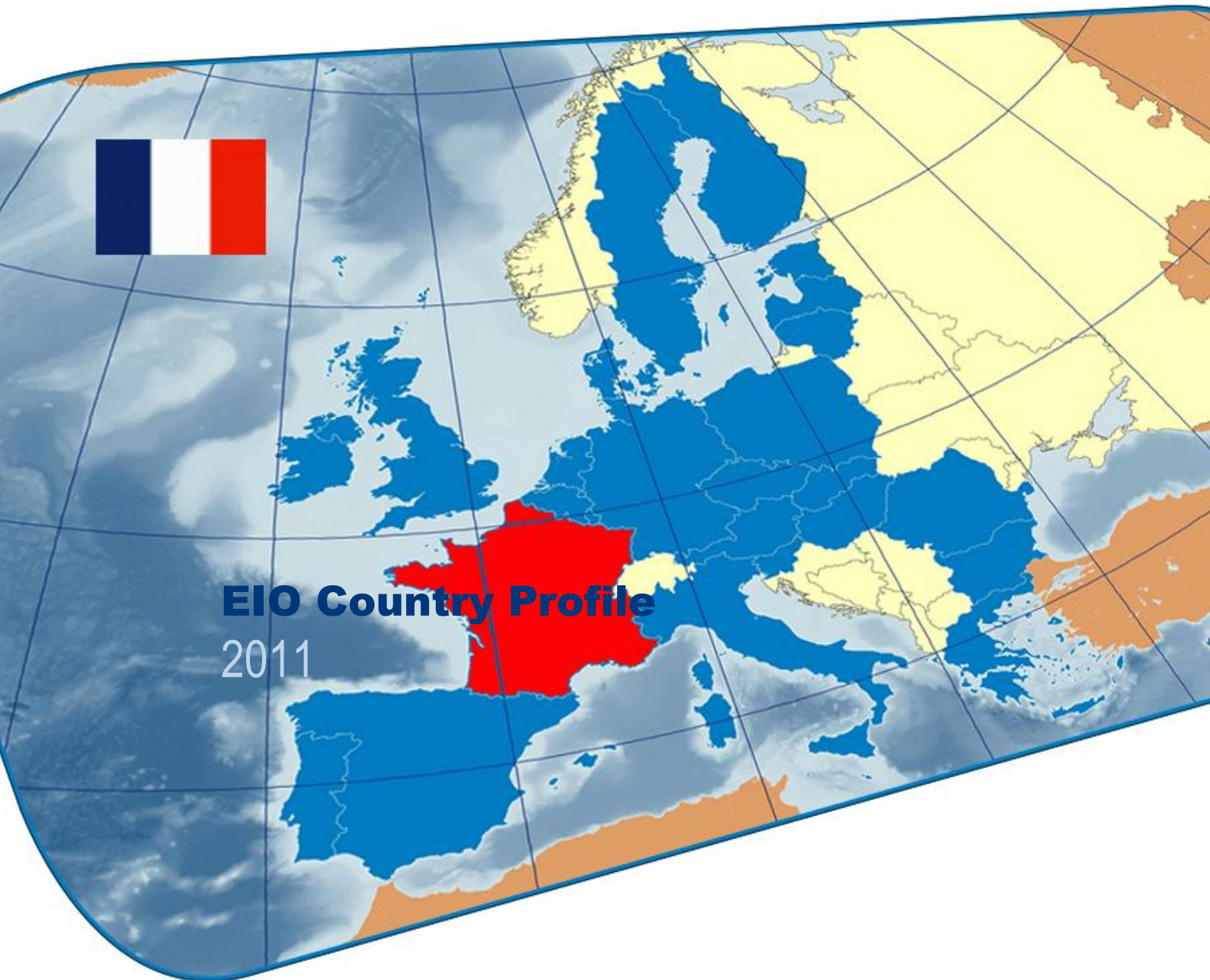


Eco-innovation in France



Eco-Innovation Observatory

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 pervasive 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

Country Profile 2011: France

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A note to Readers

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. A number of companies are presented as illustrative examples of eco-innovation in this report. Their inclusion in this report does not imply that EIO endorses these companies and, it should also be noted that, the report is not an exhaustive source of information on innovation at company level.

This brief is available for download from www.eco-innovation.eu/France

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Summary

According to the Eco-innovation composite index, the French level of eco-innovation performance is comparable to the EU27 average. France underperforms in terms of socio-economic outcomes and eco-innovation activities, but displays higher-than-average levels in terms of eco-innovation outputs, and environmental outcomes. Over the last year, the most significant difference in the level of performance of France relates to the drop in socio-economic outcomes due to a decrease in the share of exports of products generated by eco-industries.

The most important leading eco-innovation areas in France are water sanitation, waste management, and efficient buildings. In comparison to the 2010 brief however, this year's brief places special emphasis on a subsector of the waste management industry, which is recycling of industrial by-products and waste into secondary materials and recycling of construction waste. This particular subsector has shown considerable expansion and hosts an important level of eco-innovation. In addition, the production and use of recycled by-products (or secondary materials) is an important step towards the development of circular economies.

Upcoming innovation areas are linked to high-growth potential sectors which have already begun to gain visibility in the eco-industry market and possess a high innovation potential. These sectors include technologies such as carbon capture and storage (CCS) and the electric and carbon-free vehicle. In addition, the urban planning sector is also expected to take on significant importance in the years to come.

Eco-innovation has steadily risen to become one of the key issues on the French policy agenda, principally over the course of the last ten years. This is illustrated by the importance given to eco-innovation within the 'Grenelle de l'Environnement' environmental legislation package and the Investments for the Future programme recently adopted by the French government.

The Grenelle and the Investments for the Future initiatives strongly enhanced the group of policy measures aimed at supporting eco-innovation activities by implementing a set of second-generation instruments. Currently, public policy support for eco-innovation in France is composed of a mix of supply and demand oriented measures. However, the supply-side focus is predominant. There has been an important evolution in the approach taken to eco-innovation in policy measures as these have become less sectorial and have developed a more systemic approach to addressing environmental issues. This evolution is illustrated by the creation of cross-cutting and multidisciplinary programmes in fields such as the circular economy.

1 | Introduction

France currently faces a number of important environmental issues which could be addressed through the implementation of eco-innovative solutions. The two most-important issues relate to the need to reduce GHG emissions (particularly those generated by households, buildings and transports) as well as energy dependency on non-renewable sources. However, in addition to the two long-term issues, soil contamination (copper, lead, phosphorous) as well as underground and coastal water contamination (nitrates) are currently two of the leading causes for concern. These result mostly from intensive agricultural practices (accumulation of fertiliser use) and land transportation.

In addition, the growing rates of land take by artificial surface over the last two decades have resulted in the destruction of natural and semi-natural land reserves. This phenomenon stems mostly from suburban sprawl and the use of land for the construction of transport infrastructure (highways, railways). Land take by artificial surfaces could represent a potential hazard in areas exposed to high flooding risks, such as coastal regions.

France suffers from a big loss of biodiversity, as illustrated by the strong decrease of specific bird populations and certain fish population. The diagnosis for plan life is just as much a case for concern (MEEDDM, 2101b).

In spite of this, significant progress has been made over the last two decades particularly in terms of GHG emissions reductions. Reductions are particularly visible in the industrial sector where CO₂ and sulphur dioxide emissions underwent a 14% and 68% reduction between 1990 and 2007. In addition to enhanced environmental regulation, France's low levels of GHG emissions are also related to the high share of nuclear energy in electricity generation (36% vs. 1% for carbon) and a relatively high share of service industries in the French economy (70% - Kietzan-Slamanig et al., 2009). Environmental advancements recorded over recent years mostly stem from increased government efforts, technological advancements and innovative capacities, the search for cost-reductions on behalf of firms, and the significant growth of eco-industries (MEDDTL, 2010b).

Many of the challenges for eco-innovation relate to the need to adapt to certain remnant affects from previous economic and social activities. In this sense, eco-innovations could potentially contribute to France's capacity to adapt to climate change and the consequences of human activity. This is the case for lead contamination resulting from the prolonged use of automobiles not fitted with catalytic converters as well as the use of copper sulphite in wine growing areas.

