The Eco-Innovation Observatory functions as a platform for the structured collection and analysis of an extensive range of eco-innovation information, gathered from across the European Union and key economic regions around the globe, providing a much-needed integrated information source on eco-innovation for companies and innovation service providers, as well as providing a solid decision-making basis for policy development.

The Observatory approaches eco-innovation as a persuasive phenomenon present in all economic sectors and therefore relevant for all types of innovation, defining eco-innovation as:

“Eco-innovation is any innovation that reduces the use of natural resources and decreases the release of harmful substances across the whole life-cycle”.

To find out more, visit www.eco-innovation.eu

Any views or opinions expressed in this report are solely those of the authors and do not necessarily reflect the position of the European Commission.
Eco-Innovation Observatory

EIO country brief 2010: Greece

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Part 1. Introduction: innovation and environment in Greece

Greece has a population of approximately 11 million inhabitants, featuring a rapidly increasing old age dependency ratio, currently third highest in EU27, after Germany and Italy, with an estimated 18.7% of people aged over 65, in 2008 (HSA 2001, Eurostat 2010). Urban dwellers in majority, Greeks, show a high preference to the metropolitan agglomeration of Athens, the capital city, which hosts about one third of the total population.

The Greek economy, part of the Eurozone, enjoyed one of the highest annual growth rates in the period 2004-2008 (on average 4% in the first three years and then 2% in 2008), only to be hardly hit by international economic uncertainty in 2009, which slowed down growth at a rate of -1.9%. GDP development has been further negatively affected by the restrictive economic measures which followed the inclusion of Greece in the EU-IMF support mechanism, resulting in an estimated further decrease of GDP by -2.5% to -4%. The on-going financial crisis inevitably also affected the labour market of approximately 4.4 million, now characterised by a high and rising unemployment rate, measured at 12.2% in August 2010 (HSA 2010). On the other hand, the financial downturn has provided the impetus for a comprehensive and structural reform, aimed at the development of a healthier investment and business environment, including among others faster licensing procedures, a better focused investment law and the liberalisation of a number of markets.

Greece’s environmental priorities include ‘the protection of biodiversity, the reduction of the effects of pollution to human health and the ecosystems, the sustainable use of natural resources taking into account the predictions on the effects of climate change and the adoption of a new (green) growth model’ (Hellenic Ministry of Environment, Energy & Climate Change, 2010).

Greek businesses and society are open to new concepts; however, the majority of indices measuring innovation rank the country below the EU27 average, showing particular difficulties in the implementation of new ideas (Kokkalis Foundation et al. 2009). Greece seems to be performing better in the promotion of new to the firm (but not necessarily to the market) products or processes, as well as to organisational innovation.

Eco-innovation is not an exception to the above. Government funding available for eco-innovation investments is adequate, as is availability of scientific and research personnel, though not necessarily with sufficient business experience. Availability of eco-innovation inputs is expected to be further improved in the future; the Greek National Strategic Framework for Research and Innovation 2010 – 2015 (NSFRI) is based on a global target for R&D public spending at 2% of GDP in 2020, while at the same time anticipates that research will be primarily focused on selected priority areas, with ‘Environment’ already being identified as a prominent sector, in line with the national strategic objective for Green Growth (Ministry of Education, Life-long learning & Religious affairs 2010).

Part 2. Eco-innovation performance

The analysis in this section is based on the EU-27 Eco-innovation scoreboard (Eco-IS). The Eco-IS via its composite Eco-innovation index demonstrates the eco-innovation performance of EU-27 countries compared with the EU average and the EU top performers. The Eco-IS is based on 13
indicators which are aggregated into five components: eco-innovation inputs, eco-innovation activities and eco-innovation outputs, as well as environmental outcomes and socio-economic outcomes.

Greece is ranked low among the EU-27 countries, in terms of eco-innovation performance, as illustrated in figure 2.1 below. Its overall score of 59 is nearly three times below than that of the leading small-sized countries (Denmark, Finland and Austria) and equal or just below than that of the new Member States (MS) Estonia and Latvia (scoring 59 and 60 respectively). Only four MS – all new – feature a poorer performance.

