Università degli Studi di Ferrara

RIPARTIZIONE RICERCA
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Al MAGNIFICO RETTORE

SEDE

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Scheda per la presentazione del progetto

Il sottoscritto MASSIMILIANO MAZZANTI chiede l'assegnazione di un contributo di € 7000 per l'avviamento del progetto sotto descritto, a valere sui fondi di Ateneo 2012 per la promozione di iniziative di internazionalizzazione.

DESCRIZIONE PROGETTO
(il progetto può essere descritto in lingua italiana o in lingua inglese)

TITOLO:

Greening the economy through environmental innovations.

Integrated innovation processes, socio-economic performances and the role of policy

1. Concept and objectives

The advancement towards a greener and more competitive economy is possible only if all components of social welfare are taken into account by firms, stakeholders, policy makers. Environmental innovations (EI, Rennings, 2000, 1998) are a key factor, as it is well known that sustainable economic growth depends upon a constant investment in technological and organizational/labour related new ways of managing production. The EI potential must be enriched and embedded within a very broad set of related factors and economic, social environmental effects. One of the most recent definitions of eco-innovation defines it as the production, application or use of a product, service, production process or management system new to the firm adopting or developing it, and which implies a reduction in environmental impact and resource use (including energy) throughout its life-cycle. This definition includes innovations whose environmental effects are not intentional. A relevant distinction can be made between end-of-pipe technologies and clean technologies integrated in the production process. EI in technological and organizational flavours is an important part of the transition to a more sustainable society but is not the only element that needs to change. The move towards and the progress forward the green economy requires a

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complete understanding and analysis of the nexus between institutional, technological, political, economic and societal factors to envisage a new paradigm. This is learning by doing exercise that must involve all communities together: academia, research, and policy makers, business, and workers representatives, NGO, civil society. That is all agents who possess stakes and may provide skills and knowledge to integrate sustainability with economic competitiveness, including the consideration of social-economic values beyond profits and GDP. This requires a sharp and deep knowledge 'from inside' of how EI develops and is adopted by social organizations and how it spreads throughout the economy. From inside means to consider how economic and social institutions perceive and react to the challenge of establishing a green economy. From inside perspectives (the firm behaviour, the role of workers inside the firm, the interactions between firms and policy makers, firms and unions, etc.) should then meet the exogenous forces that trigger EI at a macro level.

Though energy efficiency has largely increased over the past century, environmental pressures are currently still worrying given that the scale effect driven by population and GDP (all effects captured by the IPAT model which may root both decomposition and econometric analysis) surpass the significant effect of technologies. This means that more radical EI changes and full integration between EI and other business practices are necessary to increase our chances to achieve EU policy targets and overall sustainability.

If in fact relative delinking has occurred for many local environmental pressures, and even for CO2 in the recent EU experience, absolute delinking is far from being achieved for CO2 at global level and for waste generation at EU level. Figures say that he 20th century witnessed a 23 fold increase in GDP faced by 'only' 12 in fossil fuel use and 8 in material use. On the other hand, challenges from now to 2050 are vibrant: use of water is predicted to jump from 182 billion litres to 327, GHG from 30 to 78 billion tonnes, materials from 7 to 13 billion tonnes.

Focusing on specific sectors dynamics is also relevant (see TNO related works by Diaz Lopez and Montalvo, 2012; Montalvo et al., 2012): one example among others, one of the most polluting sectors (under EU ETS policy), cement, and will enlarge its CO2 impact from 1.1 to 3.2 billion tonnes.

How to spur the adoption of new or significantly improved products or processes, organizational or marketing methods that create environmental benefits by firms, and which have to be considered valid determinants of the adoption of such environmental innovations, are central and widely debated topics.

In particular, it is possible to outline a list of determinants, which are found to be relevant in the literature for the adoption of environmental innovation by firm.

At first specific firm characteristics such as Sector, Region, Age and Size are found to be significant (Rehfeld et.al, 2007; Ziegler and Rennings, 2004; Del Rio, 2009).

The so called "market pull variables" play a role, such as turnover expectations and economic performance of the past (Horbach et al. 2012, Horbach, 2008).

On the other side also "technology push variables", i.e. those related to improvements in the technological capabilities of firms matter, in particular R&D and/or the presence of knowledge capital but also the presence of organizational innovations and management schemes, mainly ISO 14001 and EMAS have come to be relevant (Horbach, 2008; Wagner, 2007; Ziegler and Rennings,

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2004; Rennings et al., 2006). Cooperation with other 'stakeholders' and research institutiosn may matter as well (De Marchi, 2012).
Regulation and environmental policies have also found to significantly the adoption of environmental innovations (Jaffe and Palmer, 1997; Cleff and Rennings 1999; Brunnermeier and Cohen 2003; Costantini and Crespi, 2007, 2012; Costantini and Mazzanti, 2010; Frondel et. al, 2004; 2008, Horbach and Rennings, 2004; Rennings et. al, 2006; Jaffe et al., 2002; Johnstone et al., 2012; Rennings and Rexhauser, 2010), although with some mixed results when referred to the European Trading Scheme effects in Italy (Borghesi et.al, 2012).
Lastly the existence of innovative oriented industrial relations and networking activities have to be treated as determinants of those innovations with environmental benefits (Mazzanti and Zoboli, 2009).
Eco (or environmental) innovations are reaction to changes in conditions (Schumpeter, 1947). Firms and sectors react to market and policy changes to adapt and generate new business opportunities (Costantini and Crespi, 2012; Crespi, 2012). The climate change increasing potential threat, the necessity to reduce waste generation are among other 'environmental changing conditions', which have been related to the introduction of various policy packages in the EU. Those policy packages, which are key stones in the EU, have possibly driven and induced environmental innovations, which bridge between environmental performance and innovation.
The relationships between environmental performance and innovation patterns has received increasing attention in the current policy agenda of advanced economies, and in particular within the European Union (EU), within the general debate around climate change adaptation and mitigation action's costs and benefits that has followed the famous Stern Review. Environmental regulation and innovation patterns are increasingly jointly investigated in order to understand how to ensure the conditions for fostering economic development while protecting the environment (Jaffe *et al*., 2002; OECD, 2011; Costantini and Mazzanti, 2012).
We below conceptually discuss the main issues the project revolves around.

1.1 Complementarity, environmental innovations, firm's performances

What is possibly lacking is a full assessment of the links (searching for complementarities) between EI and 'non EI innovations and organizational changes', within a broad perspective that embeds in and enriches EI with links to workers conditions, relationships between the firm and its stakeholders, including the key role of unions. This perspective is crucial to identify successful and unsuccessful EI within the pathway towards the multiple environmental economic and social aspects the green economy should try to bring together. Stakeholder's involvement through case studies and interviews is often used – in absence of data - as a way to analyse and calibrate the diffusion of innovation. Collantes (2007) propose scenarios for fuel cell vehicles.
In fact, the definition of EI as noted is not only about specific technologies; it includes also new organizational methods, products, services and knowledge oriented innovations. Organisational methods are also closely linked to education and training, and then human capital formation within firms. It is worth spending some words on the definition of organisational changes, at least as we intend them here. The literature often adopts the term High Performance Workplace Practices (HPWP), to define a set of organisational changes which can be thought as drivers of superior innovative or economic performances for the firm, or beyond that we can state. Coupled with this