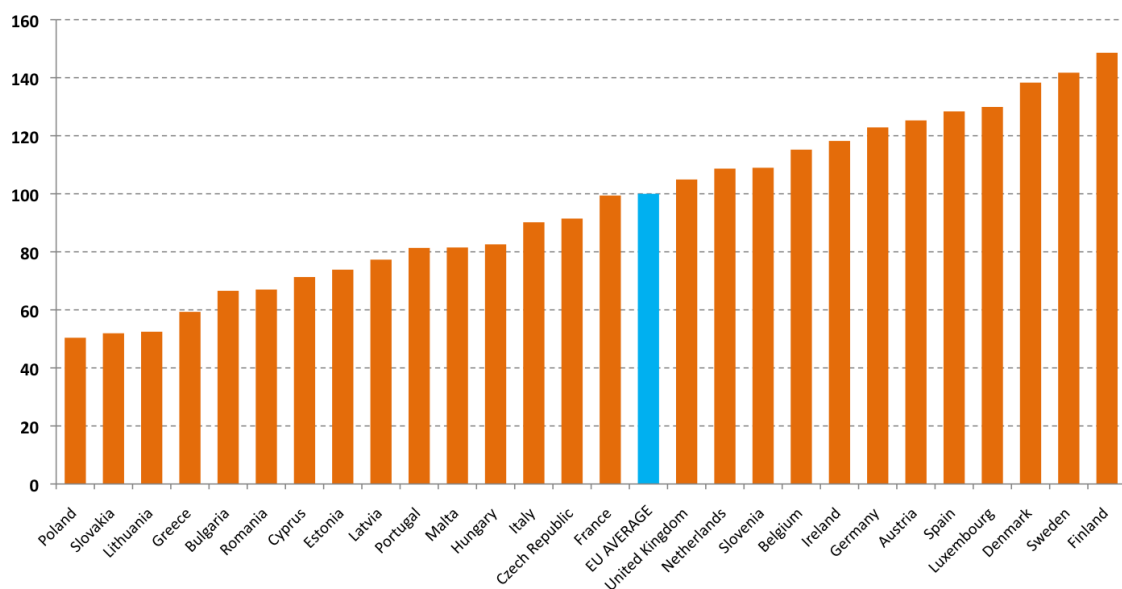
However, there are also current trends determined by socio-economic factors that harm the environment. In these cases, eco-innovation could contribute to France's capacity to mitigate climate change by fighting some of these issues from the root. This is the case of air quality and biodiversity which are strongly affected by agricultural practices. Sustained population growth resulting in an increased number of households and artificial surfaces also poses a significant challenge.

2 | Eco-innovation performance

The analysis in this section is based on the EU 27 Eco-innovation scoreboard (Eco-IS) for the year 2011. Eco-IS via its composite Eco-innovation index demonstrates the eco-innovation performance of a country compared with the EU average and with the EU top performers. Eco-IS is based on 16 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

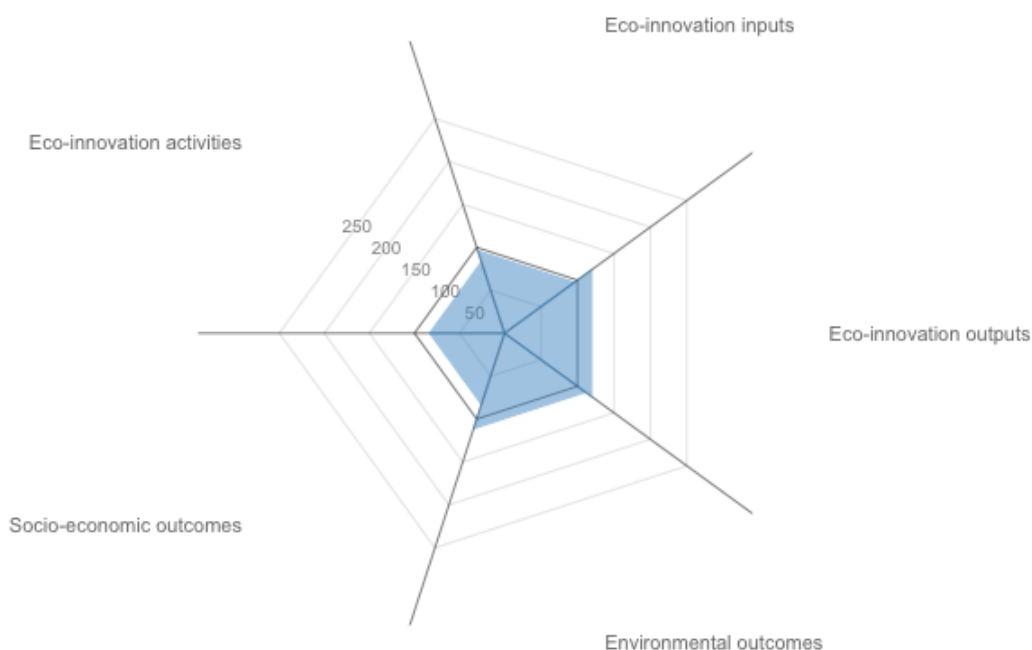
According to the 2011 Eco-innovation scoreboard, the French level of eco-innovation performance is comparable to the EU27 average. France underperforms in terms of socio-economic outcomes and eco-innovation activities, but displays higher-than-average levels in terms of eco-innovation outputs, and environmental outcomes. Over the last year, the most significant difference in the level of performance of France relates to the drop in socio-economic outcomes due to a decrease in the share of exports of products generated by eco-industries.

Figure 2.1 EU27 Eco-innovation scoreboard 2011, composite index



Source: EIO, 2011

Figure 2.2 Components of the eco-innovation composite index



Source: EIO, 2011

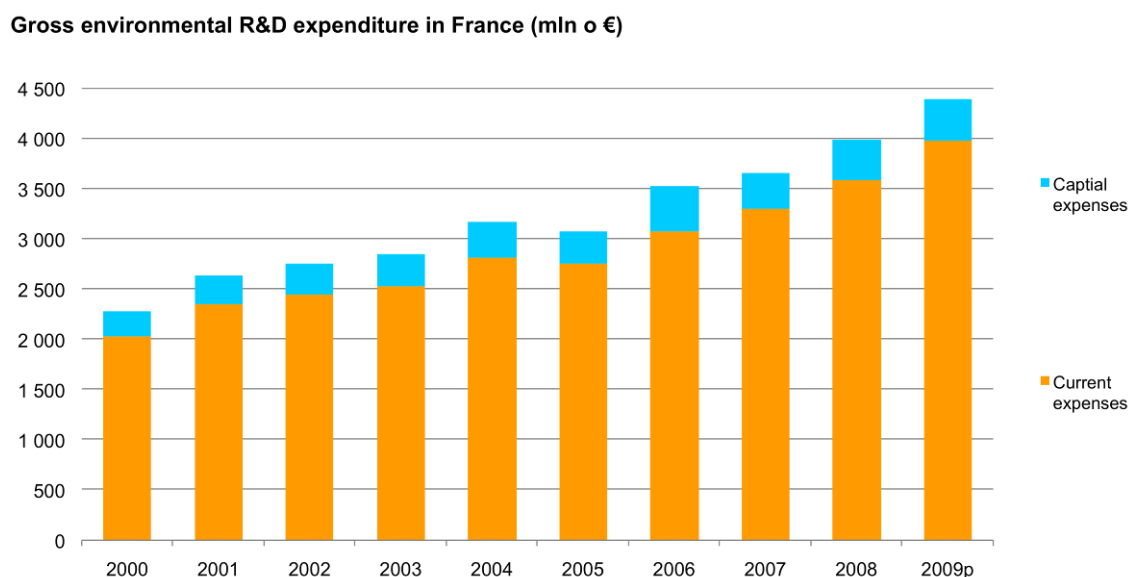
Eco-innovation inputs

In France the total of government environmental and energy R&D appropriations and outlays in 2008 amounted to 0.06% of the national GDP. This number underwent a 0.02 point reduction between 2004 and 2008. In spite of this decrease, France still performs relatively well according to the best performing European countries. According to Eurostat, the number of R&D personnel and researchers as a percentage of the total French workforce represented 1.62% in 2007, which is only slightly above the EU27 average (1.44%).

In 2009, the total environmental R&D expenditure in France equalled 4.4b€, undergoing a 10% increase compared to the previous year. This increase is considerably higher than that of R&D spending in general. As shown in Figure 3, since 2000, environmental R&D expenditure has doubled, while overall R&D expenditure has only undergone a 40% increase (<http://www.statistiques.developpement-durable.gouv.fr/lessentiel/article/375/1257/depense-recherche-developpement-protection-lenvironnement.html>).

The growth in environmental R&D expenditure is mainly driven by the private sector. In 2009 private environmental R&D expenditure grew 17%, representing a total of 2.3b€. The current economic and regulatory context has created a favourable atmosphere for this type of expenditure. Not only has environmental regulation become increasingly strict, but a series of initiatives such as the creation of several environmental competitiveness clusters have improved the visibility of the sector (Commissariat Général au Développement Durable, 2011).