Figure 2.1 EU27 Eco-innovation scoreboard, composite index

Greece is lagging behind the EU15 and EU27 averages in all five components of the Eco-innovation composite index, a fact indicating not only that poor performance is comprehensive, but also a high probability that weaknesses are systemic and interlinked (see figure 2.2). National performance is particularly low in eco-innovation outputs, while on the other hand, environmental outputs and eco-innovation activities do not score far from the EU27 average; a concise overview of the country's performance in individual components is provided in the sections that follow.
Figure 2.2 Eco-innovation composite index components

**Eco-innovation inputs**
Overall eco-innovation inputs[1] in Greece are limited, despite the relatively high number of R&D personnel and researchers currently employed. The country ranks in the bottom ten of the EU27 eco-innovation inputs index, scoring only 45, with the EU average being 100. The low level of inputs available for eco-innovation seems a persisting phenomenon, with relevant indices having more or less the same values during the last 5 years.

More precisely, R&D personnel and researchers employed in Greece in 2005, reached 1.27 % and 1.41% of total labour force and total employment, respectively, only 0.1% below EU-27 average (Eurostat 2005). The vast majority of R&D personnel and researchers (almost 80% in 2005) works in the public sector, either in Universities[2] or public research centres. The percentage of total labour force involved in R&D is more likely to drop in the future, mainly as a direct result of government cut-offs, following the severe financial and economic crisis that has hit the country. Similarly, a potential future increase of the proportion of R&D researchers in total employment is unlikely to be linked with a net increase in R&D employment rates, but should rather be attributed to the increasing unemployment rates in most of the other sectors of the economy.

In terms of financial inputs, information on Cleantech venture capital (VC) initiatives in Greece is available only for 2009 and shows zero investments. This should be attributed to the predominant culture in entrepreneurship (featuring, among others, low awareness on and inadequate experience with VCs in general), the limited involvement of the private sector in research expenditure (Ministry of Education, Life-long learning & Religious affairs 2010), as well as the small number of locally developed eco-innovation concepts with a potential for commercial exploitation (see also below section on eco-patents). Moreover, recent international VC forum initiatives show that neither environment nor energy fall within the priority focus of VC projects in the country (10th International Venture Capital Forum in Greece, 2009).
Additionally, a time series of data on the Government’s environmental and energy appropriations and outlays, covering the period 2004-2008, indicates constant expenditure levels at 0.02% of GDP. This figure, corresponding to just above 6.5% of total R&D government appropriations in Greece, is rather low compared to that of other EU countries, with only three MS allocating less than 0.02% of GDP as public expenditure on environment and energy.

**Eco-innovation activities**

Greece scores close to the EU27 average in the eco-innovation activities index[3]. The share of firms achieving a reduction in material and energy consumption per unit of output through innovations, almost tripled in the period 2000-2006, to reach 20.75%, rendering Greece a top performer for that year. This impressive improvement should be linked with the implementation of the Operational Programme (OP) ‘Competitiveness’ of the Community Support Framework 2000-2006, as well as the Development Law issued in 2004, providing Small and Medium Enterprises (SMEs) in the Greek manufacturing sector with co-financing for investments aiming at upgrading production and management processes, including in environmental technologies and practices. Similar incentives for local industries are still provided through the National Strategic Reference Framework (NSRF) 2007-2013, though more recent data on the aforementioned index are not available.

EMAS certification is relatively new in Greece. Up until 2004, there were less than 10 EMAS certified organisations operating in Greece; however their number increased significantly during 2005 and 2006, to reach 56 in 2007, covering in total 59 sites. As previously, the increase should be attributed, to a large extent, to the financial incentives provided to SMEs by the Structural Funds and the Greek Government, while a positive role was also played by the local environmental consulting firms, supporting the implementation of the systems. Large organisations also invested in EMAS certification, mainly as part of their Corporate Social Responsibility policies. It is worth noting that the use of eco-labels also improved during this period (2005-2006), with 21 eco-label awards in 2007.

