amount of provable wind resources that a region has. In layer 4, it is the subsidy amount for wind power that is decided upon – any added subsidy will bring more wind resources from being considered marginal to proven reserves. In land use (Layer 5), local planning decisions can also be made in effect to which land areas can be used for wind power production. For example, one region could decide that it is acceptable to put wind power in urban industrial areas, whereas in another region they might decide that it is not allowed. The same applies for environmental protection areas (Layer 6), where if it is proved that windmills will not harm the ecosystem, a local authority may allow them in the area, where as previously they were not allowed. Finally, local planning authorities also have an impact on windmill density. Changes in the zoning restrictions, such as distance from buildings or between windmills, can be changed (either higher or lower) resulting in a change in windmill density and thus wind power density.

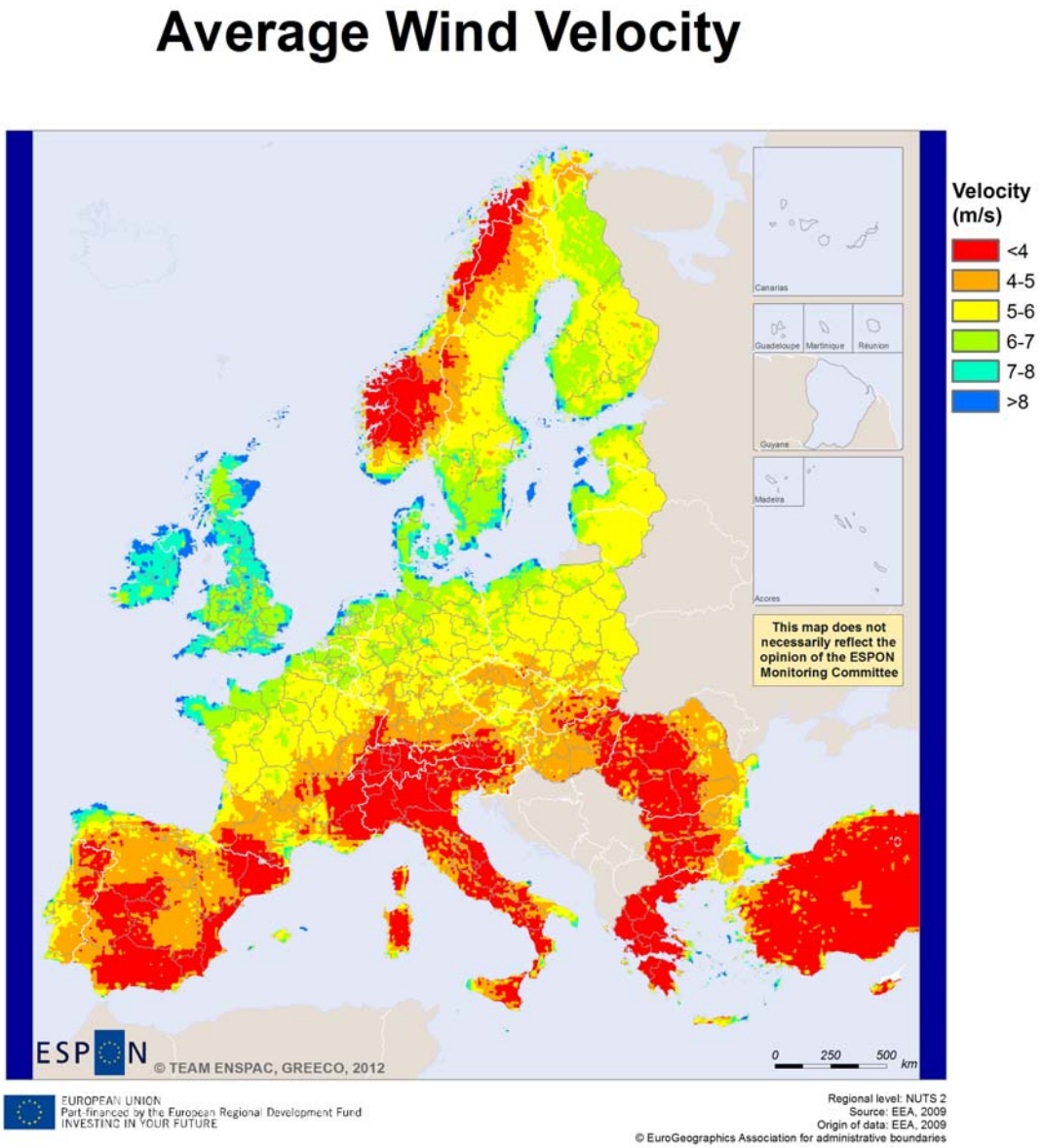
A7.2.2.9 Energy Comparison and Final Result:

This is the final step in the process (Fig. 1). Here, each region's wind potential is calculated based upon the available wind density. This provides a final estimate of the economic and environmental proven reserves. These totals can then be compared to actual wind production to see what portion of the potential proven reserves are being utilized from wind power.