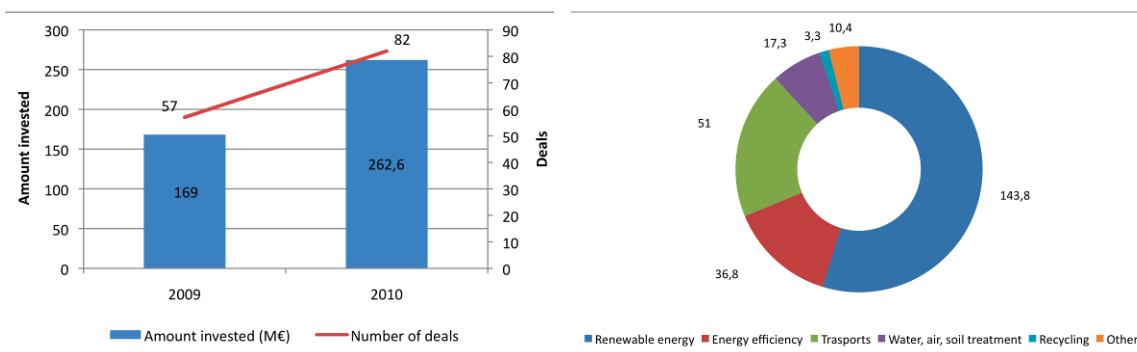
Figure 2.3 Gross environmental R&D expenditure in France (mln of €)



Source; SOeS – Commission des comptes et de l'économie de l'environnement

The lack of specific indicators makes it extremely difficult to define the types of leading eco-innovative firms. In general terms, larger eco-industrial firms tend to be seen as being less innovative than medium and smaller sized firms, particularly in terms of R&D expenditure. However, this stems mostly from the fact that these larger firms are specialised in environmental services, rather than industrial production of environmental goods. As a result, service activities apart, these larger firms do appear to dedicate a considerable amount of resources to R&D activities. In addition to this, it is necessary to keep in mind that as a result of the structural makeup of the French eco-industry structure which is strongly based on service activities, there is a considerable amount of eco-innovation taking place in firms located outside of the traditional realm of eco-industry (Griot, 2010).

Figure 2.4 Cleantech Venture Capital Investment in France (volume and distribution by sector)



Source: Club Cleantech, Baromètre des levées de Fonds Cleantech en France, 4ème trimestre et bilan annuel 2010.

Venture capital (VC) in the cleantech sector has steadily risen over the last five years in France. As seen in figure 4, in 2009 France was the fourth-highest beneficiary of cleantech VC investments in Europe (after the UK, Germany and Norway). The volume of cleantech VC investments underwent a 55% increase between 2009 and 2010 (Club Cleantech, 2011). Numbers from the fourth quarter of 2010 also

show France as being second among the top 7 European countries (18.8% of the total behind the UK - Club Cleantech AFIC, 2011). (Cleantech Group, 2010)

In spite of this recent increase in available cleantech VC, the structural makeup of the VC market in France makes it extremely complicated for firms to obtain financing for intermediary phases (between 'early' and 'pre-commercial') of technology development. This financing gap has been qualified as a 'Valley of Death' between early-stage project financing sources (private seed money, public agencies, etc.) providing up to €1m, and high-end deals providing more than €6m (Chasnier).

Eco-innovation activities

In terms of eco-innovation activities, the eco-innovation composite index shows France lagging behind the European average. Despite the relatively high number of firms having implemented innovation activities in order to reduce energy and material inputs (the French average is comparable to that of the EU), France has a surprisingly low proportion of ISO 140001 and EMAS registered organisations.

The share of innovative firms reducing material consumption per unit of output through innovations in 2008 amounted to 27.63. Furthermore, the share of all firms reducing material and energy consumption per unit of output through innovations in 2008 was equal to 14%. In this regard, France is slightly below the European average (15%) but is still far behind countries such as Germany (31%) or Portugal (22%). The fact that relatively few innovative companies have reduced their material consumption over the previous period is mostly explained by the importance of the services sector in the French economy. Firms specialising in services tend to be less energy and material intensive than traditional industrial sectors. On top of this, the leading eco-industries in France (Veolia, Suez, etc.) are specialised in the fields of environmental services, rather than the industrial production of environmental goods (Merillot, 2010).

The number of Eco Management and Audit Scheme (EMAS) and ISO 14001-registered organisations is strongly limited. In 2007, France had only 13 EMAS registered organisations compared to 1 464 in Germany and 905 in Spain. In the same year, the number of EMAS certificates per million inhabitants stood at 0.2, well behind the EU27 average (6). The surprisingly low number of EMAS-registered firms in France is explained in part by the greater predominance of the ISO 14000 certification among French businesses. However, the number of ISO 14001 registered organisations per m population in France stands only at 73, behind the EU average (162) as well as behind countries such as Sweden (452), the Czech Republic (447) and Spain (360).

Eco-innovation outputs

According to the eco-innovation outputs index, France's performance is slightly higher than the European average (119 vs. 100). Eco-innovation outputs in this case are measured in patenting outputs in pollution abatement and energy efficiency fields on the national level, the number of eco-innovation related publications, and eco-innovation related media coverage per number of electronic media.

According to the index which is based on aggregated statistics on eco-patents (OECD), France is one of the leading European countries in terms of total numbers eco-patent production. In 2008, France deposited 509 eco-patents, placing it only behind Germany which deposited 1942. The number of eco-patents deposited between 2007 and 2008 underwent a 300% increase in France. However in terms of eco-patents produced per million inhabitants in 2008, France is ranked seventh (compared to tenth last year) in the EU27 with 7.96 eco-patents per mln population.

In overall terms, the number of eco-patents registered in France has increased considerably over the last decade. According to a study published by the National Institute of Industrial Property (INPI), in 2009 eco-patents (including the energy sector) represented 37% of the total number of registered patents. In

addition, the share of eco-patents in the total number of French patents has more than doubled between 2000 and 2009.

As seen in the figure below, the leading sector in terms of eco-patenting in France is the transport sector. Transport contributed to 62% of all eco-patents produced in 2009. Furthermore, France is the world's largest producer of eco-patents in the fields of automobile and aeronautics. Source: INPI

France is also one of the leading European countries in terms of eco-innovation related media coverage. In 2010, the total number of electronic media sources in France amounted to 5 472, the second highest number after Germany. The number of publications per million population in France is well above the EU average (0.11 compared to 0.04), making France the seventh-most productive country in this field.

Environmental outcomes

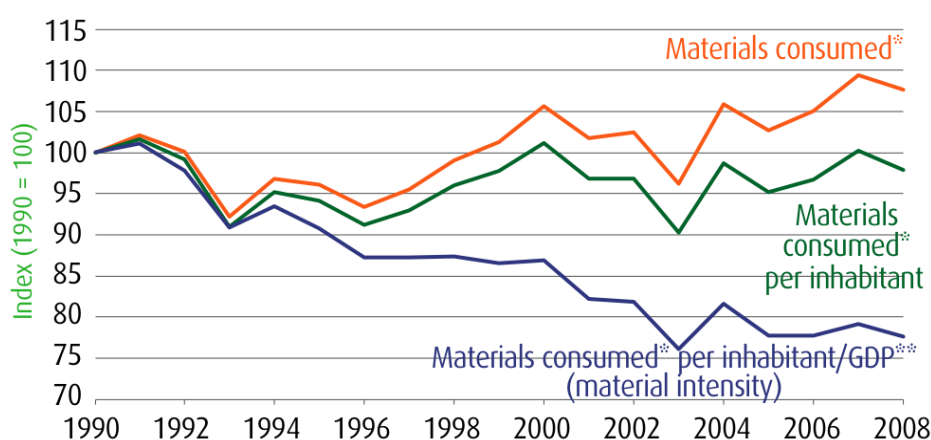
In terms of environmental outcomes, France is better positioned with regards to the European average. According to the environmental outcomes composite index, France is approximately 23 points above the EU27 average. Material productivity in France (1.90 eur/kg) in 2007 was above the European average (1.47 eur/kg), yet well below that of the Netherlands (3.13 eur/kg) or the UK (2.37 eur/kg). Material productivity has undergone a 21% increase since 1990, indicating a lower requirement of materials for the same quantity of value added. However, as seen in Figure 5, the quantity of materials consumed (around 14.3 tonnes/inhabitant) has not decreased in 17 years, in spite of technological progress (MEDDTL, 2010d). This is mainly the result of the high growth in overall production and consumption levels.

French water productivity (in EUR/m³) is 12.7, compared to the 11.3 European average; while gross energy productivity is equal to 6.33 EUR/toe, only 0.6 points below the European average.

France went from producing 0.42 to 0.32 kgCO₂/EUR between 2000 and 2009. These figures are slightly below the EU27 average which stood at 0.39 in 2009. The analysis of the factors influencing changes in CO₂ emissions shows gains made during the past two decades as a result of technological progress. However, given the increases in production and consumption, the amount of CO₂ emitted in France has, overall, remained stable. Whereas technical factors have brought about a lowering of emissions, economic factors and demographic factors have, conversely, driven emission levels upward. The benefits brought about by technical factors have also been neutralised by a 'rebound effect', where improved environmental efficiency in the use of a resource or equipment is offset by increased usage of the resource or equipment. In the end the effects of improved technology have outweighed those of increased production, notably for industry, whereas the converse is true for service activities (MEDDTL, 2011).

Figure 2.5 Consumption of Materials in France

RESSOURCES | Consumption of materials



Source; SOeS, 2011

Socio-economic outcomes

In terms of socio-economic outcomes, French levels are below the European average (-17 points). The French level of performance in this field has decreased over the last year, particularly due to a fall in the volume of exports of eco-industry related products. From 2004 to 2010, the volume of products from eco-industries exported by France shrank from €1 520m to €1 243m, resulting in a 5 point decrease in the percentage of eco-industry exports in total national exports.