**Eco-innovation outputs**

With a score of 10 (way below the EU27 average of 100) in the eco-innovation outputs index[4], Greece is ranked once again among the 10 worst performing countries, below Portugal and just ahead of Poland. Trademarks and patents are not considered a strong point for the country (Kokkalis Foundation et al. 2009); this is fully reflected in the number of inventors of eco-patents (fractional counting, as per OECD patent manual), which ranged from 0.3 to 4.0 in the period from 1999 to 2007 (with the exception of 2006 when it reached 11.5), corresponding to approximately 0.23 eco-patents per million inhabitants, in 2007. Considering the relatively limited eco-innovation inputs, especially with regard to R&D expenditure, expectations for eco-innovation outputs should be moderate; however the very poor performance in eco-patents further implies limited effectiveness in the use of available resources.

**Environmental outcomes**

Greece is positioned near the EU27 average in the environmental outcomes[5] index. Material productivity (GDP/DMC) has been steadily rising during the period 2000-2007 (with the exception of 2003, when it fell by 0.05), reaching 1.39 eur/kg in 2007, around 10% short of the EU27 average. Water productivity, measured as the value of gross domestic product per cubic meter of domestic water consumed, was 7.43 €/m3 in 2001, equal to 60% of the EU27 average. Greece's water footprint in the same year was approximately 2,300 m3 per capita, ranking the country among top EU consumers, along with Spain, Portugal, Italy and France.
On the other hand, Greece ranks among the five top EU performers in energy productivity (GDP pps/GIEC). Featuring a continuous increase since 2000, the country’s productivity reached 8.33 euro / ton of oil equivalent. GHG emissions have followed the opposite trend, annually decreasing to reach 0.48 kg of CO2 equivalent / euro in 2008, slightly above the EU27 average for the same year (0.47 kgCO2e/€). The conflicting trends of the two indicators should be attributed to the green investments made in the energy sector in Greece, notably in natural gas infrastructure and to a lower degree in renewable energy sources.

**Socio-economic outcomes**

Greece is ranked at the bottom of the EU27 standings in the socio-economic outcomes index[6]. The size of the eco-industry market is rather small, with employment making up a mere 0.39% of total workforce in 2008 and a turnover of just above €2b in 2004, representing only 1.11% of GDP. Exports of eco-industry products counted for only 0.04% of total national exports in 2004 (comparable only to Latvia’s 0.03% and Lithuania’s and Malta’s 0.04%), which amounts to €16.13m of exported eco-innovation products.

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**Part 3. Leading eco-innovation areas**

National research and innovation policies in Greece have so far targeted very broad priority areas. The lack of focus is evident also in eco-innovation, featuring initiatives in a wide range of sectors, ranging from energy and agriculture to several manufacturing sectors, including food processing, bed mattresses (the development of the bed mattresses eco label was a Greek initiative), chemicals, but also the paper industry, waste and water management, as well as to the services sector, notably tourism and banking.

In this context, the leading eco-innovation areas in Greece are selected based on their environmental performance (resource efficiency and minimisation of waste), market success (market penetration, user acceptance) and sustainability (success over time, profitability). The selection process considered the findings of the Interreg Med ‘MEDOSSIC’ project [7], the type and number of projects involving Greek partners that have been funded through LIFE+ or CIP, as well as statistical information regarding the performance of key economic sectors in Greece, to result in the following two leading sectors: food processing; and chemicals.

**The food processing sector**

Food processing in Greece produces 24% of total added value in manufacture (25% of total turnover) and provides work for more than 22% of total employees in manufacture (IOBE 2007). The sector has developed hand in hand with the modernisation of agriculture and the growth of tourism in the country. In recent years, investments in the Greek food manufacturing business have focused on meeting the global demands for healthy and environment friendly food, notably with regard to the use of local raw materials. Processing and packaging of fruits and vegetables, olives and olive oil, dairy and other traditional products, have induced innovation in several areas of business organisation, marketing and production, including in waste management.