A7.3 Wind Resource Analysis in Europe

A7.3.1 On-shore Wind Reserves

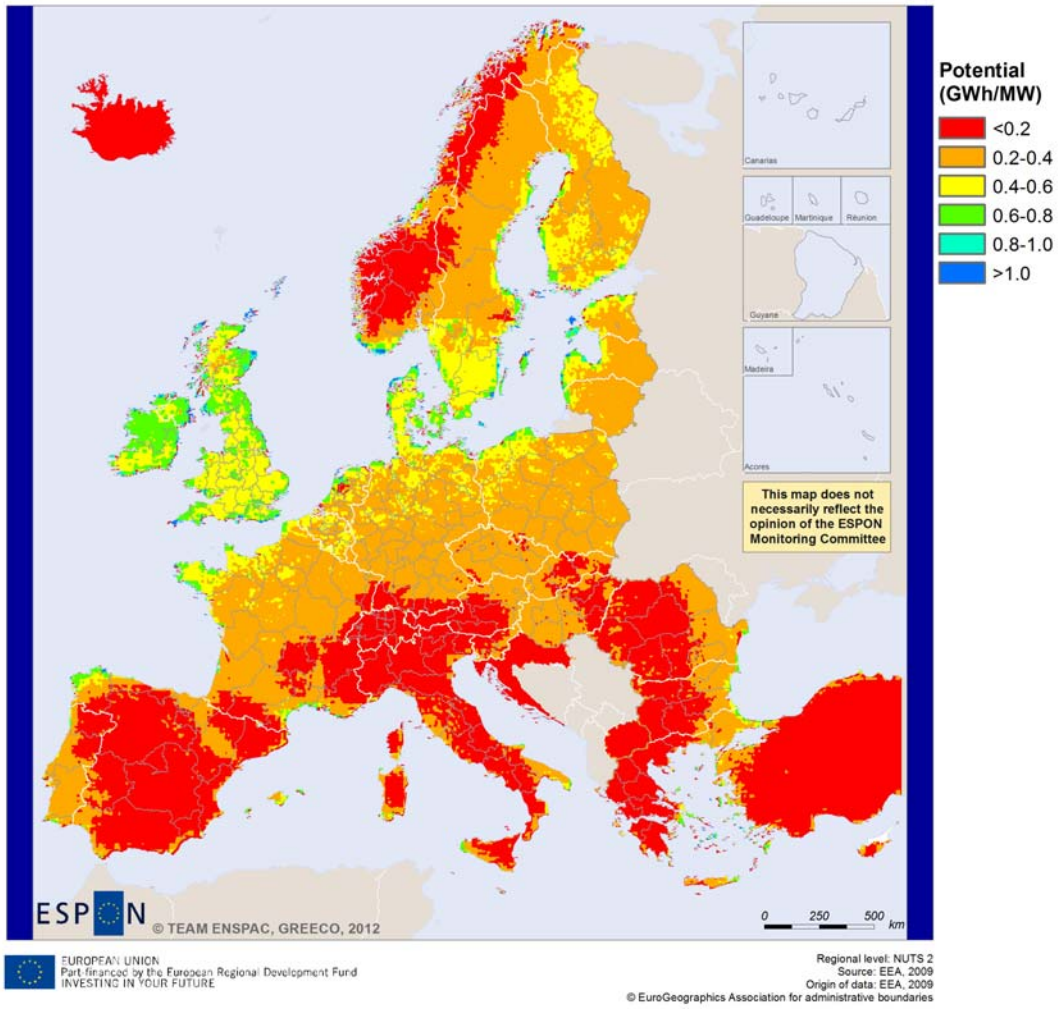
The on-shore wind reserve estimations for Europe are based upon the wind velocity map developed for the European Environmental Agency (EEA 2009). This represents Layer 1 in the model and is shown in Map 1. The former Yugoslavia states (except for Slovenia) are not included in this study.



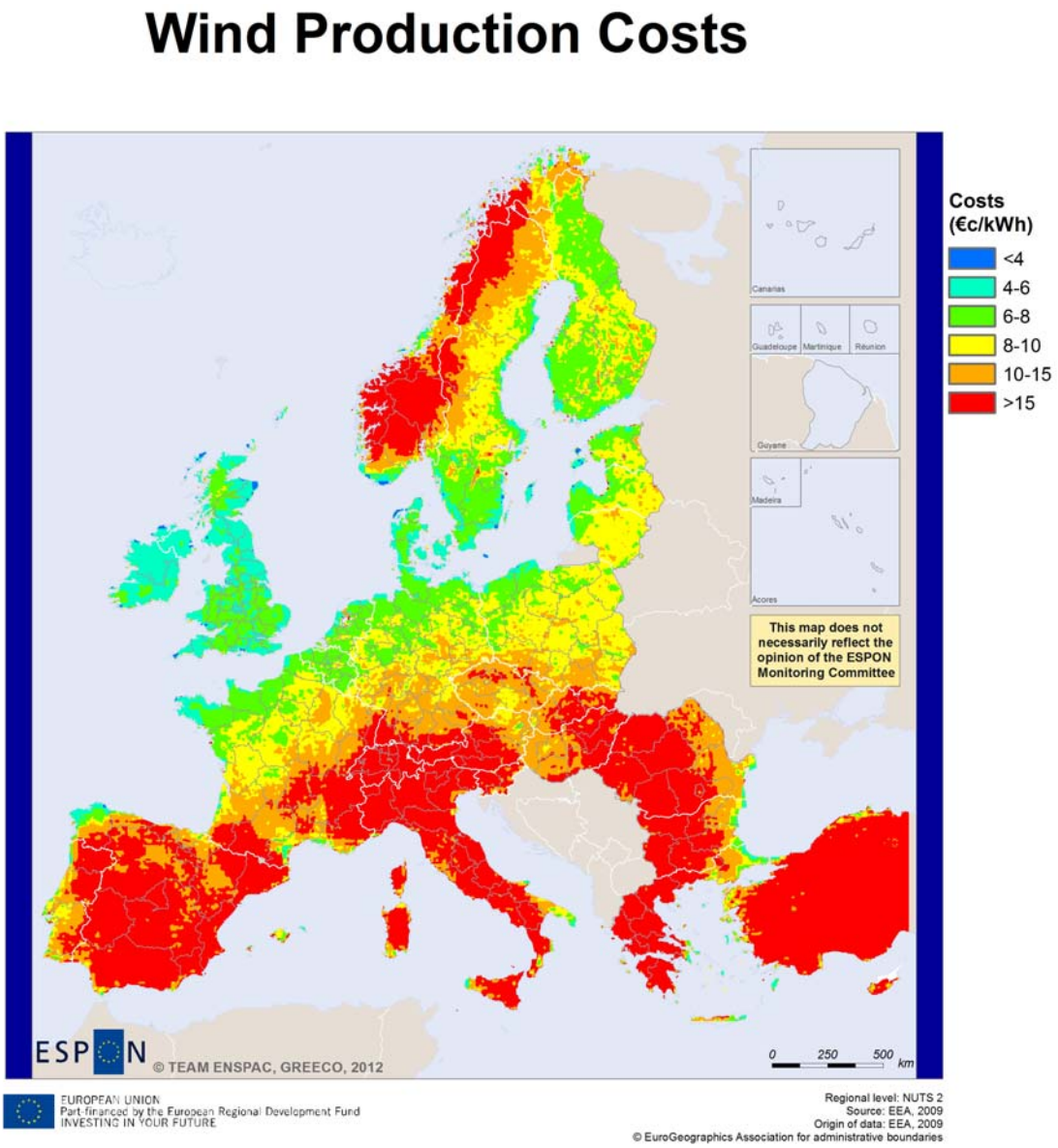
Map 1. ***Average wind velocity in Europe from 2000-2005, as modelled at an 80m hub height. The data is from EEA (2009).***

The second step in the process is to derive the amount of wind production, in kilowatt hours, per MW of installed capacity. This is based upon the load hour calculations for wind turbines based upon the average wind speed, and is shown in Map 2. It should be noted that this is based upon a statistical distribution of wind velocity for each average wind velocity category (EEA 2009).