In spite of this, France is Europe's second largest, and the world's fourth largest exporter of eco-industry products, only behind the US, Germany and Japan. Europe (44%) and Africa (20%) are the two main destinations for French eco-industry product exports (MINEFE, 2010).

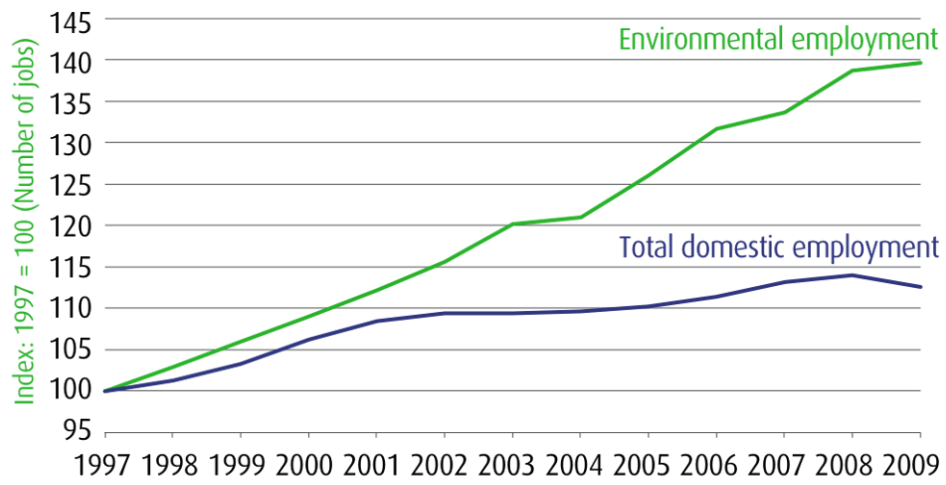
Production from the environmental goods and services sector amounted to €64b in 2009 (- 3.4% compared to the previous year – Commissariat Général au développement durable, 2011), making France the second largest producer in Europe. The contribution of eco-industries' turnover to France's GDP equalled 2.6% in 2008, which is comparable to the EU average. This average however remained stable between 2004 and 2008. Under an optimistic scenario of enhanced reinforcement of environmental protection regulation and a solid eco-industrial development policy, the French government believes the sector could benefit from a yearly €50b increase in activity and 280 000 additional jobs by 2020 (MINEFE, 2009).

As regards employment however, French eco-industries only accounted for 1.38% of the total workforce in 2008. This is below the European average (1.72%) and relatively lower than the levels of countries such as Belgium (3.2%) or Italy (2.1%). In 2009, this population of the workforce grew to 1.7% (+0.7% compared to the previous year), representing 427 1000 full time equivalent jobs of which 305 500 were in companies' green activities. As illustrated by Figure 6, the growth of employment within green industries comes in contrast with the general trends within the French labour market, which witnessed a 1.2% reduction in domestic employment over 2008 -2009.¹

¹ CGDD, Repères, 10 key environmental indicators for France 2011 edition, June 2011.

Figure 2.6 Environmental employment in France

ECONOMY | *Environmental employment*



Source; SOeS, 2011

3 | Established eco-innovation areas and markets

Based on a study carried out by the Boston Consulting Group on behalf of the Ministry of Economy, Industry and Employment (2008), the French government has established a list of priority sectors targeted by its eco-industrial support policy. These sectors or '*filières*' have been classified around three main pillars:

- High growth potential sectors which are currently underrepresented in the French economy. These sectors are now considered as high priority sectors and are likely to undergo considerable growth in the oncoming years (solar photovoltaic, carbon capture and storage, electric vehicles).
- Sectors with a high potential to contribute to climate change mitigation and adaptation, as well as to reductions in energy consumption. Support for these sectors is developed mainly from an environmental outcome perspective, aimed at reducing GHG emissions levels and dependence on foreign imports of commodities (energy efficient building technologies, biomass, recycling).
- Highly competitive sectors already established as national and international leaders. The main goal of this pillar is to reinforce French 'champions' while continuing to develop innovating solutions in relevant fields (water sanitation, waste management).

The most important leading eco-innovation areas in France are found within this last pillar, comprised of highly competitive firms on a European and international level. Two of the most important leading sectors are water sanitation and waste management. In 2011, a special emphasis has been put on a subsector of the waste management industry, which is recycling of industrial by-products and waste into secondary materials and recycling of construction waste. This particular subsector has shown considerable expansion and hosts an important level of eco-innovation. In addition, the production and use of recycled by-products (or secondary materials) is an important step towards the development of circular economies. In addition to these two sectors, the energy efficient buildings sector has also become a leading innovating sector in France.

The good practice examples presented below illustrate the use of complementary technologies from distinct sectors aimed addressing common environmental problems. In this sense, the lines between traditional industrial sectors become increasingly thin as innovators move towards more systemic approaches to innovation taking into account several environmental dimensions at once. As a result, new seamless solutions are being adopted to address environmental issues, thanks in part to collaborations between traditionally isolated actors. The Degré Bleu systems illustrate this fact insofar as it makes use of Suez Environnement's expertise in the field of water management to address the issue of building heating and cooling. The collaboration between Renault and SITA promoting the recycling of used cars and the use of secondary materials for car production is another example of cross-sectorial collaboration.

In spite of this, innovation in all three sectors can be characterised to a large extent as gradual or step-changing. There are only a very limited number of radical innovations having been introduced to the market until now.

Eco-innovation markets

France currently ranks 4th worldwide (and 2nd in Europe) by size of the eco-industry sector. The sector was estimated to represent €60b in annual turnover in 2008 and 400 000 jobs in 2007. France owes this strong position especially to the activity of two leading international groups (Veolia and Suez), a number of important 'challenger' firms (SAUR, Nicollin, Serpol, Séché, CNIM, etc.), and a dense network of SMEs (Chambolle). These firms are the leading sources of environmental protection expenditure (EPE) in France, contributing to 36% of the €16b total in 2008. At the same time, expenditure on R&D accounted for 11% of business EPE.

The water sanitation and management sector in France represents an annual turnover €17b, and employs 112 800 people (MINEFE, 2010), making it the largest environmental employer and eco-industry. The French industry in the field of recycling of industrial by-products and waste into secondary materials is estimated to represent €12b in turnover, accounting for approximately 13% of the European Union's turnover (COSEI, 2011b). This makes France one of the leading countries in the field, considered to be one of the key links towards the creation of circular economies. Despite the lack of specific indicators on the size of the energy efficient buildings market, the sector is expected to represent €20b in yearly turnover by 2020, and 110 000 jobs.

Water sanitation and management

The sector is structured around two international giants, Veolia Environnement and Suez Environnement. However, several additional firms are present in the sector, generally specialising in each of the different stages of the sanitation and management cycle:

- Design and construction of water treatment stations, and production of maintenance and construction equipment and materials: Egis, Artelia, Burgeap, Safège, Bayard, Ternois
- Water collection and drilling, and pipe installations: Saint-Gobain PAM, Bona Sabla.
- Water distribution network operators and maintenance firms: Véolia Eau, Lyonnaise des Eaux, SAUR, Sogedo, Alteau, Agur, Ternois (COSEI, 2011c)

One of the sector's main strengths lies in the particular structure of the market resulting from public regulation involving both private and public operators. Additional strengths include structured and solid R&D efforts on behalf of the public and private actors, the creation and involvement of several competitiveness clusters in the field (Axelera, Advancity, sea clusters), a long industrial history in the field, accumulated scientific and technical know-how, and the existence of an important number of demonstration sites enabling the diffusion of technologies at an international scale.

Abroad, the turnover of French firms in the sector is estimated to represent €19b. Veolia and Suez account for 2/3 of the generated turnover. Together, these firms provide services to approximately 200 million users around the world. The global turnover in this sector is estimated to represent 369b€ per year. Some estimates forecast the global market to represent up to 500b€ annually by 2016, which means a 40% increase based on the 2007 global turnover (COSEI, 2011c).

According to the study by the INPI (2010), a total of 100 patents were registered in France in the field of water sanitation (2009). This number has remained stable over the last ten years. The leading technologies include precipitation of impurities in suspension, absorption, or adsorption.

Wô water recycling system



The Wô water recycling system was developed in order to offer an integrated solution to water supply and use for the business sector. Within businesses, the water consumption cycle is traditionally set up in a linear manner: clean water is fed into the users system and waste water or effluents are then evacuated into a collection system. The system developed by 20 Innovation is aimed at improving the performance of this cycle by making it a closed loop cycle, enhancing each of the processes taking place between both ends of the cycle and improving resource productivity and reducing reliance on external clean water provision.

The system was developed based on the notion of Global Responsible and Sustainable Water Management (Gestion Globale Responsable et Durable de la Ressource en Eau – GGRDRE) developed by Jean Philippe Soleau allowing to overcome the lack of complementarity between individual water management solutions. This global approach allows setting in place a more efficient use of water, resulting in considerable cuts in water consumption levels.

As opposed to traditional treatment systems which work by eliminating pollutants from effluents, Wô instead separates and concentrates pollutants and extracts pure water from effluents.