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1
The chemicals sector

The chemicals sector in Greece accounts for approx. 4.3% of total turnover in manufacture (HSA 2010b). The workforce of the chemical industry in 2005 was 15,067 (HSA 2005). By nature, the sector has a significant impact on the consumption of natural resources, notably water. Moreover, chemical industries produce (and often manage) hazardous waste and are among the main polluters of land and aquatic ecosystems. During the last decade, the Greek chemical sector has invested in the implementation of Best Available Techniques (BATs), introducing a relatively large number of eco-innovations, though mainly regarding processes that are ‘new to the firm’.

Good practice examples

Example 1:
Planet – Product and marketing innovation in the chemicals sector (detergents and cleaners)

Description
Planet (Rolco company) produces ecological fabric and household care detergents and cleaners that ensure effective cleaning action while minimise environmental impacts. Product eco-innovation refers to the use of: i) plant-based active ingredients not deriving from petroleum; ii) biodegradable tension-actives for minimum impact to the aquatic life, as tension-actives biodegrade to carbon dioxide, water and inorganic salts; iii) a phosphate and boron free formula that protects the aquatic environments from eutrophication; and iv) 100% recyclable and user-safe packaging ensuring re-use and waste reduction. The product is marketed solely on the basis of its environment friendly merits; this is reflected in the product design, promotion and fully recyclable packaging (marketing innovation). The Planet products address both household and industrial applications, varying from laundry powder and fabric softener to dish-washing liquid, all purpose cleaners and surface cleaners. In its second year of operation, market share reached a significant 5%, almost double the 2008 total market share of eco-friendly cleaning products in the US (3%).

Determinants
Drivers:
- Market niche: Increasing environmental awareness created a market opportunity for Rolco to become the first company in Greece to launch detergents with fully biodegradable ingredients and major benefits for the environment; this was seen as a market niche where the company would have an advantage against large multi-national competitors.
- Knowledge: The existence of an R&D section and related culture in the company, provided for adequate innovation potential.
- Green ethics: A vision to protect the environment by supporting integrated management and protection of water resources as outlined in Water Framework Directive 2000/60, as well as by promoting waste reduction and recycling.

Barriers:
- Cost: The cost of ingredients (being the outcome of new research) is relatively high. Moreover, conventional technology used by competition with low environmental awareness, is much cheaper than that used for the production of the eco-innovative environment friendly detergents.
and cleaners.

**Sustainability effect**

*Planet* home care products are certified by the EU Eco-Label; they contain ingredients derived from vegetable oils (as opposed to petrochemicals) and phosphate free ingredients of high biodegradability, thus not contributing to the eutrophication phenomenon. In addition to the products’ “environment friendly” character, the company implements several processes and practices that contribute to the reduction or prevention of potential risks for the environment: use of natural gas as the primary source of energy in the plant, waste water treatment and recycling, use of dust control, lighting and waste management systems.

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**Example 2:**

**GAEA Carbon Neutral Extra Virgin Olive Oil – Material flow and marketing innovation in the food processing sector**

**Description**

Gaea’s products intent to access the international quality food market, offering high quality traditional, authentic and innovative Greek specialty food products, with an environment friendly character. Material flow eco-innovation is linked with Gaea’s Extra Virgin Olive Oils, which were the first in the world to be certified as Carbon Neutral, while maintaining their high quality characteristics, featuring only 0.3 – 0.4% acidity. Through the calculation of CO₂ emissions-carbon footprint in the life cycle of olives, the company is committed to gradually interfere in all harmful for the environment practices involved in olive oil production – from cultivation to the shelves of the markets, in order to reduce CO₂ emissions year per year, while at the same time producing a high quality extra virgin olive oil. Marketing innovation refers to the placement of the product in a niche market, certified as climate neutral, having zero energy footprint (carbon footprint).

**Determinants**

**Drivers:**

- Market demand (niche market): The perception that eco-conscious shoppers are looking for products that do more than simply fulfil their daily needs, by demanding companies to offer environmentally and socially responsible products, acted as a motivation for producing olive oils according to specific environmental rules was.