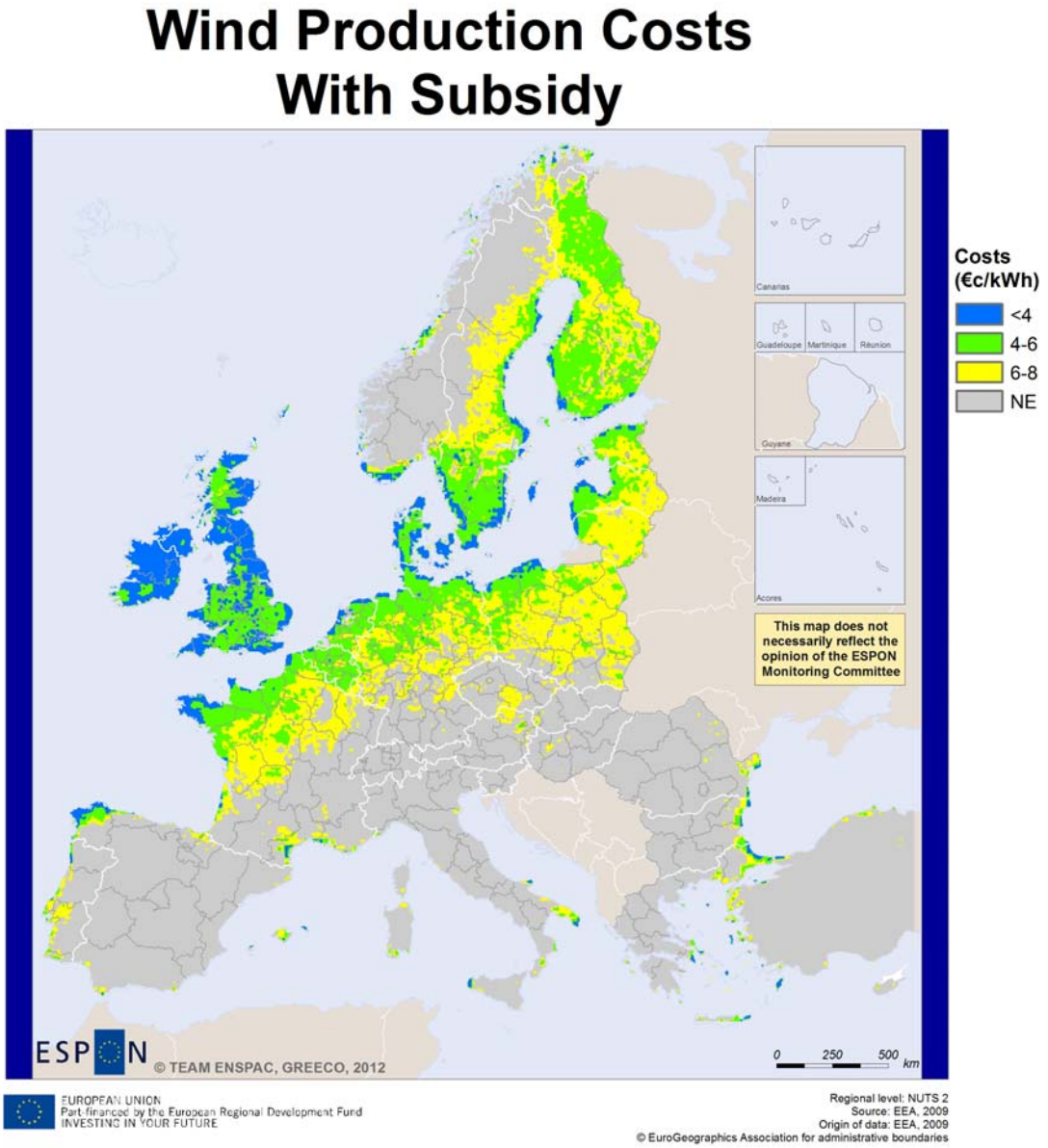
Wind Potential from Installed Capacity



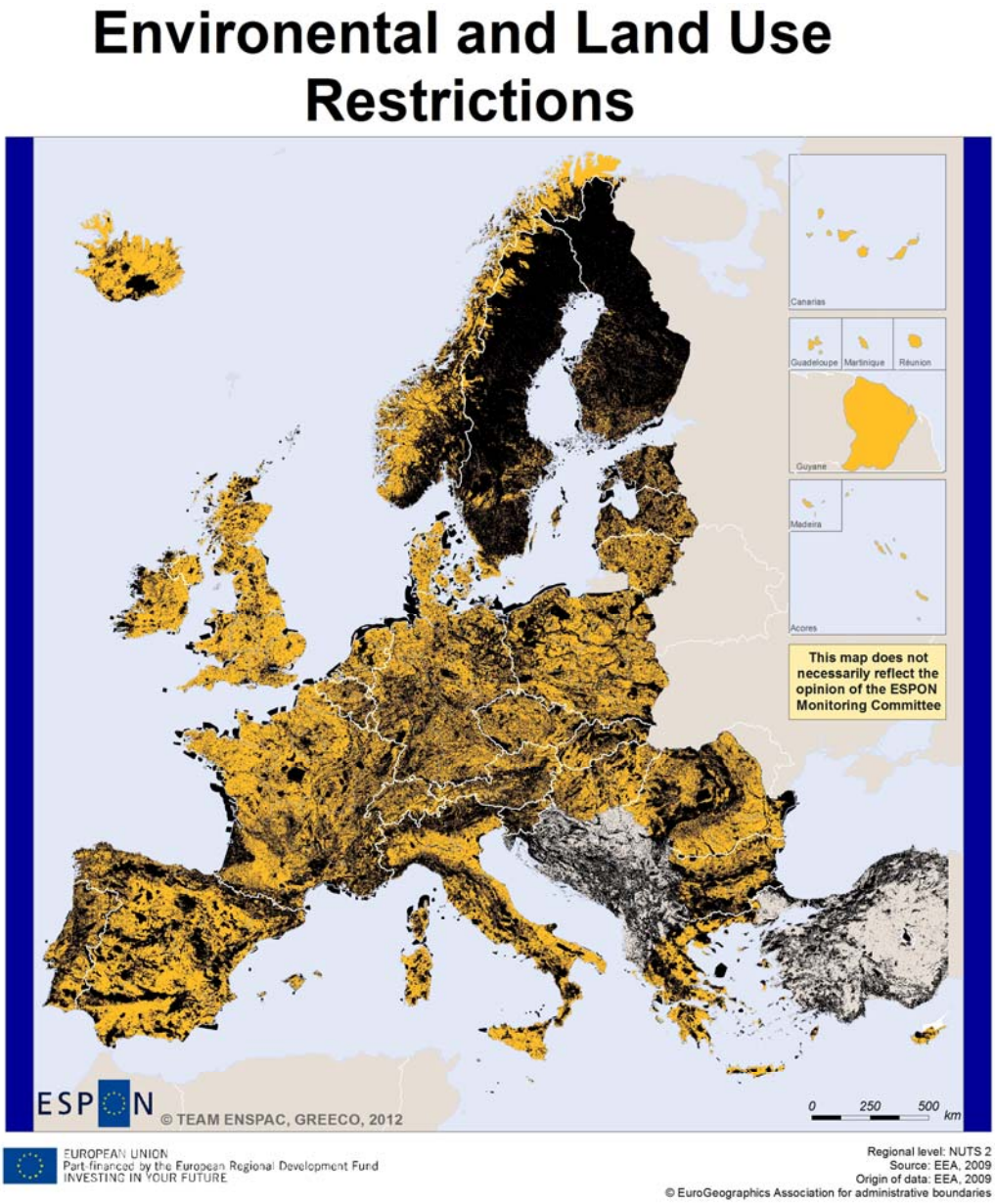
Map 2. ***The wind potential (GWh) per installed capacity (MW). This is Layer 2 in the analysis model***



