ECO-INNOVATIONS AS A RESULT OF COMPANIES' INNOVATION ACTIVITIES

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Abstract

The future competitive advantage of states, regions and companies is not low costs but primarily innovations of products and services and everything that is related to them. When we try to achieve economic growth we have to also pay attention to environmental aspects of the growth. In connection with this the eco-innovations are widely discussed recently. Generally speaking, the eco-innovation is any innovation that reduces negative impacts caused by production and consumption. The eco-innovations can be also called as environmental or ecological innovations. The environmental innovations can be developed upon the initiative of companies or they can be requested by customers. The research and development sphere can be other source of information and motivation for eco-innovations. As regards impacts of ecological innovations they can affect producers as well as customers. The example of positive impact on producers is e.g. reduced energy use per unit of output, positive impact on customer means e.g. reducing of power consumption of new product. The environmental innovations can arise intentionally but they can also arise as a secondary effect of innovations whose primary target was another. Some pressure on development of new eco-innovations can be also exerted by government. The government can either prepare new ecological legislative or provide some support or incentive for launching of innovations.

The article just deals with above-mentioned aspects. Significant attention is also paid on comparison of EU states in the field of implementing of eco-innovations. The comparative analysis results from innovation survey carried out in the European Union and it deals with which types of innovations are implemented in various states and what is firms' motivation. It was find out that ecological legislation press on introducing of eco-innovations especially in the new member states of the EU. Nevertheless, a lot of companies launch eco-innovations in the framework of their voluntary codes or agreements for environmentally good practice within the sector. Recycled waste, water or materials followed by cost reasons (savings of energy and materials) are the most frequent impacts of new eco-innovations on firms. Reducing of power consumption of new product is the most mentioned impact on users.

The article also discusses if the ecological innovations are launched more often in the most developed countries of the EU or in the less developed ones. Using correlation analysis the relationship between eco-innovations and selected economic indicators has been analysed. For the analysis we have selected such indicators that characterize socio-economic level of countries, e.g. gross domestic product or expenses on research and development.

The eco-innovations are considered by EU as important element of knowledge-based economy and that is the reason why they are supported. The attention was paid on environmental aspects of economic growth already in the Lisbon strategy from 2000. The new strategy from 2010 called "Europe 2020" continues on it and the accent on eco-innovations became even stronger. The eco-innovatios are directly supported by the Competitiveness and Innovation Framework Programme (CIP), where the support is provided by several ways:

better access to finance through the CIP financial instruments, pilot and market replication projects and networks of national and regional actors.

Key words
Eco-innovations, innovation survey, Competitiveness and Innovation Framework Programme

1. Introduction

Innovations and entrepreneurship are the engine of socioeconomic development of regions and so they contribute to general development as well as worldwide competitiveness. If some country wants to be successful on the international markets it cannot rely on its competitive advantage in the form of low cost (especially labour cost) but it has to find another source of competitive advantage. Especially new and innovated products and services and processes are the most important source of competitive advantage. So far we talked only about economic and technical aspects of competitiveness. The long-term sustainability of economic system does not depend only on the ability of the quantitative growth but it is necessary to focus our attention also on ecological aspects of the growth and sustainable development.

In the recent years the innovations are connected with the ecology more and more often. Even the new term was created for that – eco-innovations or environmental or ecological innovations. A lot of definitions of eco-innovations exist and they differ especially in the purpose of the use. Here we present some of them:

- Environmental innovations are new and modified processes, equipment, products, techniques and management systems that avoid or reduce armful environmental impacts.[1]
- Eco-innovations are all measures of relevant actors (firms, politicians, unions, associations, churches, private households) which develop new ideas, behaviour, products and processes, apply or introduce them and which contribute to a reduction of environmental burdens or to ecologically specified sustainability targets.[2]
- Eco-innovation is any form of innovation aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment or achieving a more efficient and responsible use of natural resources, including energy.[3]
- Environmental innovation can be defined as innovation that serves to prevent or reduce anthropogenic burdens on the environment, clean up damage already caused or diagnose and monitor environmental problems.[4]

If we summarize the above-mentioned definitions it is possible to say that eco-innovations are the innovations that contribute to reducing of negative environmental impacts caused by production and consumption.