The system can be put to use in several fields, particularly those which are known to produce high volumes of waste water containing abrasive and non-solvable pollutants. Examples of fields of application include: treatment of waste water produced by industrial platforms, vehicle-washing stations, agriculture, oil-based products generated by industry, and bleaching and dry-cleaning activities.

Source: www.20-innovation.com/

Recycling of industrial by-products and waste into secondary materials and recycling of construction waste

The sector has shown considerable resilience to the economic downturn in recent years, mainly in terms of layoffs and job creation. Its growth potential however will be determined to a large extent by the development of the industrial sector as well as by any increase in obligations to recycle construction waste (currently estimated to represent 245m tonnes in France).

The development of the sector over recent years has been driven by the increased use of secondary materials. In France, approximately 43% of industrial production in 2008 (vs. 38% in 2000) made use of secondary materials. In light of the volume of secondary materials produced by France, the country has become less reliant on the purchase of foreign primary materials, and the commerce of secondary materials contributes to the country's commercial surplus. Indeed, secondary materials exports grew by 13% over the last year, while imports underwent a 6% decrease. In 2009, firms in the sector exported 7.6m tonnes compared to 5.5m tonnes in 1999 (COSEI, 2011b).

In 2008, 868 million tonnes of waste resulted from industrial production mainly from the agricultural and mining sectors. This volume of waste allowed for the transformation of 41 million tonnes of secondary materials.

The sector is mainly composed of SMEs. Two thirds of workers in the field are employed by businesses with more than ten employees, especially in the range of 20 to 49. However, 70% of businesses in the sector have less than 10 employees.

Overall, the waste management, recycling and waste-to-energy market has steadily risen in France since 2002, reaching an annual turnover of €14b and representing 100 000 jobs in 2008. The sector is composed of two leading firms, Veolia and Suez, several additional large firms (Séché, Nicollin), as well as of a considerable number of SMEs. The sector is also characterised by the presence of a number of social economy actors. An important paradigm shift has taken place within public and private spheres away from the traditional vision of waste as a burden. Instead, growing raw material and energy prices and increasing dependency on foreign imports have contributed viewing waste as a potential economic and strategic resource. In addition, the French government has increased efforts to reduce waste production (household and industrial) and increase the share of recycled waste.

A total of 120 patents were registered in France in the field of waste management in 2009. The technologies having displayed high growth rates over the last five years include waste sorting, recycling and decontamination (asbestos). The share of patents of this sector in the total number of patents registered (0.6%) has remained stable in France over the last ten years.

Closing loop in car manufacturing: Renault and SITA France cooperation



The Renault vehicle manufacturing company and SITA France (a subsidiary of Suez Environnement) have joined forces to create a joint venture specialised in the recycling of end-of-life vehicles and the production of secondary materials. This is the first time in France that two companies in their respective sectors create a formal partnership in order to optimise the car-recycling process. Both companies will work together in order not only to improve the recycling process, but also more upstream issues such as car design and use of materials. As a result, the joint venture will promote the development of a more comprehensive approach to vehicle recycling, while allowing collaboration between stakeholders involved in each relevant stage of the process (from car conception and design to the production of secondary materials).

The objectives of the project are part of Renault's environmental programme adopted in 1995, which currently seeks to recycle and transform 95% of each produced vehicle by 2015. The programme includes a set of actions such as increasing the rate of reuse of raw materials in existing processes; developing new processes in the fields of recycling of materials contained in end-of-life vehicles; establish partnerships and collaboration with other actors in the automobile industry.

As part of the programme, Renault has implemented a number of actions such as the creation of the Renault eco2 line of products which guarantees the use of at least 5% of recycled plastics in new vehicles. The company has also integrated design standards into the production line of its vehicles aimed at facilitating the dismantling of used cars and the recycling of detached parts.

Sources: www.sita.fr/ and

www.renault.com/fr/groupe/developpement-durable/environnement/pages/renault-et-sita.aspx

Energy efficient buildings

Residential and commercial buildings currently account for 44% of energy consumption and 23% of CO₂ emissions in France. Increasing energy efficiency through improved building, isolation and energy saving technologies has become a crucial component of France's fight against climate change. Energy efficient building technologies have displayed a high level of dynamism over the last decade, and are expected to continue doing so as a result of the recent adoption of the 'Grenelle' environmental legislation. Under an optimistic scenario, the sector is expected to represent €20b in yearly turnover by 2020, and 110 000 jobs. Registered patents for isolation technologies more than doubled between 2000 and 2009 and there were 70 registered patents for heating technologies in the same year (INPI, 2010). Leading technologies include air convection devices, and control systems. French firms such as Saint Gobin have become leaders in sectors such as innovative materials, dedicating considerable volumes of their budget to R&D activities. Saint Gobin offers a broad array of innovative technologies in three main types of materials: ceramics, performance polymers and glass fabrics.

In France, the construction sector (including all relevant sub-sectors) is estimated to represent 3.5m jobs. Construction firms are for the most part SMEs and micro-enterprises. These firms represent 88% of the turnover in the sector. In addition, over 90% of business in the sector have less than ten employees.

Based on the results of the 4th Community Innovation Survey, the French Ministry of the Environment published a report on innovation activities within construction businesses (suppliers) from 2002-2004. The report highlights the fact that the construction sector is less innovative than the overall commercial sector. This is mostly explained by the structural makeup of the sector (constellation of small and micro-enterprises operating at the national level and a small group of large exporting firms). There appears to be a direct link between the size of businesses and the presence in foreign market and their rate of innovation (COSEI, 2011a).

Degrés Bleus heat recovery and reuse system



The Lyonnaise des Eaux water treatment and sanitation firm has developed a system allowing the recovery of the heat contained in waste water, within its water distribution and recovery network. When recovered, this heat is then re-injected into the heat generation and distribution systems within buildings, resulting in a considerable reduction of energy needs.

The wastewater which flows underground is a source of renewable energy which has been traditionally unutilised. Its temperature usually fluctuates between 12° and 20° year round, making it a source of excess heat during the winter and a means of cooling the air during the summer.

The recovery of the excess heat can be carried out within water collectors which are part of the water distribution and sanitation network, as well as from purified water obtained from water treatment stations. Once collected, this heat is integrated in to the main heating circuit by means of a heat pump.

By using this technology, it is estimated buildings can reduce up to 60% of their greenhouse gas emissions by reducing energy needs for air and water heating. The system offers the possibility to reduce energy costs in light of increasing energy prices and the implementation of the recently adopted carbon tax in France. Degrés Bleus therefore offers several potential benefits:

- Covering from 50 to 80% of total heating and cooling needs
- Reducing GHG emission by approximately 300 tons for a building with 250 residential units
- Projects may be financed in part by the French Energy and Environmental Energy's (ADEME) heat fund, making them potentially less expensive than traditional heating solutions

Source: www.lyonnaise-des-eaux.fr/collectivites/nos-offres/une-innovation-environnementale-impact-economique-positif

4 | New trends and emerging eco-innovation markets

The French government has also identified several high-growth potential sectors which have already begun to gain visibility in the eco-industry market and possess a high innovation potential. According to the BCG report, “these sectors are far from reaching an economic equilibrium, but the expected gains in productivity are so great, that they can be considered to represent tomorrow’s solutions for today’s environmental problems” (Boston Consulting Group). These sectors are for the most part linked to the production of renewable energy (solar photovoltaic, offshore wind), but also include technologies such as the electric and carbon-free vehicle and carbon capture and storage. In addition, the urban planning sector is also expected to take on significant importance in the years to come.

‘Green’ urban planning

In France, cities account for 90% of the national GDP, 80% of the population and two thirds of all GHG emissions. As a result, urban centres are now considered as a key component in all environmental protection strategies. Lowering the energy of these centres will require making use of innovative solutions from a number of domains (air, water, waste, transport) as well as the implementation of innovative urban planning policies and projects.

This particular sector is expected to get a jumpstart from the set of recent public programmes aimed at promoting sustainable cities. As part of the ‘Grand emprunt’ (Great Loan) recently adopted by the French government, the Ecocities project will allocate €1b to 13 selected cities with over 50 000 inhabitants to carry out innovative urban projects (<http://www.ecoquartiers.developpement-durable.gouv.fr/>). The Ministry of the Environment has developed a ‘Green and Blue Pathway’ programme (Trame verte et bleue), which takes on an innovative approach to land and nature conservation by developing a network of open green protected pathways around and within urban centres (<http://www.legrenelle-environnement.fr/-Trame-verte-et-bleue-.html>). Finally, the ‘Advancity’ competitiveness cluster has also been created in order to promote the development of collaborative projects in the field of urban development and mobility (<http://www.advancity.eu/index.html>).

Les petites grèves land development project

Douzy is a small rural community (1 660 inhabitants) located in the French region of Champagne Ardennes. As part of its Local Urbanism Plan, the municipality decided to develop an urban development project covering 23 ha meant to host 300 housing units and 3 mm² of public facilities. The project is known as ‘La petite grève’ and was awarded the eco-neighbourhoods prize in 2009.