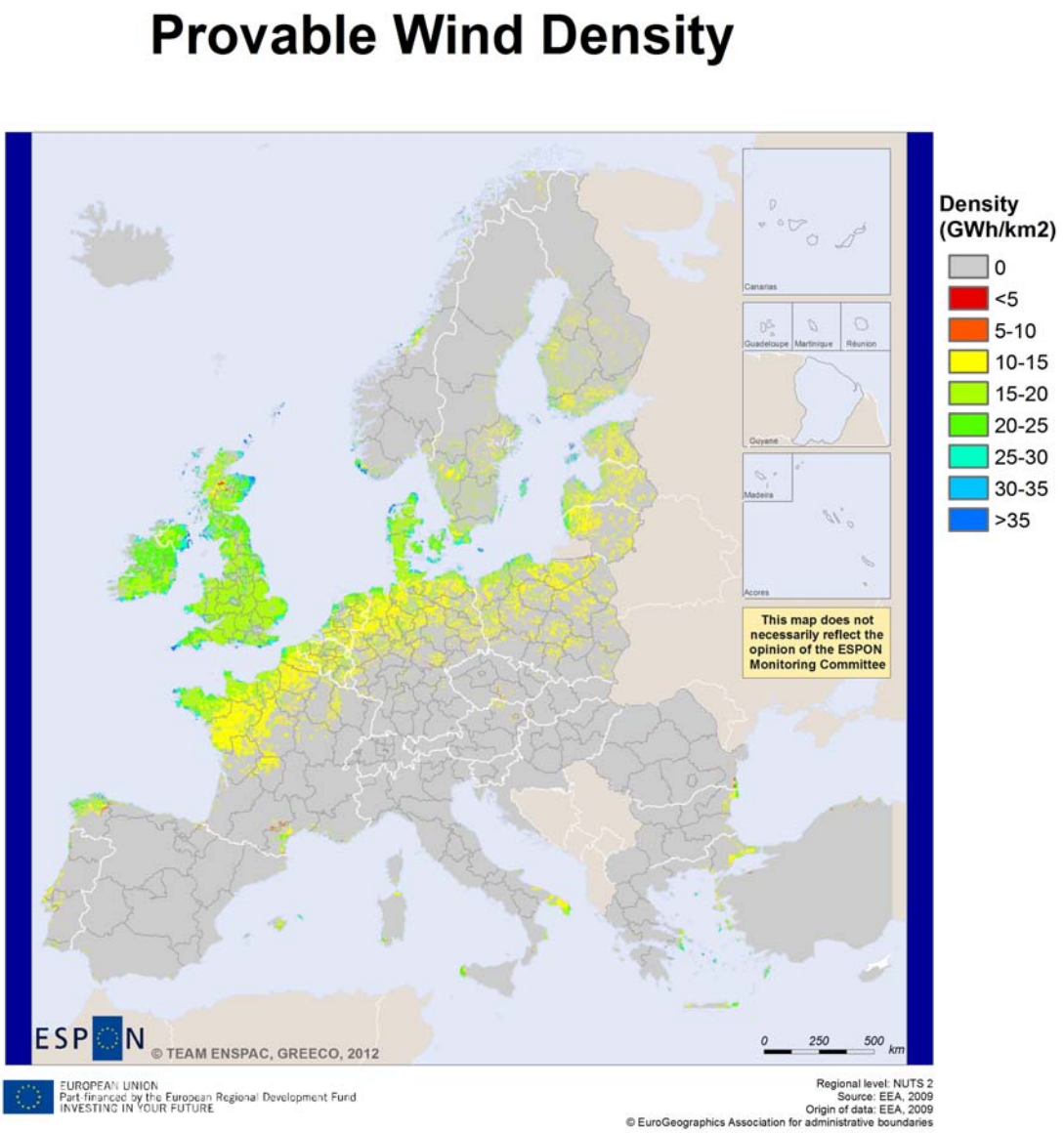
Map 3. ***Total costs for on-shore wind power development. This is Layer 3 in the analysis model***



Map 4. ***Wind power costs when a general 2 €cent per kWh subsidy is added, reducing the costs. The areas in grey represent the area where wind power is over 8 €cent per kWh, and not considered economic, represented by the grey areas labelled NE. This is Layer 4 in the model analysis.***



Map 5. ***Combined land use and environmental restrictions (Layers 5 and 6). The areas in black show the areas where it is not possible, due to these restrictions to put up windmills.***



Map 6. ***Provable wind energy reserves, given as Wind Density (GWh/km^2), after all cost, land use and environmental restrictions are removed from consideration (as shown by the areas without colour). This is Layer 7 in the model analysis***