The aim of our article is to contribute to discussion about definition of the term eco-innovation and about factors that affect development of these innovations. We would like to analyse launching eco-innovations in countries of the European Union and examine relation between eco-innovations and selected indicators of economic level. The article also deals with support of these innovations in the EU.

2. Eco-innovations in a larger framework

[1] Kemp, R. – Arundel, A.
[2] Klemmer a kol. (1999), cited Carrillo-Hermosilla et al. (2010)
[3] Decision No 1639/2006/EC of the European Parliament and of the Council
[4] VINNOVA (2001)

For the purpose of this article it is important to mention still one definition of eco-innovations, i.e. definition used in Oslo manual that serves for carrying out statistical surveys on innovations. But before that it is necessary to specify the definition of innovation in general. So, innovation is the implementation of a new or significantly improved product (goods or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be new (or significantly improved) to the firm.[5] Innovations were realized if they had been launched to the market or used in production or distribution process. It follows that innovations are subdivided to product, process, marketing and organizational innovations. From that it can be concluded that eco-innovations are considered as horizontal issue: The eco-innovations means introducing of new or significantly improved products, processes, organizational or marketing methods that create positive benefits for environment in comparison with their alternatives.[6]

If we discuss eco-innovations we have to also consider at least free questions:

- Who initiated development of the eco-innovation?
- Who will appear the positive impacts of eco-innovations at?
- Were the environmental targets of innovations intended primarily or were they rather the secondary effect?

The development of new eco-innovation can be initiated by any subject on the market – e.g. it can be some scientist who would like to commercialize results of his research, competitor, supplier and so on. However, the initiator can be also government that prepares new legislative placing new requirements on enterprises in the field of environment protection. Major part of impulses comes from two sources – from enterprise itself and from customer (user). If the eco-innovation is initiated by the enterprise it has to persuade customer of necessity and usefulness of the new product. The customer can be valuable sources of information about its needs and market niches.

The incentives for launching eco-innovations was studied e.g. by Riggs and Hippel. These authors distinguish between innovations with high scientific importance and innovations with high commercial importance. They worked with the hypothesis that innovations with high scientific importance tend to be developed by instrument users, while innovations having high commercial importance tend to be developed by instrument manufacturers. As the scientific importance they mean contribution to enabling scientific advance, opening up access to new levels of scientific information, number and quality of publications resulting from the innovation or whether the innovation furthered understanding. The commercial importance is e.g. the effect on manufacturers' product sales, sales instruments, recognition that the innovation would be useful, extent used on a routine basis to solve problems.[7]

The effects of eco-innovations can appear at producers or customers. For example, by introducing of the eco-innovation energy consumption of production can be decreased and at the same time production costs are reduced or due to eco-innovation the power consumption of new product can be reduced and consumer has lower costs.

[5] OECD (2005)
[6] Czech Statistical Office (2010)
[7] Riggs, W. – von Hippel, E. (1994)

In the previous paragraph it was said that introduction of eco-innovations has not only positive impact on environment but it also can bring other effects (but as well as costs). So we have to look at the problem with the inverse logic: Did the company follow primarily ecological objectives or the ecological aspects were only some positive externality and the original objective was different? The answer on this question should be answered through analyse of case studies. However, innovation survey of the Czech Statistical Office has also at least limited information value. It was find out that the ecological effects were rather secondary ones for the companies. The market and cost factors played more important role.[8]

In the previous text we touched the question whether and how the government should influent ecological innovation activities of firms. If governments do this, they usually try to make them eliminate the negative impacts of their activities. E.g. they make the firms reduce carbon dioxide emissions or introduce environment-friendly products. The motivation by government can be negative (stricter legislative) or positive (subsidy for launching of eco-innovations). There are also other reasons for government intervention there. Beise and Rennigns[9] on the basis of empirical analysis in the field of wind power plants and alternative-powered cars say that if the eco-innovations arise in the country it leads to new export opportunities of the country and so the country become a leader on the specific market. In other words, global demand as well as strict regulation results in the creation of lead markets. From these facts the authors derive nontechnological factors for the diffusion of environmental innovations: regulation, market demand, prices and the flow of communication. Beise and Rennigs advise government to coordinate environment and innovation policy and regularly monitor the environmental lead markets. Also Foxon et al. dealt with similar problems. They analyzed innovation system in the United Kingdom from the point of view of support of technologies for new and renewable sources of energy. These authors say that that the stable political framework is important for creation suitable conditions for innovations. They recommend to aim the support at improving risk/reward ratios for demonstration and pre-commercial stage technologies. This would enhance positive expectations, stimulate learning effects leading to cost reductions, and increase the likelihood of successful commercialisation