One of the main objectives of the project was to create the necessary capacity to increase the population of Douzy by 50% and to increase population density. The Champagne-Ardennes Region is characterised by its widespread rural surface, with a low level of population density, which generates a ‘re-urbanisation’ phenomenon. This configuration is very consuming in terms of land use and occupation, but also in terms of travel and distances covered by inhabitants, promoting the use of vehicles and a higher than average consumption of energy for this purpose. This issue is fairly widespread among French rural urban centres, as well as among European ones.

The project was thus designed to fight this phenomenon by making use of a more ‘intelligent’ distribution of land use for housing, allowing for a more tightly-knit use of land within and urban centre. The project was also designed to diversify land use by including housing complexes along with public facilities such as a community sports centre.

Sources: www.maisonapart.com/edito/autour-de-l-habitat/urbanisme-ville/vers-une-ville-durable---le-palmares-des-eco-quart-p4-3497.php and www.champagne-ardenne.developpement-durable.gouv.fr

Electric and carbon-free vehicles

Eco-innovation in electric and carbon-free vehicle-related technologies are also expected to undergo considerable growth due to recent increases in gas prices, as well as to the need to reduce GHG emissions levels. Developing technologies include improvements in performance of combustion-based vehicles (resistance reductions or hybrid motors), as well as breakaway technologies completely substituting traditional fuel sources and types of motorisation (electricity, biofuels, hydrogen).

Despite the considerable amount of support funding electric vehicle technology has received from public programmes (Israel, California, Denmark, Japan), a global large-scale market is still to be developed. However, it is difficult to anticipate the size this market might grow into over the next decade due its high reliance on public support. Under an optimistic scenario, accumulated production of electric vehicles is expected to reach 100 000 units by 2015 in France, while the European market could potentially represent between €2b and €5b (Boston Consulting Group, 2008). Under similar conditions, electric vehicles could represent between 15% and 20% of the automobile market by 2020.

Due to its high growth potential, as well as to the strength of the French automobile industry, this particular sector is at the top of the French industrial policy and R&D agenda. French authorities have not only implemented a number of CO₂ emission restrictions, but have also set in place supply and demand support mechanisms which are sure to stimulate the sector's growth. Competitiveness clusters such as Mov'eo and Vehicles of the Future have been created, and have already launched a series of projects in the field.

As indicated by a recent OECD publication (OECD, 2011), "though France was not an early player in the field of electric vehicles, an ambitious national policy was launched in 2008-2009 with the announced goal of 2 million electric cars on the roads by 2020". The distinct feature of the French strategy is the importance of the state and national intervention. The government has invested heavily in charging infrastructure (€1.5b in charging points) and has set in place a public procurement policy in order to purchase 100 000 electric vehicles by 2015. The government also heavily subsidised private R&D and production activities such as the €125m capital investment in the Renault battery factory in Flins.

Autolib' electric vehicle-sharing service



Autolib' is the first public electric vehicle-sharing service, developed at the scale of a large European metropolitan area. The service was implemented in October 2011 in Paris and 45 surrounding cities, and allows subscribers to make use of 100% electric cars to and from a number of stations installed in the metropolitan area. Due to the vehicles' exclusive use of electricity as a source of energy, they

produce zero emissions, smell and noise while in use. One of the particularities of the system, particularly in comparison to traditional car rental schemes, is that the user must not necessarily return the vehicle to the point of departure.

The system was developed by Bolloré, which was selected as the official subcontractor by the City of Paris and surrounding municipalities. Bolloré is known for its experience as a producer of components for capacitor used to stock electricity. The vehicles used in the Autolib' system, called Blue Cars, run on a solid-state Lithium Metal Polymer battery with a 200 000 km life expectancy. The battery is able to store up to five times more energy than a traditional battery of the same weight.

Source: www.autolib.eu/autolib-pour-tous/

Carbon capture and storage

Despite the absence of domestic market for carbon capture and storage (CCS) due to the high share of nuclear energy production, French industrial and research actors are in a good position to benefit from the future growth of the sector and have already begun to show particular dynamism. This is mostly due to the fact that French actors are present at every stage of the value chain of CSS (Alston, Air Liquide, Total, GDF Suez, and Schlumberger). This relatively young market is expected to undergo considerable growth due to the current need to reduce the volume of CO₂ released in to the atmosphere by human activities. CCS is increasingly considered as a key ingredient in all scenarios of the fight against climate change, in addition to the development of renewable energies and improvements in energy efficiency. Most scenarios foresee the need to capture and store three to four Gt of CO₂ yearly by 2030. If this objective is to be met, there will be a need for approximately 400 CCS sites. Currently, there are only 20 pilot projects in place. The global market for CCS is expected to reach anywhere between €60m and €120m if these objectives are met.

The prices of CCS processes are expected to undergo a considerable reduction over the oncoming years, making the diffusion of CCS techniques more likely. Currently, the cost of CCS is mostly concentrated around capture procedures (73%), while transport and storage represent 10% and 17% respectively. Although transport and storage technologies are mature, capture technologies are still in a development phase which explains for the lack of competitiveness of prices on the market.

Government regulation will play a key role in the development of CCS due to this technology's dependence on carbon pricing mechanisms. Currently, the difference between the cost of adopting CCS and the value of carbon emission credits is still too important which acts as a counterincentive for technology development and adoption.

5 | Public policy in support of eco-innovation

Eco-innovation has steadily risen to become one of the key issues on the French policy agenda, principally over the course of the last ten years. This is illustrated by the importance given to eco-innovation within the 'Grenelle de l'Environnement' environmental legislation package and the Investments for the Future programme recently adopted by the French government.

The French government has recently launched an ambitious agenda aimed at further developing the country's eco-industrial potential. This strategy is part of a wider environmental protection framework also known as the 'Grenelle de l'Environnement' adopted in 2007. The two pieces of legislation adopted as part of this strategy (Grenelle 1 and Grenelle 2) establish a number of medium and long term commitments including a 85% cut in CO2 emissions by 2050, reducing the economy's energy intensity by 2% per year by 2015, increasing the share of renewable energy sources to at least 23% of energy consumption by 2020, and increasing to 45% the recycling rate of household waste produced by 2015. The French government also committed to allocating a total of €440b in support of the construction, transport, renewable energy, protection of biodiversity, water and waste management sectors over the next decade.

It is within this context that the ministries of Industry and Environment decided to launch the Strategic Committee for Eco-Industries (COSEI) in 2008. This Committee is intended to provide a common discussion grounds for business and public sector representatives in eco-industrial-related sectors. Its main objective is to set forth proposals to develop the eco-industry, based on a clear diagnosis of its strengths and weaknesses, and potential for growth.

The COSEI was responsible for drafting the 'Ecotech 2012' policy document, which represents the main strategic document guiding policy interventions in support of eco-industrial activities. One of the main actions set by 'Ecotech 2012' includes the launching in 2009 of an 'eco-industry' call for proposals aimed at supporting R&D activities in the field. This programme was set to cover a three year period and received a total of €30m in funding. It is implemented by the OSEO innovation support agency and the French environmental and energy efficiency agency (ADEME).

The Investments for the Future (<http://investissement-avenir.gouvernement.fr/>) policy package was adopted by the French government as part of its post-crisis recovery plan. This set of programmes is aimed at promoting innovation and research as a means of developing productivity and competitiveness of the French economy. It provides €35b in funding for research infrastructure, collaborative research and technology platform projects mainly through grants, subsidies and loans. Eco-innovation is one of the main cross-cutting items of the programme, which focuses on fields such as transportation, housing and town-planning, health and biotechnologies. The programme is centrally overseen by the office of the Prime Minister. However, the management of each of the different components or sub-programmes has been delegated to different public bodies such as the Environmental and Energy Management Agency (ADEME) and the National Research Agency (ANR). The budget managed by the ADEME amounts to €2.9b.

A number of actions implemented within the framework of the Investments for the Future programmes build off of the work and the structures of competitiveness clusters. The French competitiveness cluster policy is overseen by the Ministry of Economics, Industry and Finance. The ministry has recently labelled six clusters as 'eco-technology' clusters specialised in subsoil management, water, waste and sustainable buildings. Clusters are mainly funded through the Single Interministerial Fund (FUI) which offers financing opportunities for collaborative research projects carried out by cluster members. During the 2009-2011 period, the FUI provided €600b in support for R&D projects and innovation platforms

(<http://competitivite.gouv.fr/les-appels-a-projets/les-appels-a-projets-de-r-d-dans-le-cadre-du-fui-fonds-unique-interministeriel-380.html>).

The Grenelle and the Investments for the Future initiatives strongly enhanced the group of policy measures aimed at supporting eco-innovation activities by implementing a set of second-generation instruments. Currently, public policy support for eco-innovation in France is composed of a mix of supply and demand oriented measures. However, the supply-side focus is predominant. There has been an important evolution in the approach taken to eco-innovation in policy measures as these have become less sectorial and have developed a more systemic approach to addressing environmental issues. This evolution is illustrated by the creation of cross-cutting and multidisciplinary programmes in fields such as the circular economy.