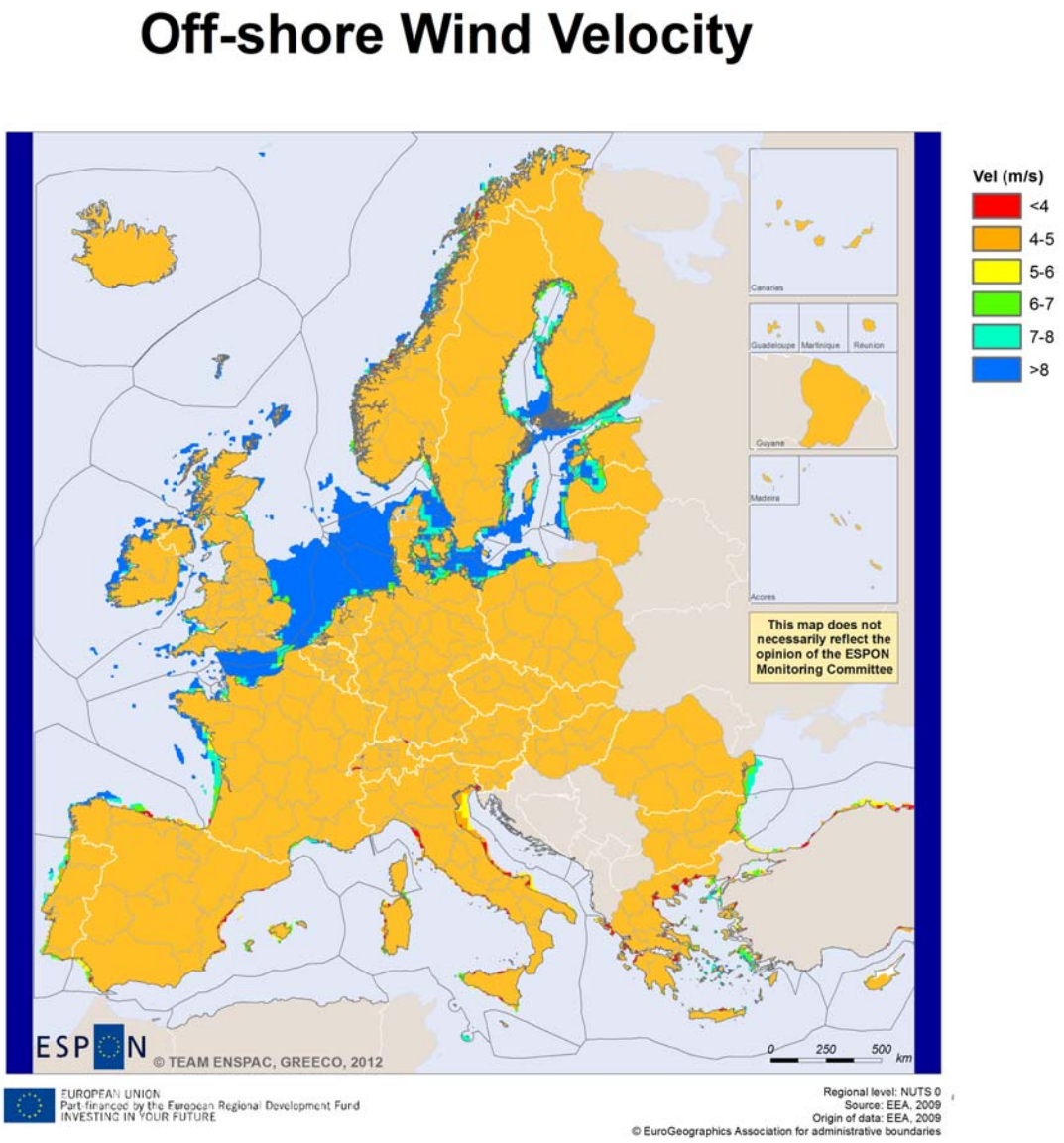
Table 4. ***Total on-shore wind power potential (given in TWh/year).***

Country	6 €c	7 €c	8 €c	9 €c	10 €c	Physical/ Eco-logical Reserves	Total Reserves
Finland	102	261	364	386	393	413	4574
Norway	105	130	169	217	259	670	1780
Latvia	82	154	253	336	346	361	920
Sweden	322	424	497	550	567	673	5027
Denmark	500	510	513	519	519	599	802
Estonia	66	118	190	200	202	221	688
Lithuania	31	87	225	436	464	471	797
Ireland	885	893	897	900	901	943	1416
The Netherlands	136	284	328	329	329	341	518
UK	3162	3232	3251	3257	3261	3462	4600
Germany	289	811	1236	1552	1782	2120	3914
Lichtenstein	0	0	0	0	0	1	1
Luxembourg	0	3	6	13	14	14	29
Poland	139	321	816	1660	1865	2033	3726
Belgium	54	195	227	228	228	230	434
Slovakia	0	0	1	3	9	105	261
Czech Republic	0	0	8	66	124	342	623
Switzerland	0	0	0	0	0	53	95
Slovenia	0	0	0	0	0	27	92
Romania	8	10	12	22	52	529	976
Austria	0	1	10	32	53	189	367
Hungary	0	0	1	4	16	303	533
Cyprus	0	0	0	1	2	26	41
Bulgaria	12	16	26	39	59	221	520
Turkey	23	43	67	98	117	784	1354
Italy	34	51	83	113	135	616	1050
Greece	44	58	72	81	89	307	545
Portugal	16	25	47	79	100	269	602
Spain	105	136	161	184	211	960	1806
France	599	1139	1786	2294	2534	3191	5065
Total	6712	8904	11,245	13,596	14,631	20,488	43,156

Note: The columns represent the total provable reserves at different cost limits, in Euro cents (€c) per kWh. This includes removing the area with land use and environmental restrictions from consideration. The physical/ecological reserves column includes the removal of land use and environmental restrictions. The total reserves column is the potential wind reserves with no restrictions.