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set of practices that are related to changes in production organisation and labour organisation, Human Resource Management (HRM) practices are also relevant, which are associated with the training activities sphere. The human capital embodied in employees becomes a fundamental resource since "innovating organization benefits from a strong skill-base" (Leiponen, 2005, p.304), which is able to sustain and to direct absorptive capacity. It becomes clear the importance of training activities that help generating and accumulating skills and competencies: this is overlooked with reference to EI adoption and development. Indeed, when a firm passes through organisational changes, such as the introduction of HPWP, then the employees could be asked to learn how to manage and how to behave in a new organisational environment. Reconfiguring the organisational system in a way that increases the workforce involvement and skill base, through the implementation of complementary HPWP/HRM practices, may be functional to the creation of an environment that smoothly absorbs and exploits also radical innovations. The potential relationship between HRM/HPWP and EIs is fully pointed out as a core issue by the scholars that study the development of the well known Porter Hypothesis (PH) within 'Social Corporate Responsibility' issues (Diaz Lopez, 2011; Ambec and Barla, 2006; Ambec and Lanoie, 2008; Ambec et al., 2010).
Complementarity is an issue which pertains both the drivers of EI and its effects on performances. Key is its role to achieve win win green technological and competitiveness outcomes.
The role of innovation in the export-productivity relationship has been widely documented (Cassiman et al, 2010). Big emphasis has been devoted also to the role of innovation on the different productivity patterns of firms, sectors and countries (Griliches, 1998; Crespi and Pianta 2008; Bassanini and Scarpetta, 2001).
Intuitively, the basic reasoning is the following: only more productive firms may afford the fixed costs of exporting, as well as only more productive firms may afford the fixed costs of innovating. Moreover, innovation implies lower marginal costs of production. Hence innovators may charge a lower prices on the goods they sells both in the domestic and in the foreign markets, and, if the foreign demand is assumed to be elastic, innovators find exporting more profitable than non-innovators.
Through product innovations firms upgrade their products to meet the foreign consumers' preferences and to adequate to foreign market standards and regulations (also the environmental ones). Instead, through process innovations firms improve their production processes receiving cost advantages; hence, they can charge lower and competitive prices on the foreign markets and expect higher profits from exports, which in turn increase their probability of exporting.

1.2 Sustainable development and EU policies towards a green competitive economy

The issue within the green economy arena, which has renewed interest in sustainable development, is whether short and long run environmental and economic performances might be complementary (Costantini and Mazzanti, 2012, 2013). The 2008-2009 downturn, whose consequences are far from being over in terms of unemployment and GDP performances, has renewed attention on the necessity to (i) rethink the paradigm of growth (ii) greening the economy for environmental and economic sustainability.
The various Green economy packages that were implemented in 2009 after the G20 in April (in the EU, US, Korea, China) were another shock and change in conditions. One may wonder whether they were too mild, or lack specificity in terms of innovation targets. In fact, as it is shown in table

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1, EU environmental innovation performances present strong heterogeneity across countries and themes.
In any case, a process has started. The need is not to take stock of the past effects and think of the evolution of the economic system from now on.
The European Commission proposed "A European Economic Recovery Plan" – EERP which called for a commitment of €200 billion to address the economic crisis and set out a programme to direct action to "smart" investments, including (a) infrastructure and energy; (b) energy efficiency in buildings; (c) the development of green products; (d) research and innovation. Saha and von Weizsäcker (2009) estimated that €395 billion of measures were allocated in EU-27 in 2009, representing around 3% of GDP of EU-27.
National recovery packages are expected to have the key role in the EERP and the measures for recovery adopted by the 27 Member States have already been reviewed by the EC in March 2009. Half of 500 specific measures outlined in the national recovery plans can be considered as a new response of governments to the crisis, while the rest are part of medium-term reform strategies in the framework of the Lisbon Strategy. Of the 500 measures some 30% are classified as "supporting industrial sectors, business and companies", whilst a lowest share (16%) is for "supporting the labour market". More than half (55%) are expected to boost "aggregate demand" (consumption, investments) and a large share (28%) are considered relevant for supporting employment. According to the EC, it is too early to comprehensively assess the impact of these measures, including their possible impacts on green economy. Despite that, some initial indications can be made.
A number of measures across different policy areas seem to be of relevance for a green economy. Among the policies towards "industrial sectors, businesses and companies", most measures are fiscal incentives or direct subsidies to consumers in the car, tourism and construction sectors, sometimes also related to environmental policy objectives, e.g. reducing CO2 emissions. One example is measures to support demand in the car industry, which combine tax exemptions for cars with lower CO2 emissions with a financial incentive for scrapping an old vehicle when buying a new one (e.g. in Germany). In some countries, investments in social infrastructures (health care, social housing, long-term care) are intended to support the construction sector and generate employment.
Within measures to support "investment activity", energy efficiency measures represent an important share (25%) and are directed either at households or businesses. They generally comprise financial instruments for promoting investments (e.g. subsidies, loans with lower interest rates, tax credits), regulatory instruments (for buildings, on energy saving production), and public grants. A number of such measures are part of medium to long term programmes, e.g. energy efficiency in buildings. In the same category, R&D and innovation measures (33%) mostly comprise funding, both across the economy, specifically targeting start-ups, SMEs and sectors (e.g. automobile), and funding for specific purposes (e.g. green transport and biotechnology).
Ecological tax reforms are also one way to reconcile the environment and economic growth. They may spur environmental innovation, which is the key factor, by funding public expenditures on innovation and by changing market price conditions. Over the dynamic, the long run effects may be substantial.

ADB/cf

One of the main premises of the market economy is that goods and services are freely traded on the market and supply and demand defines the price. The reason for many environmental problems is that global prices (on resources, energy, waste and pollution) do not reflect the real costs (no internalisation of environmental effects) to society, for example from air pollution or degradation of ecosystems. This in its turn leads to that private households in the developed world have had an "over-consumption" of material goods inter alia due to relatively low prices (made possible by the movement of production to regions with low labour costs, and due to low transport costs). In addition, governments have been eager to keep the price of energy low to maintain the competitiveness of businesses. Due to the relatively low prices on resources and high costs of labour there is no price incentive to buy high quality goods, which last longer, or to repair them. Hence, our present consumption leads to the increasing amount of waste. Furthermore, there is little incentive to produce goods, which can be reused or recycled, or that are designed with environmental criteria in mind. One of the main steps to address this deficit is by implementing an Ecological tax reform (ETR) as an essential complementary element in the policy tool kit aimed at long-term sustainable growth that can help the EU to further strengthen its global leadership in environmental sphere. Especially in times of (social) crises, the ETR is a way to reassess the (social) "model of development" and to redirect the growth/development machine towards long-term equity and quality of life (Ekins and Speck, 2011; Andersen and Ekins, 2009).
Ecological tax reform may be emphasised as a specific set of measures to achieve a greener structure of the economy. In addition to the usual "double dividend"(employment + environment) – or even "triple dividend" (employment + environment + innovation), ETR may provide other dividends depending on economic policy priorities. Fiscal measures can also help increase production of greener products and private provision of public goods.
The employment impact of environmental innovation and innovation in general are extremely crucial in the present situation, to tackle both the harsh unemployment performance we are witnessing and achieve the EU202020 and Lisbon agenda targets. Innovation, economic specialization, industrial relations and policy all matter together. Though recent attention has been placed by EU scholars on the theme (Horbach et al., 2012), the employment effects of innovations have been studied extensively outside the green economy paradigm.
Such studies showed that technological change plays a major role in shaping the quantity and quality of employment. Firm-level studies have shown that innovations in products and in processes generally lead to a positive direct employment effect on the firms that introduce them. Innovative firms tend to increase jobs faster than non-innovative ones. However sectoral analyses highlighted that innovation appears to have a net job-creating effect in those manufacturing and service industries characterized by high demand growth and an orientation towards product innovation, whereas new processes generally result in job losses (Vivarelli, Evangelista and Pianta, 1996; Pianta 2001; Evangelista and Savona, 2003; Mastrostefano and Pianta, 2009).
Moreover, the impact innovation has on the quality of jobs has attracted widespread attention. The dominant findings of the econometric literature is that the diffusion of technologies has a strong skill bias effect, while it has a less evident effect on wage polarisation (Pianta, 2005, Chennells and Van Reenen, 2002; Acemoglu, 2002). In this respect, information and communication technology is seen as a key factor accelerating the upskilling process, as first argued in early studies on the US by Berman, Bound and Griliches (1994) and Autor, Katz and Krueger (1998).