The national ETAP roadmap of France includes a total of seven measures, most of which are supply side oriented. From an eco-innovation point of view the document sets its priorities on the technological fields of solid waste management, renewable energy generation, technologies for the mitigation of climate change, fossil-fuel energy-efficient electricity generation and energy efficiency and conservation measures in the residential, commercial and industrial sectors (Kietzan-Slamanig et al.).

It is important to highlight that the scope of many of the policy instruments identified as supporting eco-innovation (See Annex I) goes well beyond eco-innovation alone. These instruments, which can be considered as 'generic' innovation support instruments, are for the most part managed by the OSEO innovation agency, and include the loans, grants and subsidies.

In addition to the set of policy measures implemented at the national level, French regions have also adopted policy instruments in support of eco-innovation. The increased importance of the regional dimension of policy-support comes as a consequence of the competencies transferred upon regions in the field of innovation and economic development over the last two decades. Regions today account for 40% of the funding provided by the FUI to competitiveness cluster projects. The 'Responsible Innovation Grant' awarded by the Ile de France region also represents one of the many initiatives taken by Regions in support of eco-innovation.

It is impossible however to present a clear picture of the group of policy initiatives taken by regions in support of eco-innovation. Regional action remains for the time being, considerably scattered. The national government faces difficulties in identifying what is done at the regional level, and there is no group of common guidelines regarding eco-innovation amongst regions or between regions and the national government (Griot, 2011).

There is no single overarching definition given to eco-innovation among all French stakeholders. In general terms however, policy support has tended to put limited emphasis on the resource efficiency and material productivity dimensions of eco-innovation (Merillot, 2010). This is illustrated the absence of such notions in the definition given to eco-innovation by the Ministry of Environment as "the production or integration of novelty in products, process, services or managing techniques throughout their life cycle, in order to significantly prevent or reduce environmental risks, pollution and other negative impacts related to the use of resources" (MEDDTL).

Figure 5.1 Policy measures addressing eco-innovations in France

	Group of policy measures	Type of policy measure	Focus of policy measures (tick if applies)				
			Generic focus on eco-innovation	Resource efficiency improvement	Energy efficiency improvement	Reduction of emissions incl. CO2	Other relevant areas (e.g. renewable energy, etc)
SUPPLY SIDE FOCUS	Equity/business support	Venture capital funds	X				
		Public guarantee funds			X		
	Support for R&D in public sector and industry	R&D funding	X	X	X	X	
		Collaborative grants	X			X	Carbon-free vehicles, circular economy
		R&D infrastructure	X		X	X	
		Loans and Grants	X		X		
	Fiscal measures	Tax incentives for R&D and start-ups					
		Tax incentives for R&D personnel					
	Education, training and mobility	Tailored training courses for companies, entrepreneurs	X				
		Advise/consulting for start-ups, companies, entrepreneurs	X				
		Placement schemes for students	X				
		Support for R&D workers recruitments					
	Networks and partnerships	Competence centres, clusters, science-technology parks	X				
		Technology platforms and innovation networks			X	X	Renewable energy
Foresight and common vision building							
Market intelligence and other forms of information sharing		X					
DEMAND SIDE FOCUS	Regulations and standards	Regulations, targets, cap & trade schemes					
		Performance standards, labelling, certification	X				
	Public procurement	“Green” public procurement of goods and services	X			X	
		R&D procurement					
		Pre-commercial procurement					
	Technology Transfer	Advisory support for technology adopters	X				
		Financial or fiscal support for technology adopters (e.g. grants for purchasing new technology)					
	Support of private demand	Tax incentives for consumers (e.g. for purchasing environmentally efficient products)					
		Tax reductions for products and services (e.g. VAT reductions)					
		Demand subsidies (e.g. eco-vouchers, consumer subsidies)					
		Awareness raising and information provision					

The European Environment Agency's Survey of resource efficiency policies in France mentions that in France, the use of resources is "at present, managed from a more economic perspective rather than environmental one i.e. ensuring security of supply and reducing external dependence. The waste prevention and management policies remain, at present, a stand-alone area of environmental policy. Nevertheless they are being progressively integrated into some sector based policies as part of the work on the safety of waste materials, the waste management policy is more and more looking at including a whole life-cycle approach" (EEA, 2011).

In overall terms, the French policy framework aimed at supporting eco-innovation can be characterised as a hybrid framework, composed of first and second-generation measures with a mixed approach to

eco-innovation. A first group of policies was developed on the basis of a more orthodox approach to innovation, aimed at supporting solutions to improve solution control and other end-of pipe technologies. More recently adopted policies have developed a more comprehensive approach to eco-innovation, placing a stronger emphasis on upstream innovation mainly by supporting solutions resulting in a more rationalised use of resources and the creation of closed-loop systems.

6 | Main findings

6.1 Strengths and weaknesses of eco-innovation in France

One of the strengths of France in terms of eco-innovation relates to the fact that it has a well-established industrial sector, with important assets in terms of know-how, technology and market presence in fields directly related to the environment. France has leading international firms in fields such as water and waste treatment, transportation, energy, and construction. Many of these firms have produced innovative solutions allowing urgent environmental issues to be addressed.

In addition to this, the French government has implemented a wide spectrum of support instruments aimed at promoting eco-innovation, as well as a comprehensive set of environmental protection regulatory measures. This regulatory and policy framework is of great relevance in the context of the French economy and productive sector, which have been demonstrated to be particularly responsive to the regulatory-push pull effect resulting from the implementation of environmental policy instruments².

On the other hand, France suffers from a lack of SMEs with the necessary internal capacities (human and financial) to carry out their own innovation activities, able to bring more step-changing and radical innovations to the market. Eco-innovation in France is currently driven to a large extent by large multinationals which specialise in the provision of environmental services. These companies rely heavily on SMEs to provide them with innovative technologies. However, due to their limited size, SMEs have limited innovative capacities (Griot, 2011).

An additional weakness relates to the complexity of the support system created by public authorities. Potential innovators often see the development of an innovation project as an overwhelming task, due to their lack of understating of possible support mechanisms and the time required to prepare applications and administrative requirements (Griot, 2011). The level of fragmentation of the support system is partly a result of the lack of coordination among the main stakeholders responsible for its implementation.

Figure 6.1 Strengths and Weaknesses of France in the promotion of eco-innovations

Strengths	Weaknesses
<ul style="list-style-type: none"> - The size the eco-industry and existence of large multi-national firms which drive the growth of the sector and innovation. - A dense eco-innovation policy-support system both at the national and regional level. Existing policy actions cover all stages of the innovation cycle. - Significant presence of French eco-industries in foreign markets, and particularly high-growth developing countries. - An ambitious policy agenda, which sets environmental protection objectives in the short, medium and long term. 	<ul style="list-style-type: none"> - The lack SMEs with the necessary internal capacities in order to generate step-changing and radical eco-innovations. - A highly fragmented eco-innovation policy support system, which often deters potential beneficiaries from gaining access to it. - A persistent 'market-push' approach to eco-innovation, which sets a priority on the market value of innovation rather than on its medium to long-term environmental, social and economic benefits. - Weak knowledge circulation and transfer among key stakeholders, particularly from research to industry.

² See the work of Belin, Horbach and Oltra.

6.2 Opportunities and threats to eco-innovation in France

There are significant **opportunities** to be seized by French eco-industries particularly in high-growth potential developing countries. A number of large firms are already present in these markets and plan to continue their expansion.

In addition to this, there are significant market niches to be developed mainly through the integration of value chains in the production of environmental goods and services. Some firms have already begun to establish partnerships or diversify their activities in order to develop and acquire competencies in market segments that have remained traditionally untapped.

In terms of threats, the French economy and productive sector are still highly dependent on nuclear energy, strongly limiting their capacity to develop innovation in the field of alternative and renewable energy resources. In addition, the approach to eco-innovation currently in place places a strong emphasis on the market value of innovative solutions, while neglecting to take into consideration the social and environmental medium to long-term impact.

Figure 6.2 Opportunities and Threats for eco-innovations in France

Opportunities	Threats
<ul style="list-style-type: none"> - The growth of eco-industries in developing countries; - Niche market opportunities by making use of complementary know-how and skills of historical industrial leaders. - Integrating value chains in the production of environmental goods and services. - Possibility to increase the demand-side drivers of innovation, by promoting more environmentally oriented consumption behaviours. 	<ul style="list-style-type: none"> - High dependence on nuclear energy, which acts as a counter incentive for the development of innovation in the field of renewable energy. - Continued predominance of large multinationals in the eco-industrial sector, limiting the growth potential of a larger number of smaller players. - High dependence on regulatory measures for the promotion of eco-innovation, making it vulnerable to political changes.