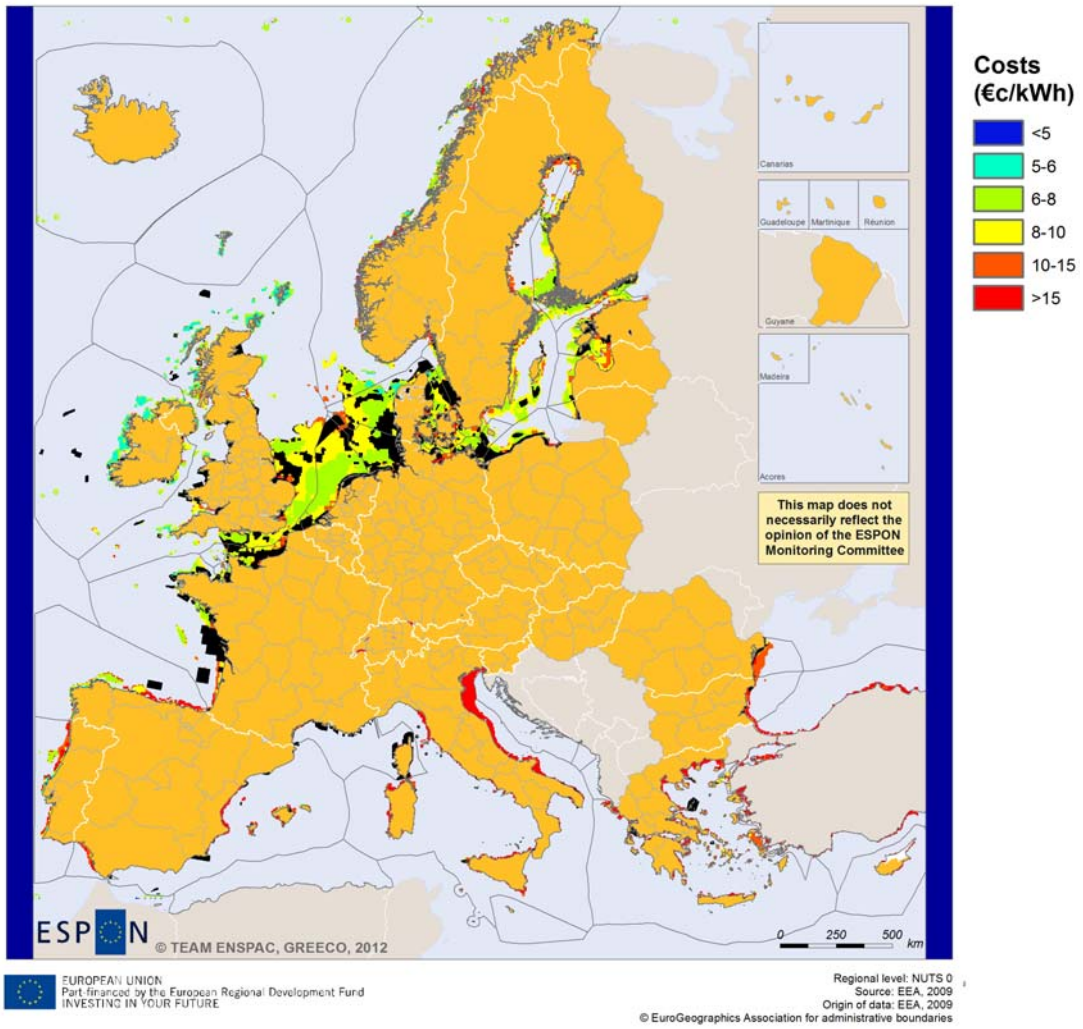
A7.3.2 Off-shore Wind Reserves

Like the on-shore wind reserve estimations, the off-shore wind energy estimations for Europe are based upon the wind velocity map developed for the European Environmental Agency (EEA 2009). This represents Layer 1 in the model and is shown in Map 8. The former Yugoslavia states (except for Slovenia) are not included in this study.

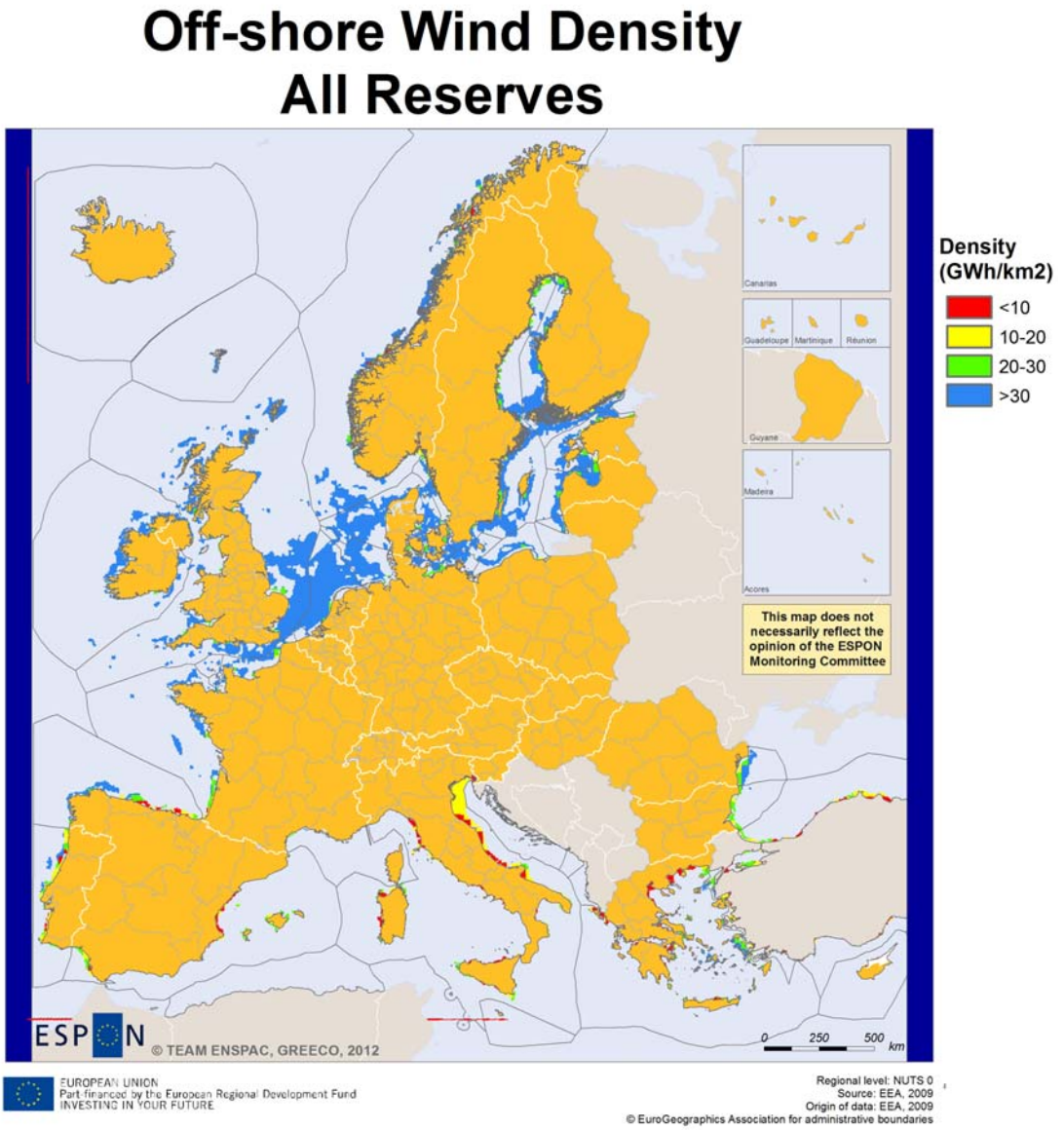


Map 7. ***Off-shore wind velocities at water depths of less than 50m. The map also shows the international Economic Exclusive Zones (EEZ) for each country***