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This framework of studies offers relevant insights for studying the impact of eco-innovation on the quantity and quality of employment. It is in fact relevant from the job/skill perspective to hold attention on the importance and developing of green jobs, with specific insights on green competences and skills, in brown sectors (e.g. green technology engineering in the chemical industry or steel), and how skills and competences – not only narrowly green - develop and are related to innovation in 'green firms' in 'green sectors' (e.g. green technology developers).
Research shows that green investments, particularly in renewable energy and eco-construction, are potentially significant engines for job creation. A study recently realized in the UK estimated that 400 000 gross jobs could be created by 2015 if plans to reduce greenhouse gas emissions were realised (Innovas, 2009). In the US, money invested in energy efficiency and renewable energy is estimated to produce between two and a half and four times as many jobs as the same dollar invested in producing energy from oil (Pollin et al., 2009). Moreover "green" technological change, is causing important shifts in labour markets and skills needs. Public policies and enterprise strategies in many areas are directed towards the creation of innovative, clean and greener economies. Availability of skills for green jobs plays a crucial role in triggering change and facilitating this transition (ILO, 2010).
Green technologies and green jobs role is to be ascertained first in strict integration with HRM and human capital creation within firms, then those factors are to be integrated in the full picture of 'techno-organizational changes' of a firm, where the firm is an entity which is by necessity defined through soft boundaries. In fact, all stakeholders and social values might be within its boundaries in a green economy perspective. This is a way to reconcile environmental, social and economic performances.

1.3 Extending the Eco Innovation realm: broadening relations, impacts, diffusion

The efforts placed in the past towards the advancements to greener economy must be recognised, assessed, and put into a dynamic perspective.
This also means that we should methodologically pay attention both at the ex post facts – what we have observed and learnt so far and ex ante facts – what paths and innovation dynamics we should expect from now on. Both perspectives are needed and brought together in the effort of accelerating the path towards the green economy.
Notwithstanding the core role played by eco innovation in the achievement of green economy sound pathways, there is a real need to widen the scope of its comments and effects. Eco innovation should not be thought as an isolated factor, or linked to environmental outcomes only. They are certainly the first objective of environmental policy and induced environmental innovation. Nevertheless, a wide spectrum of economic issues – effects and related factors of EI- should be analysed.
The green economy points to the integration between economic and environmental performances. The employment effects of induced EI are certainly crucial. Human capital is nevertheless a key factor in a broader meaning. The 'quality' of employment creation – namely skill contents of the workforce, the workers conditions in the firm, the social effects of economic activities in the territory and impact on social stakeholders are all effective parts of the competitiveness at micro, meso and macro levels. Within this, we also observe that a broad definition of economic competitiveness in the green economy – economic, social, environmental effects - is also a

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consequence of how industrial relations work – that is the role of union's – management interactions, of the links to civil society pressures and interests – the role of NGOs but not only that. Unions are undoubtedly one of the most important stakeholders in the process of innovation activities, both for environmental and non environmental innovations. They play an important role on the strategic orientation of the management towards innovation (Metcalf, 2003; Menezes-Filho and van Reenen, 2003). Unions may directly hamper the introduction of innovations because of conservative behaviours and they indirectly reduce the incentive to innovate for the management because of their rent seeking activity. However, if unions and management establish a win-win strategic behaviour in pursuing common goals and gains within a non-adversarial climate, the presence of unions can be an element that spur innovation activity. The quality of industrial relations emerges as a key factor in securing a win-win strategic orientation. In addition to the role played by unions, as vital elements of the institutional context, on the innovative activity of the firms it cannot be neglected the linkage between a good climate of a firm-level industrial relations and the working conditions of the employees. In fact, it can be argued that within a participative kind of management/unions relation, the latter are able to influence management decisions on innovation implementation, securing organisational configurations having a positive or at least non detrimental impact on workers' conditions.

This argument links the present micro meso oriented discussion on the green economy to to the beyond GDP debate that has also be relaunched during the 2009 downturn by the Sen-fitoussi-Stiglitz report. Beyond GDP measurement is possible through, as example, MEW (Measurement of Economic Welfare), HDI (Human Development Index), GPI (Genuine Progress Indicator), SNBI (Sustainable Net Benefit Index) and ISEW (Index of Sustainable Economic Welfare) indicators. The latter is specifically relevant and possibly interesting for green economy assessment and advancements, at last to set a general framework. It embeds environmental, social, health, economic issues.

At conceptual level, the micro/meso reasoning on the wide array of EI drivers and effects is encapsulated in the beyond GDP arena, where ISEW is a powerful framework.

To correct the well-known limitations of GDP as a welfare measure (cf. Sen et al., 2009), several alternative indicators have been proposed over time, such as MEW (Measurement of Economic Welfare), HDI (Human Development Index), GPI (Genuine Progress Indicator), SNBI (Sustainable Net Benefit Index) and ISEW (Index of Sustainable Economic Welfare). The latter, originally introduced by Daly and Cobb (1989), has been recently applied to several countries and over different periods (cf. Prochowicz and Sleszynski, 2006, for Poland, Jackson and Stymne, 1996, for Sweden, Jackson et al., 2008, for the UK, Pulselli et al., 2006 and 2011, for Tuscany and a few Italian cities). Following the seminal papers by Leipert (1989) and Leipert and Simonis (1989), the ISEW introduces among the corrections terms also the so-called "defensive" expenditures, namely, all the expenditures that individuals have to face to self-protect from the degradation of the environmental and/or social capital. The existing studies show a systematic and increasing decoupling from the 1970s onwards between the ISEW and the GDP in all the contexts being examined. This empirical evidence seems to support the results of the theoretical literature on this issue. In fact, using both neoclassical and evolutionary game theoretical models, several contributions (e.g., Antoci and Bartolini, 2004; Antoci et al., 2005, 2008; Antoci and Borghesi,

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2010 e 2012) have shown that defensive expenditures can contribute to enhance the GDP while reducing the agents' welfare, thus leading the economy along an "undesirable" growth path.
The ISEW has been generally computed so far to evaluate the performance of single geographical regions over time (cf. Posner and Costanza, 2011). What is missing in the literature is an international comparison of the ISEW across different countries that may allow to determine the existing differences and the underlying drivers. This obviously requires an harmonization of the evaluation techniques and a standardization of the single components to be included in the ISEW. While this work is certainly challenging from a methodological viewpoint, it seems particularly desirable, especially for rather homogeneous countries sharing common features and institutions, as in the case of the EU-15 and the EU-27.

1.4 Dynamic environmental-economic frameworks

The dynamic analysis of environmental innovation (EI) and of the co-evolving socio-economic, institutional and policy contexts is gaining growing relevancy in the current academic and political debate. Environmental and innovation policies are increasingly jointly investigated in order to understand how to ensure the conditions for fostering economic development while protecting the environment (OECD, 2011). In particular, the ongoing economic and financial crisis has engendered increasing attention towards a broadly defined transition to the green economy as a powerful mechanism to escape from the current downturn, especially in the European Union context. A roadmap for environmental-friendly technologies combined with a cooperative institutional framework for a coherent environmental regulation seems to be widely acknowledged as necessary in order to simultaneously improve economic and environmental performance (Mazzanti and Montini, 2010). Within the environmental policy arena, resource efficiency and climate change, namely, the definition of the post Kyoto framework after 2012, are the hottest issues. Within an international policy framework that suffers from lack of coordination, the EU has led the way in setting targets – such as the Lisbon agenda and the recent 20-20-20 strategy on energy, CO2 and renewable energies. Though such steps are important, the horizon is not crystal clear: the compliance with the Lisbon agenda is poor (see figure 1 on R&D) and heterogeneous across countries, with some leading but also widening the gap between different EU areas (figure 1). There is thus a strong need to understand whether gaps may be reduced through policy actions, sector integration, stakeholder involvements, all actions that are necessary to extensively diffuse EI and create the pre conditions for full achievements of the green economy potential.
Although the Kyoto targets have been achieved, this was mainly due to the ongoing crisis (Borghesi, 2011). Therefore, one may reasonably wonder whether the 20-20-20 targets will be achieved once the economy recovers from the recession. Moreover, the current crisis, that started already in 2008, might have undermined investments in energy efficiency and green technologies, especially in the southern European countries where the recession is particularly severe.
A number of research programmes have been under way in the EU in the context of broadly defined environmental and innovation strategies, and with reference to the Lisbon Strategy pillars too. Among others initiatives, it is worthwhile to note that the 7th Framework Programme attributed to energy related research 2,590 million euros, while environment related research (including climate change) has been assigned 2,240 million euros. In 2004 the Environmental Technologies Action Plan (ETAP) was launched with the aim to define and promote the competitive advantages of