**Barriers:**

- Cost: competition is in a position to offer products of similar quality characteristics, but with higher environmental impact, at lower prices.
- Knowledge: Know-how for the calculation of the olive’s life-cycle carbon footprint was not available in-house; external assistance was provided in the application of scientific and technological tools (based on the Greenhouse Gas Protocol Corporate Standard) by the Center for Sustainability (CSE) and Myclimate organization.

**Sustainability effects**

Gaea, recognizing the severity of Climate change, has minimized its impact on the climate through offsetting the carbon emissions of its olive oil products in co-operation with the Swiss organization Myclimate. It calculated the amount of carbon emissions produced per kg of olive oil and compensated it by funding protection projects through the myclimate foundation. Moreover, the calculation of the carbon emission throughout the life-cycle of olive oil provided an opportunity for several environmental improvements to be made in the cultivation and transportation of olive oils, the
production and bottling, as well as the final distribution to the retail network. The initiative may benefit in the future from relevant R&D efforts in olive waste management, that are currently under way in Greece and other Mediterranean countries, such as the PROSODOL project, funded under Life+.

Part 4. New trends: areas on the rise

The upcoming Greek National Strategic Framework for Research and Innovation 2010 – 2015 (NSFRI) is expected to advance research and innovation efforts in selected priority areas, reflecting the actual market needs, as well as global and national trends. Specific focus areas for eco-innovation have not been decided yet; however, recent reports on eco-innovation (OANAK 2010), investment initiatives taken by companies that are leaders in their sectors, as well as the publicly expressed opinions of policy makers (Kathimerini 2009, Microsoft innovation Centre 2009, Invest in Greece 2010), indicate the following three areas as emerging lead markets with a good potential for eco-innovation:

- the waste management sector (recycling, treatment, re-use)
- the green tourism industry
- the green banking sector

Waste management

Following decades of inertia, Greece, under the pressure of both EC non-compliance fines and public reaction, is embarking on a long-term plan to overhaul its waste management practices. The waste management sector is developing fast, boosted by public demand (environmental awareness), numerous business opportunities, as well as the national strategic vision for Green Growth. Greece produces more than 5 million tons of municipal solid waste annually; this is equivalent to 453 kg per person (Eurostat 2008). The introduction of new technologies in all stages of waste management, from prevention and recycling to energy recovery and final disposal, is considered essential for Greece to meet its environmental targets.

Green Tourism

With more than 9.000 hotels currently in operation, tourism accounts for 18% of Greece’s GDP and directly or indirectly employs more than 900.000 people (NTO 2009). Long before Greece’s tourism development policy officially address the issue of sustainability, a number of pioneering hotels and resort complexes invested in eco-innovative practices – already in 2002, a Greek hotel chain won the Hermes Award for “Best Innovation in Terms of Environmental Protection” (Capsis Elite resort 2002). Today, environment friendly policies are inherent in the majority of tourism & hospitality businesses in Greece, opening up a huge potential for eco-innovations, in areas such as efficient building solutions, small scale desalination plants, energy efficient power supplies, closed loop resource systems, and software monitoring systems.

Green banking

Following a decade of growth and high profitability, the banking sector in Greece is currently under pressure, as a result of the financial crisis that has hit the country. At the same time, Green growth has been systematically promoted as a viable solution that can bail the country out of the recession. Green entrepreneurship requires specially designed banking products which will motivate investors
and facilitate investments. Greek banks have a unique opportunity to play a pioneering role in this field. To date, eco-innovative approaches planned and implemented by the leading green banking organizations in Greece have been proved successful, though mainly involve loans to consumers and to SMEs for the purchase of environment friendly equipment; green financial investments (e.g. green unit trusts) are still at an infant stage, with only few initiatives at a starting phase (e.g. Marfin Bank).

Example 1:

**Waste management sector – Robotic Waste Bins: an example of product innovation**

**Description**

SOUKOS ENVIRONMENTAL S.A. is a company founded in 2008, which developed the ‘Robotic waste bin’ as a waste management solution that eliminates at least 80% of the initial waste volume discharged. The product is a worldwide patented invention (No. 1005724), manufactured in the region of Larisa, Greece.