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ANNEX 1. Policy measures addressing eco-innovations in France

	Group of policy measures	Type of policy measure	Specific measure <i>Please provide reference to or brief summary of specific measures (national, regional) add cells if necessary</i>	Focus of policy measure (tick if relevant)				
				Generic focus on eco-innovation	Resource efficiency improvement	Energy efficiency improvement	Reduction of emissions incl. CO2	Other relevant areas (e.g. renewable energy, etc)
SUPPLY SIDE FOCUS	Equity/business support	Venture capital funds	DEMETER Common Fund for Risk Placement (http://www.aides-entreprises.fr/repertoireaides/aides.php?e=NTA3NQ=&id_ter=) offers support for SMEs in the field of sustainable development.	X				
		Public guarantee funds	Energy Management Investment Guarantee Fund (FOGIME - http://www2.ademe.fr/servlet/doc?id=40695&view=standard) is aimed at promoting SME investments towards a more rationalised used of energy. It provides a supplementary financial guarantee for bank loans in order for SMEs to finance their investment projects.			X		
	Loans and grants	OSEO start-up loan (prêt participatif d'amorçage) allows businesses to strengthen their financial structure while facilitation and preparing their first capital fundraising and finalising innovation programmes.	X				Covers fields other than eco-innovation	
		OSEO grants for the creation of innovating businesses (http://www.oseo.fr/votre_projet/innovation/aides_et_financements/aides/aide_a_la_creation_d_entreprise_innovante) provide support for entrepreneurs to define their business plan and verify the feasibility of their innovation project.	X				Covers fields other than eco-innovation	
		Grant for technology transfer for public research organisations (http://www.oseo.fr/votre_projet/innovation/aides_et_financements/aides/aide_au_transfert_de_technologies_pour_les_organismes_publics_de_recherche) is aimed at facilitating the purchase of research outcomes generated by public laboratories by businesses.	X				Covers fields other than eco-innovation	
		Grant for responsible innovation provided by the Ile de France regional council is directed at regional SMEs wishing to implement eco-innovation or eco-design projects (http://www.lieududesign.com/aide-a-l-innovation-responsible-air-aides-a-l-innovation)	X					
	OSEO Green loans (http://www.oseo.fr/votre_projet/croissance/aides_et_financements/financements_bancaires/pre_t_vert_bonifie) were developed as part of the Investments for the Future programme. They are awarded to SME wishing to carry out environmentally-oriented investments or to introduce market introduction of			X				

			environmental goods or services.					
Support for R&D in public sector and industry	R&D funding		ECOTECH sustainable production and environmental technology programme (http://www.agence-nationale-recherche.fr/ECOTECH-2011): the general objective of the programme is to promote the creation and dissemination of innovative technologies or services by supporting research on technological, organisational, regulatory, economic and social issues. The French Environmental and Energy Agency's support for R&D and innovation projects: calls for proposals in the fields of new knowledge research (excluding fundamental research), support for eco-innovation, industrial research, experimental development (http://www2.ademe.fr/servlet/KBaseShow?sort=-1&cid=96&m=3&catid=24280)	X		X	X	
			OSEO's projects aimed at developing competitiveness clusters (PSPC - http://www.oseo.fr/a_la_une/agenda/appels_a_propositions/aap_r_d_structurants_des_poles_de_competitivite)					Covers fields other than eco-innovation
	Collaborative grants	Vehicle of the future programme funded by the 'Investments for the Future' programme (http://investissement-avenir.gouvernement.fr/content/action-projets/les-programmes/transports): the programme is aimed at supporting the development of innovative and sustainable technologies and organisations in the field of surface transports. Financial support for collaborative demonstration projects between public research and industrial players. The 'Investments for the Future' Circular Economy programme (http://investissement-avenir.gouvernement.fr/content/action-projets/les-programmes/%C3%A9nergie) is aimed at supporting innovating projects and research demonstrators. The programme also allows for the creation of technology platforms gathering public and private research actors while pooling research resources.	X			X	Carbon-free vehicles Circular economy	
	R&D infrastructure	Excellence institutes for carbon-free energy: as part of the French Government's Investments for the Future programme (Investissements d'Avenir) support is granted for the creation of institutes gathering higher education institutions, public and private applied research laboratories, businesses and demonstration infrastructure (http://investissement-avenir.gouvernement.fr/content/action-projets/les-programmes/%C3%A9nergie). Shared innovation platforms (http://competitivite.gouv.fr/les-investissements-d-avenir-une-opportunit%C3%A9-pour-les-poles-de-competitivite/les-projets-de-plates-formes-mutualisees-d-innovation-une-opportunit%C3%A9-pour-les-poles-de-competitivite-659.html) are aimed at offering competitiveness cluster members open access to shared resources (equipment, personnel, and additional services) in order to carry our R&D projects.			X	X	Renewable energy	
Fiscal measures	Tax incentives for R&D and start-ups							
	Tax incentives for R&D personnel							

	Education, training and mobility	Tailored training courses for companies, entrepreneurs	French Environmental and Energy Agency training and courses for decision-makers and companies (http://formations.ademe.fr/index.php?s=produit) The French National Research Agency's 'Institutes for Technological Research' are interdisciplinary institutes gathering industrial and public research actors in order to promote industrial or services development. IRT cover all innovation stages, from demonstration to industrial prototypes (http://competitivite.gouv.fr/les-investissements-d-avenir-une-opportunite-pour-les-poles-de-competitivite/les-instituts-de-recherche-technologique-irt-campus-d-innovation-654.html)	X					Covers fields other than eco-innovation
		Advise/consulting for start ups, companies, entrepreneurs	French Environmental and Energy Agency market studies for entrepreneurs (http://www2.ademe.fr/servlet/KBaseShow?sort=-1&cid=96&m=3&catid=24575) National Institute for Industrial Property's (INPI) pre-diagnoses (http://www.inpi.fr/) offer businesses an evaluation of their needs in terms of industrial property. The service is financed by the INPI or regional council, making it free of cost for businesses.	X					
		Placement schemes for students	The French Environmental Agency's scholarships for doctoral students (http://thesenet.ademe.fr/)	X					
		Support for R&D workers recruitments							
	Networks and partnerships	Competence centres, clusters, science-technology parks	French national competitiveness cluster programme (http://competitivite.gouv.fr/): French competitiveness clusters bring together large and small firms, research laboratories and educational establishments, all working together in a specific region to develop synergies and cooperative efforts. The French government provides financial support via the Single Interministerial Fund (FUI) for collaborative R&D projects and innovation platforms. Regional councils also provide complementary support for governance structures and projects. The French government has recently awarded the 'eco-technology competitiveness cluster' label to six new clusters.	X					
		Technology platforms and innovation networks	Demonstrators and technology platforms for renewable energy and green chemicals: as part of the French Government's Investments for the Future programme (Investissements d'Avenir) funding is provided for the creation collaborative platforms aimed at supporting the demonstration of new environmental technologies.			X	X		Renewable energy
		Foresight and common vision building							

		Market intelligence and other forms of information sharing	The Orée association gather businesses, local governments, corporate sector associations, education institutions and non-governmental organisations in order to carry out a collective debate regarding the best solutions in favour of an integrated environmental management (http://www.oree.org/presentation/objectifs.html).	X					
DEMAND SIDE FOCUS	Regulations and standards	Regulations, targets, cap & trade schemes							
		Performance standards, labelling, certification	NF environment eco-label awarded by the AFNOR certification agency (http://www.ecolabels.fr/fr/la-marque-nf-environnement-qu-est-ce-que-c-est)	X					
			Environmental Technology Verification scheme managed by the French Environmental and Energy Agency (ADEME)	X					
	Qualit'ENR association for the promotion of high-quality service provision of renewable energy systems (service provisions labels - http://www.qualit-enr.org/document/Menu_Haut/Qualit_EnR/Identite/index.htm)		X						
	Public procurement	"Green" public procurement of goods and services	Electric vehicle procurement group (http://www.ugap.fr/actualite/actualites/actualites-ugap/les-vehicules-electriques-retenus-par-le-groupement-de-commandes_10171): As part of its electric vehicle plan, the French government created this group in order to facilitate the purchase, on behalf of public organisations, of electric vehicles. City of Tomorrow programme funded by the 'Investments for the Future programme' (http://investissement-avenir.gouvernement.fr/content/action-projets/les-programmes/urbanisme-logement): Financial support is provided to cities wishing to invest in sustainable development technologies.	X				X	
			R&D procurement						
			Pre-commercial procurement						
	Technology Transfer	Advisory support for technology adopters	French Environmental and Energy Agency's technical and economic feasibility studies for technology adopters (http://www2.ademe.fr/servlet/KBaseShow?nocache=yes&m=3&sort=-1&cid=96&catid=14981&p1=0)	X					
		Financial or fiscal support for technology adopters (e.g. grants for purchasing new technology)							
	Support of private demand	Tax incentives for consumers (e.g. for purchasing							

		environmentally efficient products)						
		Tax reductions for products and services (e.g. VAT reductions)						
		Demand subsidies (e.g. eco-vouchers, consumer subsidies)						
		Awareness raising and information provision						

About the Eco-Innovation Observatory (EIO)

The Eco-Innovation Observatory (EIO) is a 3-year initiative financed by the European Commission's Directorate-General for the Environment from the Competitiveness and Innovation framework Programme (CIP). The Observatory is developing an integrated information source and a series of analyses on eco-innovation trends and markets, targeting business, innovation service providers, policy makers as well as researchers and analysts. The EIO directly informs two major EU initiatives: the Environmental Technologies Action Plan (ETAP) and Europe INNOVA.

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