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energy and environmental technologies produced by European firms, and to stimulate initiatives featuring several "crossing points" with EU environmental and innovation policies. To further support the ETAP development, in 2008 the "EU Competitiveness and Innovation Programme" launched a call worth 28 million euros for the development of environmental products and technologies. Environmental innovation is indeed a relevant part of the Competitiveness and Information Programme (CIP), for the 2007-2013 period, featuring a budget of 3,6 billion euros. The objective of such initiative is to fill in the gap between innovation and market development in European industries involved in eco-products, with an emphasis on small and medium sized firms (SMEs).
The role of SMEs and district based industry is relevant in many EU industrial economies. Environmental and innovation economics scholars should deepen the analysis of how EI spreads and is adopted in sectors and countries that are rich in SMEs (Cainelli et al., 2012). This would allow fruitful integration between environmental economics and regional studies as well. In this regard, it is noticeable to observe that a sector based and regional perspective is coherent with new policy and growth approaches in the EU.
More recently, a rebalanced emphasis that explicitly includes the role of geographical aspects as a driver of development and growth is also present in the re-launching of the redefined Lisbon agenda. Thus, EU growth policy is moving to a more balanced perspective that accounts for both joint regional - sector based 'smart' specialization which explicitly accounts for climate change and environmental related issues in light of EU 202020 aims (Barca and McCann, 2011). This is relevant given the 'leadership' the EU is trying to take in both environmental and innovation realms.
Within this geographical discourse, how sector specialization and geographical effects jointly matter in the diffusion of environmental innovations is crucial to assess.

1.5 The role of sectors and geography in the EU achievement of a competitive green economy

A multi-sector country based specific perspective is needed to discover weakness and strengths under the overall macroeconomic performance and strengthen future innovation trajectories in the EU. A meso/micro level perspective goes directly into the centre of innovation generation, diffusion, including the relevant technological spillovers occurring within industry, between services and industry, between innovators and adopters located in different sectors/countries. The heterogeneity of national policies, associated with the economic and technological interdependencies occurring between actors in various countries, also emphasizes the possibility of other ways of inter country policy transmissions.
This perspective highlights an important point insofar as the environmental trajectories are not only technological, but involve complementary organisational innovations, such as EMAS, and non environmental innovation as well, in the spirit of the Porter idea that the development of a green economy requires a complete restructuring of productive and environmental features of industrial processes (Cainelli et al., 2011a,b; Mazzanti and Montini, 2010; Costantini and Mazzanti, 2013). The analysis of the effects of environmental policy mixes should then also account for the *total effects on the innovation strategy,* including new management practices, as human resource management, outsourcing and new and lighter organisations of production (Bloom et al., 2010).

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Kemp (2000, 2007, 2010) addresses EI policy impacts through a 'modulation approach', where within an evolutionary framework, the effect on EI of environmental policy is extensively defined in its scope and aims: the focus of environmental technology policy is on all technologies, EI includes organisational processes, it effectively stems from synergies between instruments, co-evolution between policy and innovation realms is relevant, society involvement in innovation processes and policy design is needed, policy making is forward looking and adaptive, aimed at dynamic more than static efficiency, efficiency and effectiveness are joint aims. The approach is that 'the capabilities, interests, interdependencies and interactions of social actors around an environmental problem are relevant, instead of the environmental problem itself and how this problem may be solved through the (flexible) and synergic use of economic instruments.

As far as sector based analyses are concerned, we note that It is worth noting that the empirical decompositions of changes in resource use (RU) and pollution highlight that the 'technology effect' is the main factor that balances the increase of RU as driven by economic activity whereas the 'industry mix' effect is not the main driver of environmental efficiency gains. The weakness of an industry mix effect may be explained by looking more closely at industrial trends in Europe. Contrary to expectations, from the mid-1990s to the mid-2000s, the EU increased its share in world manufacturing in certain sectors that can be classified as brown economy industries (pulp and paper, petroleum refining, chemicals, basic metals, motor vehicles). This trend is confirmed by specialization indexes and is largely driven by the increased specialization of Germany and the German-centered industrial block comprising Austria and some Eastern European Countries.

In addition, the shift towards a service economy in Europe does not necessarily lead by itself to sustained GHG reductions. The increasing interdependence between services and industry (each of them activating a significant amount of input provided by the other macro-sector through push and pull multiplier effects) make even immaterial service sectors heavily dependent on resource-intensive inputs. This applies even more to certain 'material intensive' services such as transport: more extensive production networking and the increased role of intermediate goods may lead to higher circulation of goods and higher intensity of transportation. In the end, the indirect emissions accounted for by services may increase more than their total economic effect and account for about 30% of the total, almost on a level with manufacturing. See Figure 2.

Given the relevance of sector interdependences, the manufacturing sector cannot be the only focus of analysis when looking at innovation effects in open innovation systems. The increasing role of vertical integration makes it necessary to look at both industry and service industry innovation dynamics.

Unsustainable production dynamics in fact involve a structural redefinition that sees an increasing role for environmental friendly technologies in both green and brown sides of the economy and industry, in an interconnected perspective, in line with the Porter hypothesis framework (Porter and van der Linde 1995).

2. Project specific issues and aims

2.1 General aims

Building upon the previous more general insights, we define the set ***of issues and aims of the project we aim at supporting, which should start with the events we might fund through the UNIFE 'bando per progetti di internazionalizzazione'.***

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The project aims at providing best practices and lessons learnt on EI by taking a comprehensive perspective on EI and the green economy. We aim at achieving knowledge exchanges and spillovers to learn and analyze EI developments in various fields (CO2 abatement, energy efficiency, biofuels and waste reduction the main ones) by bringing together research / academic achievements, business perspectives, stakeholders experiences and views. The idea is thus to interact research knowledge, business knowledge, policy makers insights, social stakeholders knowledge and perspectives in order to (i) stocktaking and assess the information we might receive from past studies and adopted practices (ii) using this stock of processed information to identify weaknesses, barriers, innovations that are worth being pushed and diffused. This is useful for future policy making efforts and innovation management in firms and within firm-stakeholders relationships (union's involvement and consultation but not only). In fact we do assign a strong role to the firm-union interactions on the innovation selection and management. In addition, civil society and NGO are also importantly included among stakeholders given the 'beyond the firm' effects of innovation in economic, employment, environmental terms.
The summary of main project issues is a set of consequential points

- Relations, in terms of complementarily and trade off, between EI and other techno-organizational innovations, namely whether they are jointly adopted / positively correlated

- Whether different EI are integrated or not, namely whether they are jointly adopted / positively correlated

- Relations between the adoption of EI and the quality of industrial relations, namely the role of unions

- Relations between the adoption of EI and the nature and quality of stakeholders involvement in the society, namely the role of NGO, policy makers.

- Relations and impacts of EI on employment, skills structure of the workforce and workers conditions

- Relations between EI and firm competitiveness that is intended in the broad meaning, not only profitability. We pose attention mainly on productivity, namely value over employment, which links directly to the EI employment creation issue

Though adoption of EI receives a major focus, also the generation and development of EI has a role in the project.
Success stories and barriers are assessed at general level and focusing on specific sectors / SME which we identify with our social partners of key importance in the progress towards the Green economy.

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2.2 Specific tasks in the project(s) (to be developed) and partners roles

1. ***The geography of green innovation: the role of local context in explaining the success in eco-innovation*** (Nice, Francesco Quatraro; UNIFE M Mazzanti)

   This part of the project aims at investigating the dynamics of generation of environment friendly technologies at the local level, as well as their impact and relations with the local socio-economic system. The identification of key factors -at the local level- in the emergence and success of green technologies will help to assess the specific role that different stakeholders should play to foster eco-innovation. The research activity will focus especially on the localized path-dependent dynamics of emergence of eco-innovation across European regions, by investigating both the economic, policy and technological determinants of the observed differential performances, like the structure of the knowledge base in terms of coherence, cognitive distance and technological variety. Besides this, in collaboration with the other WPs, we will investigate the economic effects of green technologies and their interaction with the local socio economic context in terms of the demand for new jobs and skills both as an effect of the creation of new firms producing such technologies and as an effect on the derived demand of dedicated skills in firms which decide to adopt them.