**Possible effects: economic, social, environmental**

The ‘Robotic waste bin’ can replace conventional bins in any public area, with the following benefits: automatic compression of waste to at least 80% of its initial volume; provision of a large lighted surface (using RES) for advertising; low purchasing and maintenance costs; limited noise during waste collection; elimination of odours and liquids.

**Barriers and drivers**

**Drivers:**
- Market demand: addresses the immediate needs of Municipal Authorities for low maintenance costs (incoming revenues from advertisements, as well as less frequent collection schedule)

**Barriers:**
- Cost: The self-evident setback deriving from the robotic bin application is that common waste bins are way cheaper.
- Policy: it does not address policy priorities in waste management such as waste reduce / re-use or recycling.

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Example 2:

**Green Tourism industry - Green Luxury - COSTA NAVARINO: an example of material flow innovation**

**Description**

Costa Navarino Hotel located in the Greek region of Messinia, is a new prime destination in the Mediterranean, with a strong commitment to environmental responsibility. Material flow eco-innovation is linked with the comprehensive environmental management approach that the management of the hotel has committed to, going way beyond legislative obligations. More specifically, strict environmental protection guidelines and management principles have been applied with regard to: the building footprint (bioclimatic architecture); replanting of trees and plants that were removed during
construction will be replanted; the use of self-sown plants adapted to local terrain and climatic conditions for landscaping; protection of important habitats including the loggerhead sea turtle (Caretta caretta); the use of water that is naturally replaced; the usage of organic fertilizers; the implementation of integrated pest management; the use of a 22MW photovoltaic system and the installation of geothermal equipment for cooling and heating; the integrated solid and liquid waste management system based on waste reduction, reuse and recycling.

Possible effects: economic, social, environmental
Key effects of Costa Navarino’s operation include the economic growth of the area (through, among others, placing local products and producers at the top of the hotel’s supply chain); the promotion of the local culture by supporting a wide range of local groups, organizations, festivals and activities; the creation of employment locally (recruitment of staff is mainly from the local communities).

Barriers and drivers
Drivers:
- Regulation: The strict legislation regarding EIA screening in sensitive habitats and ecosystems was the leading incentive for the creation of this eco-friendly hotel, as Messinia is one of the regions with the highest biodiversity in Europe, both in terms of species and ecosystems.
- Market demand: The combination of luxury services with environmental protection positions the hotel in a niche market.
- Green ethics: Environmental measures far exceed legal obligations, while one of the primary aims of the new development was to create sustainable income in the remote rural villages of Messinia (birthplace of the owners).

Barriers:
- Cost: Following strict environmental protection principles and management systems raises the construction and operation cost.
- Knowledge: As Costa Navarino is a leader in luxury eco-conscious hotels, know-how was limited (and certainly not available in-house).

Example 3:
Green Banking – Piraeus Bank: an example of material flow and marketing innovation

Description
PIRAEUS bank offers since 2006 specially designed green banking products to support environment related entrepreneurship. The bank has developed green loans for renewable energy investments; green mortgages; green loans for households (purchase of bicycles, energy saving infrastructure and equipment); green leasing; as well as green insurance products. Moreover, the bank has designed and implemented an environmental management system comprising a series of measures to minimize its environmental footprint and to communicate the benefits of these actions to its customers. The project was co-financed by the European Commission through the LIFE programme.

Possible effects: economic, social, environmental
The bank has reduced its energy consumption and improved natural resource management, taking simple measures such as mainstreaming electronic transactions (offering to its customers, fully electronic - no need for paper - means of transactions). Widespread use of Green Banking has changed the relationship between the bank and the customer, achieving among others: direct benefits
to the environment; improved quality of service; significant reduction in transaction costs; good marketing results with eco conscious clients.