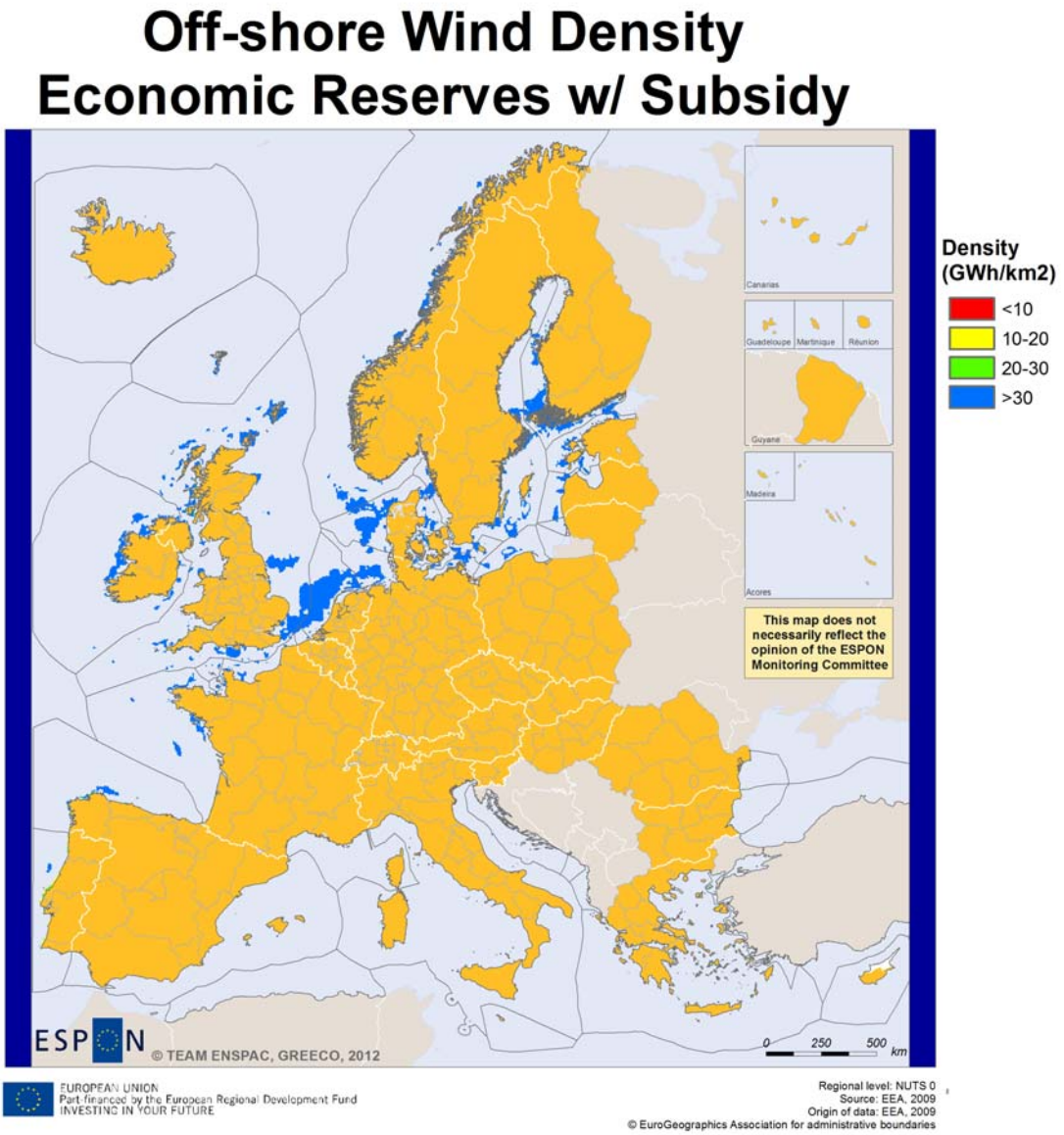
Off-shore Wind Costs



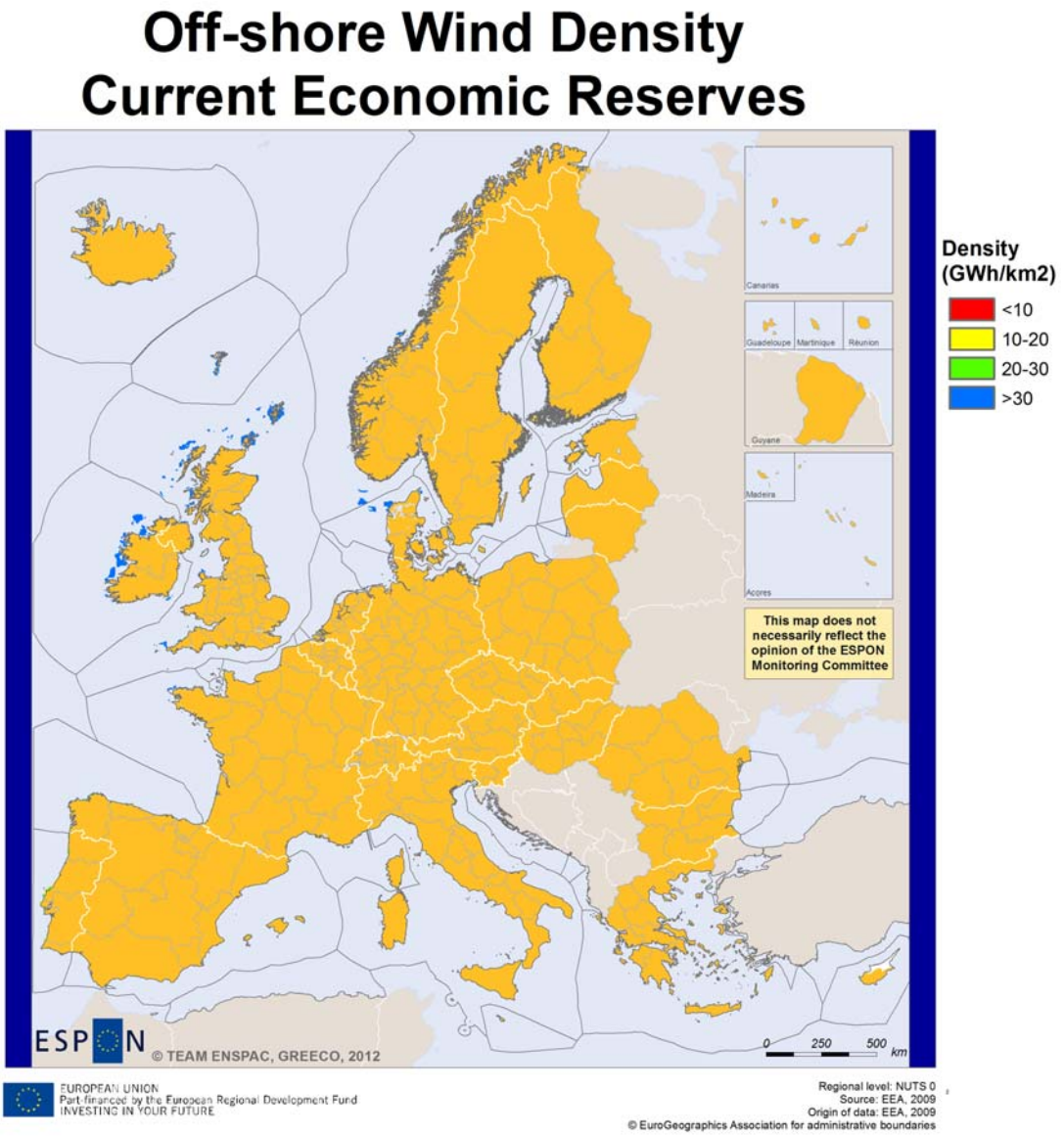
Map 8. ***Off-shore wind costs (given in €cents per kWh). The environmental restrictive areas, shipping lanes and military areas are shown in black.***