2. ***Eco innovations, complementarity and socio-economic performances. Enhancing future business and wide social 'green economy' practices*** (UNIFE M Mazzanti, A Musolesi INRA, Grazia Cecere, Paris Sud)

   It focuses on the identification of main barriers and drivers of eco innovations (EI). It aims at identifying current successful EI to be diffused as well as potential EI that needs to be selected and eventually supported by public policy and industry-stakeholders actions, by using official sources at EU national and regional level, including case studies and surveys. Interview based analysis is used as complement tool. It takes both ex post and ex ante perspectives, both of which are needed to support the achievement of a greener economy. In taking a broad perspective on sustainability the social targets are assessed in environmental, economic and social terms.

3. **Towards the green economy: Eco-innovation and employment** (Horbach, Univ. Augusta, M Mazzanti UNIFE, A Musolesi, INRA)

The Green Economy may offer win-win opportunities to all European countries but the realization of these opportunities depends on some important pre-conditions. Eco-innovations as basis of the success of a green economy are still highly dependent on a fitting policy frame-work. Furthermore, they require a functioning infrastructure of universities and other research institutions building

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networks with firms. A win-win situation occurs if realized eco-innovations do not only lead to environmental improvement but also to an increase of employment what is especially important for countries such as Spain, Portugal, Ireland, Bulgaria or Hungary that show unemployment rates of more than 10% or even 20%.

This part of the project aims at exploring the success factors and the remaining barriers of eco-innovation on a European level and its effects on the labour market. The country-specific results of the study will help to detect inefficiencies in national eco-innovation systems, to give recommendations to improve the policy framework and to improve the information flow between policymakers, firms and other stakeholders. An important feature of the planned study is that not only traditional research methods such as the application of econometric analyses will be used but the research results will mainly be the outcome of an intensive discussion process of the relevant actors (e. g. research institutions, politicians, firms especially SME´s or industry associations).

4. **Non-technological innovation, green management practices, and productivity in Europe** (U Wagner, Madrid, G Cecere, Paris sud, UNIFE)

This part will empirically analyze the nexus between green innovation and firm growth in the European manufacturing sector. The research activity will focus on non-technical innovation such as climate-friendly management practices and on climate-friendly product and process innovation. Innovation is considered climate-friendly if it either decreases the carbon footprint of production or reduces the carbon emissions stemming from the consumption of a product. This part of the project idea will take stock of green innovation adopted in different manufacturing industries and analyze their causes and consequences. Moreover, it will elaborate a database as an input for the web interface to be developed under WP1 and which allows stakeholders to obtain information about both technological and non-technological eco-innovation in their respective industries.

5.Regulatory frameworks and sustainability-related innovation (Del Rio, Madrid; M Wagner, Wuerzburg, A Musolesi, INRA)

This part of the project will explain the link between sustainability-related and similar regulation and environmental and sustainability-related innovation in firms and ultimately also the effect on economic performance and competitive advantage. The main research question underlying this WP relates to issue of induced innovation which has been much framed by the debate of the famous Porter hypothesis positing private (and social) benefits of firms from stringent environmental or social regulation (Porter, 1991). It will combine qualitative (cases) and quantitative methods.

Areas of interest are especially the role of regulation as well as possible spill-over effects between different sectors that are exposed to regulation (e.g. shifts in the locus of innovatory activity). Specific regulations affecting eco-innovations are distinguished with reference to their formality, stringency and flexibility, and firms' voluntary agreements in relation to them. This will also address the link between environmental regulations triggering eco-innovations and sector-specific competitiveness. Since competitiveness may be influenced by different drivers like, amongst others,

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first mover advantages, diffusion effects or export opportunities, the prior step of creating a fundamental understanding of the complex interactions in each sector is additionally justified.

Case studies of matched firms in specific are very suitable to analyse the incidence of such innovation offsets, their determinants and their relevance relative to other factors, like R&D subsidies. Also, they are able to analyse the double externality issue of sustainability-related and similar innovations - that is the derivation of social benefits from profit-motivated innovation. The focus will be on manufacturing and process industries and cover larger as well as small firms. Furthermore, from a legal perspective a case-based analysis will provide detailed insights into different modes of coordination such as markets or regulation (induced innovation).

3. Project Main methodologies

To enhance and maximise the information spillover and exchange of information, the main methodology on which the project rely is stakeholder's involvement through case studies, interviews (including more technical frames such as Delphi study), and workshops.
Meta analysis of the stock of existing knowledge is carried out by surveying the academic and non academic fields.
Multivariate statistics and econometrics are used to identify regularities from the past EI adoptions. We will mainly exploit the EU CIS2009 dataset that for the first time covers eco innovations. It is largely unexploited from an EU perspective, besides national analyses. The results of econometric analyses might be fruitful as food for though for the in field applied investigation of barriers and successes of EI in different firms, sectors, countries.
We place all our efforts looking at both micro and meso layers. The micro layers (firm level) is where we observe the effective adoption of EI and interactions between parties. The sector level is conceptually relevant since firms are embedded in the technological pattern of the sector they belong to. Moreover they receive spillover from firms in the same sector and firms in other sectors to which they are integrated or only geographically / economically close.
Any assessment of past adoptions and generation of EI, and of future developments, should therefore fully integrate data and analysis at both levels. We will cover all EU information on the two levels, further exploring the EI issues on the field by this two minded perspective.
Ex post and ante assessments are considered. From the ex post perspective, the project takes stock of the work carried out in the EU and globally in the field of EI, with specific reference to climate change, energy efficiency, waste, renewable fields.
The ex post analyses through data collection, data sharing, statistical analyses generate information that fuel the main activities where researchers, the business community, stakeholders and policy makers interact to learn from success stories and failures. Barriers and drivers are identified. The ex post analyses thus transits towards ex ante forward looking perspectives through the activities where all societal parties are involved. This one system approach integrates information, values, knowledge from a technological and social point of view. The basis for future oriented reasoning on the development of EI is placed.

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The field of diffusion of technologies often exploits historical data and also data on stakeholder's opinion through interviews to develop estimates of innovation potential, market evolutions, long run patterns from birth to maturity (Collantes, 2007).
From an ex ante perspective, the project would define future scenarios in terms of 'techno-organisational trajectories' (Mazzanti and Zoboli, 2006) by means of interviews and focus groups involving 'innovation stakeholders' (managers, engineers, policy makers, unions where participatory industrial relations exist and might be innovation oriented). Such trajectories, compared to the business as usual state (of technologies and policy) are expected to depict how different environmental policy designs and stringency, as well as targets (EU ETS at 15€ or higher pricing levels: 30€, 60€, EU ETS complemented by a carbon tax on other sectors, EU ETS with revenue recycled to R&D, EU ETS complemented by sector based covenants) would shape different innovation paths, namely in terms of:

- incremental or radical trajectories,
- processes led by big players or more diffuse along vertical and horizontal relationships,
- whether innovation develops within the firm or through technology providers
- the role played by technological and organisational innovations,
- the role played by private and public R&D

This exercise is engraved in a full interaction ***with business firms and other social actors, with the main aim of linking various disciplines (economics, social sciences, chemistry, engineering/technology as key ones).***

4. Contribution to the co-ordination of high quality research

The key project aim, is to coordinate an extensive action which brings together relevant experiences and skills on applied economics research with strong focus on innovation and environmental economics realms. The research competence is used as a tool to take stock of past evidence and assess future scenarios. We highlight that it bring together researchers who have on the one hand lead research on EI I the past, but on the other hand they have covered different aspects of EI drivers and effects. Complementarities between competences are thus sought for, with and throughout the project. More research competences, always strongly of applied nature, are the complemented by the competences possessed by SME and stakeholders.
EI thus emerge as real world facts that are driven (braked) by various factors. Within the driving factors, the knowledge and competence of all stakeholders' is needed to provide unbiased – in terms of economic, employment, environmental, social effects - EI development. The challenge of enhancing EU labour productivity at micro and macro levels is part of the green economy scenario.
ADB/cf

EI plays a role in contributing to the generation of higher labour and environmental productivities together. Given that organisational and innovation changes occur within and between firms to a large extent, involving both industry players and workers' representatives is nowadays crucial. We pose this as key element in the analysis of EI.