The environmental benefits are summarised as follows: with 20,000,000 electronic transactions conducted annually, Piraeus Bank saves 90,000 kg of paper, a number interpreted in 2,000 trees; 3,500,000 litres of water and 450,000 KWh of energy saved by not consuming this amount of paper; additionally, by saving energy, the emission of 90,000 kg of CO2 in the atmosphere is avoided. Moreover, the bank makes continuous efforts to raise customers’ environmental awareness, through messages in web and ATM banking.

Barriers and drivers

Drivers:

- Green Ethics: The motivation for promoting the Green banking derives from the excessive penetration of bank transactions in everyday life and activities. A key point in green banking is that the additional profit that derives from the green banking operation is contributory to the environment and the public and not benefiting the bank units themselves.
- Market demand: Green Growth, now a national, EU and global strategic vision, creates a huge market for Green Banking products; competition is due to promote eco-innovation.

Barriers:

- Risk: Green banking products are a new market, in which traditional banks have little experience.
- Knowledge: Environmental know-how is not fully available in-house, hence a new department as well as strategic alliances with external consultants were required.

Part 5. Public policy in support of eco-innovation

Responsibility for research and technology policy in Greece, including eco-innovation, has been recently fully allocated to the Hellenic Ministry of Education, Life-long learning & Religious affairs. In this framework, the General Secretariat for Research and Technology (GSRT) has become the executive instrument for research policy formulation and implementation, also in charge of developing the Greek National Strategic Framework for Research and Innovation (NSFRI) for the period 2010 – 2015; the latter is currently in the last stage of public consultation. The NSFRI anticipates, among others, an emphasis to be given on priority sectors defined by the business community and the society; at this preliminary stage, the environment is among the three priority domains outlined. Moreover, the NSFRI will provide direct support to innovation, including the strengthening of innovative entrepreneurship, the business use of research outputs, as well as the promotion of patents.

<table>
<thead>
<tr>
<th>NSRF Focus</th>
<th>Funds allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment &amp; Sustainable Development</td>
<td>€2.8 bn.</td>
</tr>
<tr>
<td>Infrastructure Improvements</td>
<td>€7.5 bn.</td>
</tr>
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The Development Law[8] is considered among the main means for the provision of financial support from the Government to entrepreneurs. In addition, the Operational Programme ‘Competitiveness and Innovation’ and the Regional Operational Programmes of the NSRF 2007-2011, offer both SMEs and research and education centres, access to funding. Although most of the aforementioned programmes are not explicitly targeting eco-innovation, such initiatives are eligible for funding in the majority of the NSRF areas of focus.

In the context of the upcoming NSFRI, networks and partnerships of research centres will be promoted. Such collaborations, will allow, among others, the joint design and implementation of postgraduate and PhD programmes, as well as the best use of existing research infrastructure, exploiting synergies and avoiding duplication of efforts. This is particularly relevant to eco-innovation in Greece, since for the majority of research centres in the country, the environment is a new domain of activity and often not the primary focus of work.

As regards the distribution of the results of research - and by extension of innovation – key stakeholders promoting environmental innovation are:
- the Ministry of Environment, Energy & Climate Change, promoting Best Available Techniques (BATs) in industrial sectors (IPPC Directive) through the publication of guides which assist Greek industries to assimilate and introduce existing BATs into their production processes.
- the Technical Chamber of Greece in collaboration with the Ministry of Environment, Energy & Climate Change and other bodies, organises a bi-annual International Environmental Exhibition (HELECO) with the aim of promoting and distributing all new technological applications to those interested (industries, local government, researchers, etc.);
- the Hellenic Innovation Relay Centre, acting as a connector of Greek businesses with new technologies and innovation in the countries of the European Union.

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**Part 6. Understanding eco-innovation performance**

The main drivers for eco-innovation in Greece are:

**The provision of direct funding (co-financing) from the Structural Funds and the Development Law.** Access to capital, by a large number of companies, mainly manufacturing and service SMEs, facilitated investments in environmental infrastructure and equipment, as well
as in environmental management systems. Investments were not always focused on environmental protection, however in some cases facilitated the introduction of BATs. Moreover, the availability of funds has assisted in the creation of spin off companies, as well as of regional business incubators and science and technology parks.