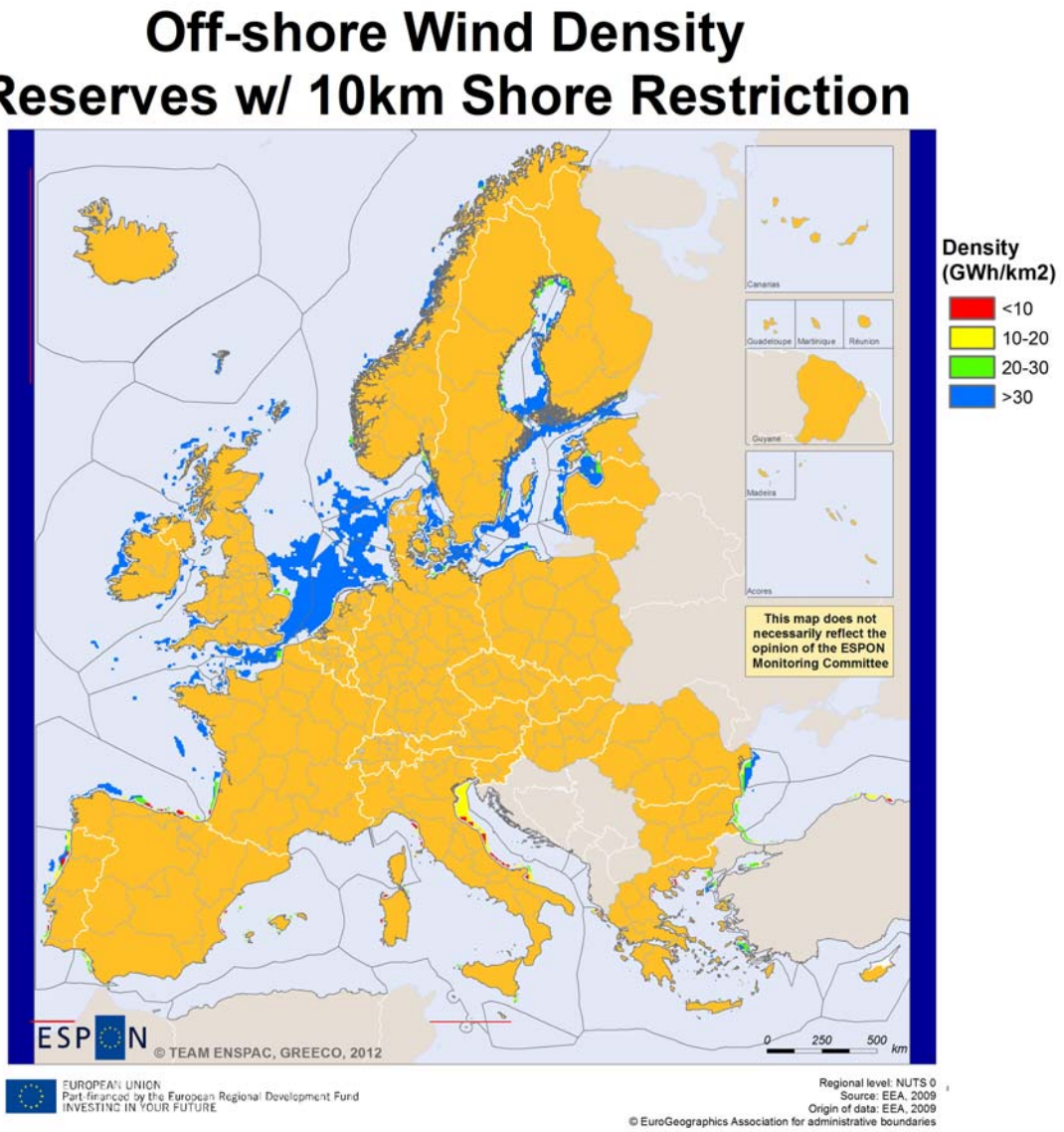
Map 2. ***Off-shore wind density (GWh/km^2) after the removal of only the environmental, shipping, and military restrictions. This shows all reserve potential with no cost or coastal proximity restrictions.***



Map 3. ***Off-shore wind density (GWh/km^2) after the removal of only the environmental, shipping, and military restrictions. This shows the provable wind reserve potential with a 2€cent/kWh subsidy.***



Map 4. ***Off-shore wind density (GWh/km^2) after the removal of only the environmental, shipping, and military restrictions. This shows the provable wind reserve potential with no subsidy for wind production.***



Map 5. ***Off-shore wind density (GWh/km^2) after the removal of the environmental, shipping, and military restrictions as well as a 10km coastal restriction zone. This shows all reserve potential regardless of costs, assuming that no wind turbines cannot be installed within 10km of the nearest coastline.***

Table 5. ***Off-shore wind reserves, given in TWh/year.***

Country	No Coastal Restrictions			10km Coastal Restrictions		
	All	Provable w/ 2€c subsidy	Provable w/ no subsidy	All	Provable w/ 2€c subsidy	Proveable w/ no subsidy
Malta	2.0	0.0	0.0	1.2	0.0	0.0
Latvia	444.8	113.3	0.7	356.3	90.2	0.0
Estonia	478.6	184.4	6.3	359.8	142.5	0.0
Bulgaria	73.7	1.9	1.6	48.1	0.0	0.0
Greece	298.6	23.3	0.4	82.4	3.3	0.0
Denmark	1732.7	843.8	104.3	1476.4	762.7	89.4
Norway	1316.4	546.0	71.1	914.9	445.4	58.5
Finland	1315.5	761.0	11.8	1089.6	647.8	0.2
Netherlands	1608.6	949.0	0.6	1580.3	944.7	0.0
Italy	352.8	0.5	0.3	187.3	0.0	0.0
Lithuania	74.2	10.0	0.0	67.9	8.7	0.0
France	726.4	284.7	28.6	560.5	204.7	9.5
Ireland	660.4	471.0	273.5	466.5	358.0	221.5
Portugal	212.9	56.1	21.4	147.0	23.2	1.3
Sweden	1634.9	557.8	28.5	1241.7	433.1	0.0
Romania	170.4	0.0	0.0	161.9	0.0	0.0
Turkey	224.9	2.0	0.2	71.8	1.4	0.2
United Kingdom	3492.9	1660.0	405.3	2812.3	1313.3	212.9
Spain	424.7	129.6	26.0	247.3	82.0	0.0
Slovenia	0.3	0.0	0.0	0.0	0.0	0.0
Belgium	37.3	21.1	0.4	33.7	18.4	0.0
Germany	891.9	375.6	1.5	818.9	356.0	0.0
Cyprus	3.4	0.0	0.0	0.0	0.0	0.0
Poland	270.3	93.2	0.0	257.3	94.3	0.0
Total:	16448.7	7084.4	982.4	12982.9	5929.6	593.5

Note: For the calculations, all areas with environmental, shipping and military restrictions have been removed. The area with "No Coastal Restrictions" mean that windmills can be built up to the coastline. The area with "10km Coastal Restrictions) removes all areas within 10km of the coastline from consideration for wind power development.

A7.4 References

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