From a policy perspective, the inclusion of (regional) policy makers is important due to the endogenous nature of innovation and policies: innovation needs well designed policies that benefit from information on good and unsuccessful EI experiences. Moreover, environmental innovations is stimulated by the whole set of national and regional policies, not only of environmental nature. A regional perspective on policy in the EU is also relevant in light of the emphasis on smart and sustainable growth which roots on regional more than national competitive advantages. The project reserves large space to the geographical pillars and contents of EI diffusion.

We note that the various stakeholders and SME that we have identified are a platform to enlarge this involvement to EU level (e.g. national industry associations, unions, NGOs, which possess EU links and are part of EU networks). We take a bottom up approach: the understanding of EI and its diffusion and importance for the EU begins with the analysis of actor's actions and perspective at a more local level. We try to reconstruct a general picture from various pieces we collect from bottom up. Both the extension of the networking at EU level within the project and the aggregation of micro and meso evidence play for this goal.

Again, if applied research meets in field studies and bottom up experiences this outcome is more likely to occur.

This approach allows embedding EI in frameworks that go beyond the 'green technology' markets and policy areas. EI thus becomes truly part of a green economy possible paradigm that traces the way to an EU sustainable competitive economy.

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Table 1 – Adoption of Environmental Innovations in the EU (CIS source, 2006-2008)

Manufacturing - average adoption rates	Energy efficiency	CO2 abatement
Belgium	0.394	0.297
Bulgaria	0.149	0.059
Czech Republic	0.407	0.190
Germany	0.538	0.379
Estonia	0.096	0.146
Ireland	0.422	0.390
France	0.272	0.172
Italy	0.187	0.153
Cyprus	0.198	0.135
Latvia	0.278	0.081
Lithuania	0.419	0.231
Luxembourg	0.378	0.364
Hungary	0.445	0.199
Malta	0.324	0.130
Netherlands	0.285	0.168
Austria	0.387	0.285
Poland	0.328	0.183
Portugal	0.460	0.330
Romania	0.405	0.262
Slovakia	0.339	0.112
Finland	0.380	0.262
Sweden	0.344	0.223
Croatia	0.438	0.223

source: EUROSTAT (May 2012)
note: UK and Spain did not implement CIS2008 environmental innovation

Figure 1. % R&D on GDP (GERD; Eurostat)

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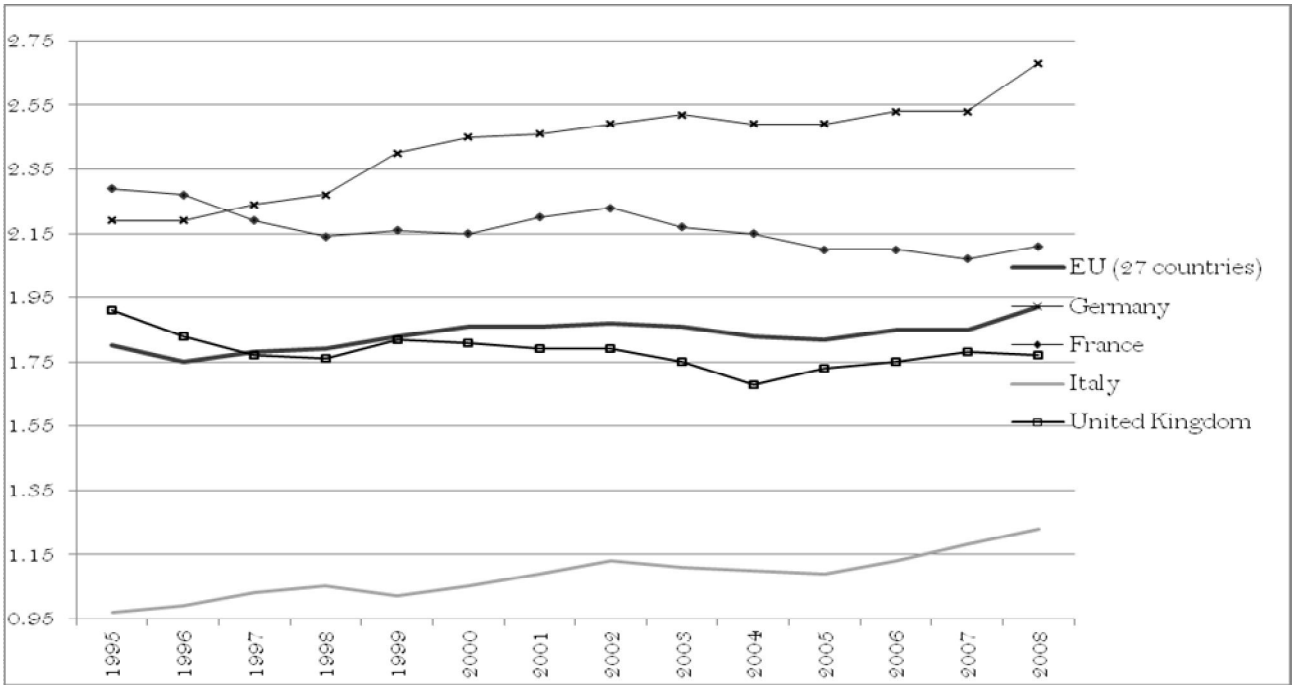
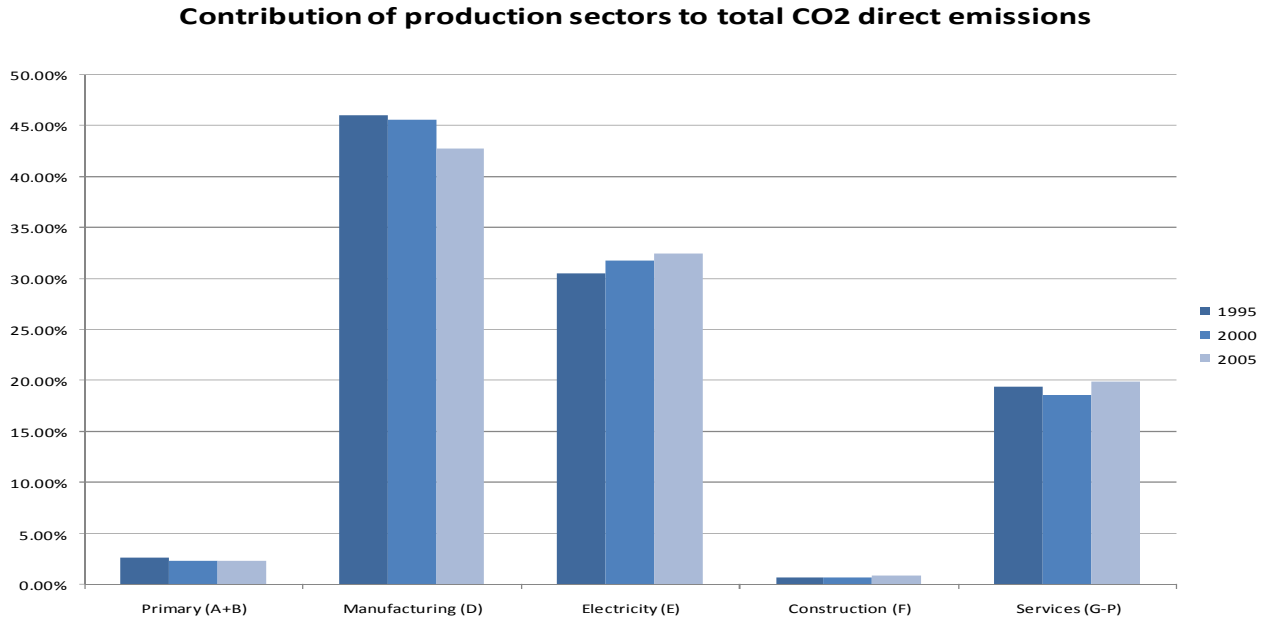


Figure 2 (Marin, Mazzanti, Montini 2012)