**A significant number of research and educational institutes, including research laboratories.** The numerous on-going research efforts focusing on environmental issues have allowed relatively easy access to social capital, in particular human and knowledge capital. Collaboration among businesses (strictly SMEs) and research centres, on the basis of new eco-concepts, has been further promoted through initiatives funded by the NSRF (innovation vouchers), leading to the direct implementation of eco-innovations by the companies involved.

**Significant market opportunities for new environmental technologies in the waste management and renewable energy sectors as well as for environmental practices in the tourism and services sectors, fostering collaboration with SMEs and research centres abroad.** Access to technical and technological capital facilitated the transfer of know-how and the development of research capacities in Greek SMEs. Moreover, it provided the impetus for the establishment of new business ventures in the aforementioned fields, laying the ground for future innovation.

The main barriers to eco-innovation in Greece are:

**Uncertainty in financial and environmental policies.** The lack of a clear and coherent framework for the promotion of eco-innovation, including explicit priority areas and a transparent funding mechanism discourage a large number of entrepreneurs to take the risk of investing in eco-innovation. Moreover, the lack of focus in environmental priorities, limits the ability of the actors involved to plan and organise long term investments.

**Limited access to funding for business exploitation of eco-innovative concepts, especially for SMEs.** Access to capital through the credit system in Greece, often prohibits the involvement of SMEs in research projects potentially leading to (eco)innovations. Moreover, externalities such as the effects of the financial crisis (both global and national) have further limited the ability of SMEs to secure funding for the implementation of innovative eco-concepts.

**Regulatory and policy restrictions in business exploitation of eco-innovative concepts.** The time frame related with the implementation of a business plan for eco-innovative activities in Greece (including the procedures for setting up a new business and for securing the necessary permits for the operation of the business), often far exceeds the actual time required for the intended research to produce results. Furthermore, poor flexibility of public procurement procedures provides no incentives for the development of eco-innovative products targeting the public sector.

The long existence in Greece of a wide range of obstacles to eco-innovation (reflected in the poor performance of the country in all relevant indicators), has created structures and mentalities - in both public and private sectors - that systematically impede new eco-concepts from developing and being put into practice. Persistent eco-innovation barriers over the years, coupled with the society's resilience to change, make any efforts for improvement particularly difficult. In this light, the on-going multi-level social and economic reform, triggered by the financial downturn, provides an opportunity for the introduction of positive measures, which will in time lead to healthier attitudes and acceptance to aspects of eco-innovation.
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Endnotes:

[1] The index is based on aggregate statistics on R&D researchers, Cleantech venture capital investment and governments’ environmental and energy R&D appropriations and outlays in the EU 27 MS.

[2] Tertiary level education in Greece is strictly public, since the Greek Constitution forbids the operation of private Universities in the country.

[3] The index is based on aggregate statistics of the Community Innovation Survey (2008), on the share of firms reducing material consumption per unit of output through innovations and the share of companies with EMAS certificates. In the case of Greece, data on the cis2008 Material reduction per unit output (% of firms) index are not available. The EU27 average value (100) has been used instead for the calculation of the eco-innovation activities composite index, hence any analysis or conclusions deriving from the corresponding index value, should be treated with caution.

[4] The index is based on aggregate statistics on eco-patents, i.e. pollution abatement and waste management patents, as well as patents in energy efficiency in buildings and lighting (source OECD). The indicator is based on fractional counts (as opposed to whole counting).

[5] The index is based on aggregate statistics on Domestic Material productivity, domestic water productivity, inland energy productivity and on GHG emissions intensity. Statistics of the latest available years for each indicator have been used in the computation of the composite index.

[6] The index is based on aggregate statistics on employment in eco-industries, on the size of eco-industry markets and on exports of eco-industry products. Statistics of the latest available years for each indicator have been used in the computation of the composite index.


[8] Until recently, Law 3299/2004 set the regulatory framework for the provision of government financial support to private (and in some cases local authority) investments in Greece. A new Development Law is expected to come into force at the beginning of 2011.