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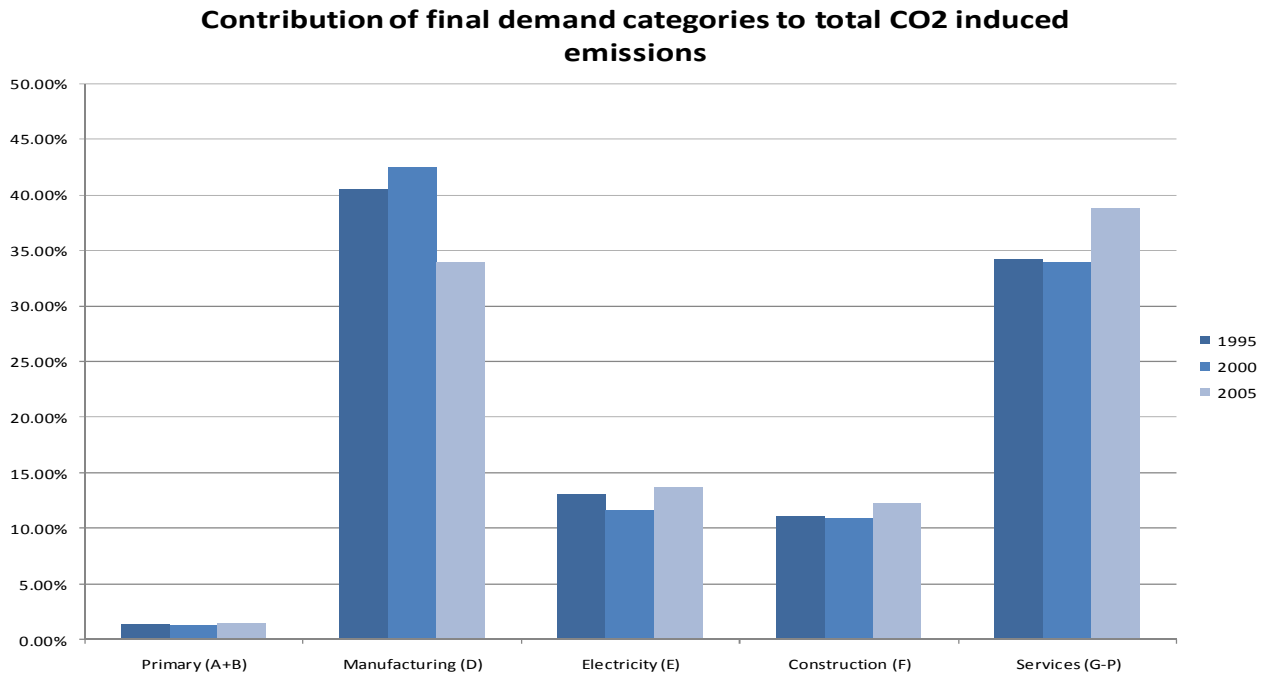

Appendix

Table A1 – Main reports on EI

Index	Theme/Topic	Institute/Org	Summary
1.	**Eco Innovation**		
1.1	Potential for Eco-innovation in nine sectors of the European Economy. SIW	TNO-DG Enterprise and Industry	EnvInnovation potential in 9 sectors from a sector and value chain perspective. Construction of "eco-innovation clusters". Policy implications.
1.2	Eco-innovation - putting the EU on the path to a resource and energy efficient economy	Wuppertal Institute, SERI, CSCP and Factor Ten Institute	Envinnovation are mainly seen as a way to reduce European dependency from raw materials imports. Soma case studies are presented for the 3 areas: "food and drinks", "mobility" and "housing".
1.3	Eco-Innovation Final Report.SIW	Technopolis, Systematic, EuropeINNOVA	The need to analyze environmental innovation under the 3 levels (micro, meso and macro) is stressed. Challenges in environmental innovation measurement are presented. Case studies analysis of eco-innovative firms is performed.

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1.4	Socio-cultural determinants of environmental innovation	Systematic, EuropeINNOVA	In the textile and clothing sectors, the following "socio-cultural determinants" of environmental innovation are analyzed: cultural capital & consumer behaviour, human capital, organisational capital & entrepreneurship, social capital. A set of indicators to measure this determinants is proposed.
1.5	Policy pathways to promote eco-innovations	TNO	The best policy solution to foster environmental innovations must be a policy mix: acting only on one out of the heterogeneous determinants will not allow the policy to reach the objective. This is the main message of the report.
1.6	Measuring Eco Innovations	Eco DRIVE	The report provides insights on how to measure environmental innovations and to catch the "*most relevant variables which are conducive to economic growth and environmental improvement* and to place them in a *framework* where their usefulness and relative importance can be evaluated", with focus on Europe, and through an approach which considers the dynamics aspects of eco-innovation (including "rebound effects").
1.7	Regulatory and Policy Issues Influencing Innovation in the Eco-innovation Sector	ZEW, - EuropeINNOVA	Aim of the report is test the business and policy factors which are either barriers or driving forces for innovation activities in 7 sectors.The following barriers or driving forces are considered: financing of innovation, taxation, competition in product markets, demand, regulation. These are clustered into 3 fields: Factor market effects, Product market effect, Government intervention effect
1.8	Final report MEI (Measuring environmental Innovations)	UNU-MERIT, ZEW, DTU, ICL, LEIA	A more comprehensive definition of environmental innovation is provided; a taxonomy for classifying environmental innovation is reported; an insights of the main challenges on measuring environmental innovation is given together with some insights on how to overcome these difficulties.
1.9	Blueprints for an Integration of Science, Technology and Environmental Policy	Strata Project	A set of actions to promote environmental innovations is provided by the final report of the Strata Project.
1.10	Eco-innovation in the industry. Overcoming the crisis and beyond.	OECD (not only EU)	No summary provided (as it is not European Organiz.)but to be complete on the topic I just mention it
1.11	Eco-innovation Opportunities in Europe and lessons for the Basque Country	TNO	The report estimates the value of the market potential for selected environmental innovation in the Basque Country and depicts main trends in the international level. Potentials for eco-innovation in the Basque country are provided.
2.	**Employment**		
2.1	Employment impacts of cleaner production: theory,	IMPRESS Project: ZEW	Employment of effects of environmental innovation for environmentally innovative firms are studies through an econometric an a case studies analysis. Environmental innovations are grouped into 6 classes.

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	methodology and results		
2.2	European employment and social situation, quarterly review 2012	DG EMPL	Employment trends and levels are quarterly analyzed through a set of indicators by DG EMPL. The report provides a description of those indicators and their evolution for European Member States.
2.3	Restructuring in Europe 2011	Employment social affairs and inclusion	…. Download non funziona del report, peccato perchè è uscito settimana scorsa… copio e incollo abstract: Preserving Europe's competitiveness in a way that respects social cohesion and creates new, sustainable jobs will be crucial to the future. The report 'Restructuring in Europe' describes the actions developed by the Commission to support employers and employees alike adapt to the rapidly changing business environment to sustain a high level of employment while maintaining and reforming social protection. This publication is available online only in English, French and German
		Then eurostat reports…	http://epp.eurostat.ec.europa.eu/portal/page/portal/publications/collections/news_releases
3.	**Workers Conditions**		
3.1	Industrial relations and working conditions developments in Europe 2010	Eurofond	Based on an European survey on working conditions, the report describes the major trends and current levels of working condition both at a country level and at the European level. Particular attention is devoted to the economic crisis effects on working conditions.
4.	**Green Economy**		
4.1	Environmental Indicator Report 2012	EEA	It deals not directly with Green Economy, but provides a set of indicators, covering 6 areas of interest, to study whether European Economy is moving towards a "green Economy"…. This is the best I could find at European Level
4.2	(NOT A REPORT BUT MAYBE USEFUL) Exploiting the employment potential for green growth	European Commission staff working document	This communication highlights the importance of favoring the growth of "green jobs" to make European Economy more sustainable (green) and at the same time more competitive.

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1) Partner stranieri e internazionali:

- Università di Wuerzburg (M Wagner)
- Università di Madrid Carlos III (U Wagner)
- Università di Augsburg (J Horbach)
- Università di Nice CREDEG Sophia Antipolis (F Quatraro)
- INRA Grenoble (A Musolesi)
- CSIC Madrid (P Del Rio)
- Università di Paris Sud – Telecom Business school (G Cecere)

2) Obiettivi del progetto e risultati attesi:

Fase di avviamento (per la quale si richiede il finanziamento)

workshop / incontro di start up a UNIFE (della durata di 3 giorni) finalizzato a:

- definire specifici progetti di ricerca da sottomettere nelle linee di finanziamento europee durante il 2013/14 (FP7/8 two stage e one stage, Cost actions), sulla base delle linee di ricerca definite sopra. Al fine di sfruttare in modo efficace ed efficiente la base di contenuti, si moduleranno linee progettuali di ricerca pura (es. two stage), orientati a coinvolgere le imprese (one stage), di networking, quali le cost actions.
- Inoltre, si sfrutterà il workshop al fine di organizzare attività didattiche e di ricerca di varia natura che sviluppino relazioni tra UNIFE e i membri del team di natura strutturale
    - Doppi titoli di laurea
    - Scambi Erasmus da attivare
    - Phd supervision (joint) per il Dottorato in Economia
    - Interventi seminariali e lectures all'interno dei corsi della LM di economia.
    - Attività di ricerca tra i membri del team di natura più informale (papers da presentare a conferenze)

Fase successiva a quella di avviamento (per la quale non si richiede il finanziamento; max 500 parole):

- Sviluppo di progetti europei
- Networking attivabili e finanziabili con altre fonti

Il proponente dichiara che (barrare la casella che interessa):
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X il progetto non ha mai ricevuto contributi sul bando di Ateneo per la promozione di iniziative di internazionalizzazione .

☐ il progetto è già stato finanziato sul bando di Ateneo per la promozione di iniziative di internazionalizzazione – Anno _____; si allega relazione sulle attività già svolte, con motivazione del mancato avviamento del progetto e della richiesta di contributo per completare la fase di avviamento.

3) Il progetto potrà avere ricadute positive sui seguenti indici di internazionalizzazione della didattica e della ricerca richiamati dal Piano Strategico Triennale di UniFe (barrare le caselle che interessano):

X Sostegno alla mobilità didattica in uscita

per le seguenti ragioni:

- Attivazione di teaching/student mobility opportunity via Erasmus
- Attivazione di teaching/student mobility opportunity via doppie lauree
- Entrambe le forme possono essere rese più efficaci come esperienze di ricerca e apprendimento se integrate in una rete coesa dal punto di vista tematico e progettuale (supervisione tesi e progetti educativi da parte dei membri del team)

X Aumento degli studenti stranieri iscritti

per le seguenti ragioni:

gli interessi di ricerca sinergici su temi di economia ambientale e dell'innovazione (corsi insegnati alla LM di Economia) possono portare a proficui scambi di studenti

- via attivazione di mobilità Erasmus (già attivato con Madrid, in attivazione con Wuerzburg e paris, attivabile con altri Atenei del network),
- periodi di visiting (anche via Marie Curie, con il DEM potenziale ricettore su temi di environmental economics) di studenti,

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- iscrizione di studenti via doppie lauree (contatti attivabili con Wuerzburg, Paris sud e Nizza in primis).

Le ricadute possono essere anche su altri corsi dell'ateneo, date le interazioni tematiche su ambiente e sostenibilità, presenti nella didattica e ricerca di altri dipartimenti (si veda la rete Routes).

X Creazione di percorsi didattici internazionali

per le seguenti ragioni:

- Doppie lauree sono attivabili con (almeno) Paris Sud, Wuerzburg e Nizza al livello della LM di Economia. La fase di start up è quindi finalizzata a favorire in modo sinergico le interazioni di didattica e ricerca, che trovano nel livello della LM la loro naturale integrazione.
- Al livello del dottorato di Economia (Prof. Mazzanti coordinatore) gli scambi possono riguardare la strutturazione di moduli e corsi ad UNIFE, di natura economia ed interdisciplinare, e la docenza di di personale UNIFE in dottorati esteri del network, al fine di favorire l'internazionalizzazione della ricerca e delle esperienze didattiche.

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X Creazione reti di eccellenza

per le seguenti ragioni:

- La partecipazione a programmi di finanziamento che richiedono solide basi di networking quali ERC, FP7/8 e cost action tra le altre, porta in caso di successo alla creazione di reti formali ed informali di eccellenza sostenibili finanziariamente
- UNIFE può contribuire mediante il DEM e il neo nato centro di Ricerca SEEDS (Sustainability, Environmental Economics and Dynamic Studies), di cui DEM è leader e mette in rete 4 Atenei Italiani su temi di Economia ambientale.
- Inoltre, i partner, su temi di green economy, innovazione ambientale e sostenibilità dei processi industriali, possono contribuire ad arricchire la rete ROUTES (rete internazionale su sostenibilità) di UNIFE.

X Accesso ai canali europei e internazionali di finanziamento della ricerca

per le seguenti ragioni:

- La rete può nei prossimi anni partecipare a varie call di bandi europei (ERC sinergy, Fp7, bandi su schema Horizon 202020 tra gli altri, come esempi più rilevanti), soprattutto in area Sh3 dove i temi di green economy e environmental innovations sono spesso cruciali nello sviluppo dei tasks. La rete suddetta può interagire con altri dipartimenti di UNIFE al fine di contribuire a bandi al di fuori da SH3 con competenze di economia dell'ambiente ed innovazione, ove necessarie. Questo si coniuga con gli obiettivi 'interni' della rete ROUTES.
- Inoltre, importanti occasioni di finanziamento per DEM/UNIFE possono derivare da partecipazione a bandi nazionali aperti a ricercatori esteri (Francia e Germania in primis), dove sia richiesta la presenza di partner nazionali.

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Competenze complementari dei membri del team funzionali a creare reti di eccellenza, arricchire la didattica di UNIFE e contribuire alla ricerca inter disciplinare in UNIFE

- Università di Wuerzburg (M Wagner): Environmental innovations from economic and business perspectives, business case studies and statistical methods based analysis
- Università di Madrid Carlos III (U Wagner): Management of Environmental innovations in manufacturing firms, EU environmental policy
- Università di Augsburg (J Horbach): Econometrics of environmental innovations
- Università di Nice CREDEG Sophia Antipolis (F Quatraro): Regional and geography analysis of Innovation. Case studies and econometric methods
- INRA Grenoble (A Musolesi): Econometric methods, Green chemistry innovation themes, sustainability and competitiveness of chemistry firms
- CSIC Madrid (P Del Rio): Renewable energy technology, climate change policy issues
- Università di Paris Sud – Telecom Business school (G Cecere): ICT and green economy, Green ICT and patents, waste performances in economic sectors

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4) Costo del progetto per la sola fase di avviamento:

Costi di mobilità personale italiano

Ruolo	n.	Durata complessiva * (in giorni)	Previsione di spesa €
Professore ordinario	2	6	200
Professore associato	2	6	200
Personale tecnico			
Ricercatore	2	6	200
Altro (specificare)			
TOTALE	6	18	600

Nota. Parte dei costi del personale italiano (referenti degli atenei della rete identificata dal centro SEEDS) saranno coperti da fondi degli Atenei stessi

Costi di mobilità personale straniero

Ruolo	n.	Durata complessiva * (in giorni)	Previsione di spesa €
Professore ordinario	2	6	1200
Professore associato	5	15	2700
Personale tecnico			
Ricercatore			
Altro (specificare):			
TOTALE	7	21	3900

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Costi di mobilità studenti

	n.	Durata complessiva * (in giorni)	Previsione di spesa €
Studenti italiani (Phd students da coinvolgere in quanto lavorano su tematiche specifiche al progetto)	4	12	600
Studenti stranieri (Phd students da coinvolgere in quanto lavorano su tematiche specifiche al progetto)	4	12	1600
TOTALE	7	24	2200

Altri costi:

Descrizione attività	Previsione di spesa €
Pasti Nessun altro costo è previsto come imputabile su questi fondi.	300
TOTALE	300

* (sommare tutte le mobilità)

Ferrara, 14 Dicembre 2012

Il Responsabile Scientifico

Allegati:

X dichiarazione di interesse da parte di ciascuno dei partner elencati al precedente punto 1;

☐ (*solo per i progetti già finanziati su una precedente edizione del presente bando*) relazione indicante le attività già realizzate e le ragioni in base alle quali si richiede un ulteriore contributo per l'avviamento del progetto.

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