Rennings dealt with justification of government interventions already in his older article where he also recommended to coordinate environmental and innovation policy and support especially pilot projects. Furthermore, he claimed that environmental policy is responsible for internalizing external costs imposed by competing, non-ecological products or services. As long as markets do not punish environmental harmful impacts, competition between environmental innovations is distorted. According to him the eco-innovations are determined by technology push (product quality, energy efficiency, product palette) or market pull (customer demand, labour costs, market share, new markets, competition). Eco-innovations are (in contrast to such technologies as microelectronics and telecommunications) not self-enforcing and factors of technology push and market pull are not strong enough and so the government interventions are necessary (e.g. environmental legislative, occupational safety and health standards). He called this idea as regulatory push/pull effect.[10]

3. Introduction eco-innovations in the EU

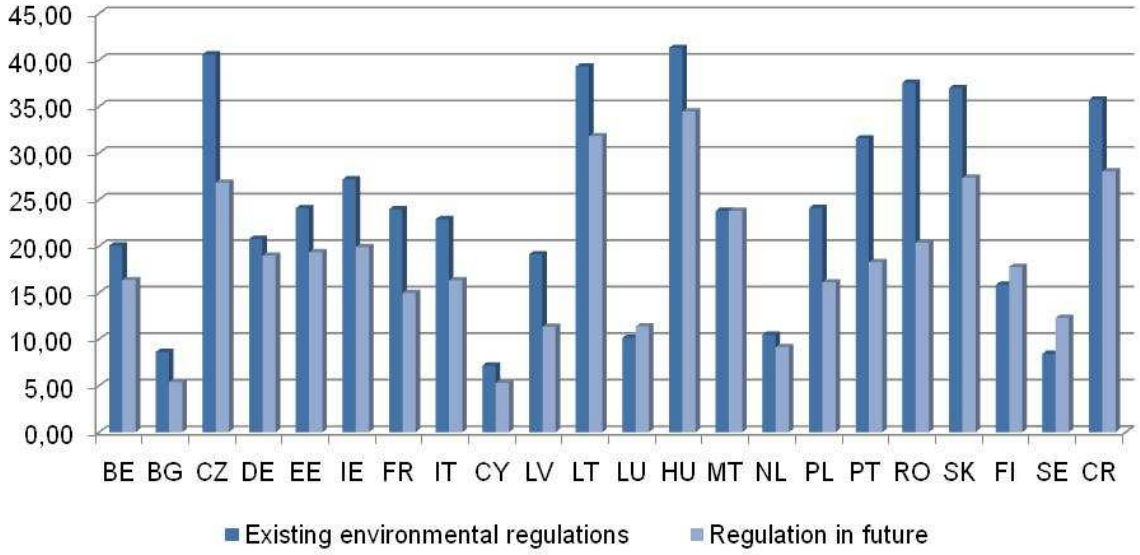
Since the 90's the statistical surveys on innovations in the EU has been carried out on the basis of Oslo manual that provides methodology for collecting data on innovations. The surveys are called as Community Innovation Surveys (CIS). The CIS enables better

[8] Czech Statistical Office (2008)
[9] Beise, M. – Rennings, K. (2005)
[10] Rennings (2000)

understanding of innovation process and analyses effects of innovations on economy (on competitiveness, employment, economic growth and so on). Since 2004 it has been carried out each two years on the basis of Commission Regulation (EC) No 1450/2004 aiming at the production and development of Community statistics on innovation. In the Czech Republic several innovation surveys were carried out according to European methodology on innovations CIS. In compliance with the newest methodology two innovation surveys have been carried out: Technology innovation 2006 (CIS 2006) and Technology innovation 2008 (CIS 2008).

The scope of survey is extended with time. Initially the surveys dealt only with product (technology) innovations in selected industrial sectors. Then the surveys were supplemented by service innovations, new sectors, new countries and organisational and marketing innovations. In the last survey the eco-innovations were included. In older surveys the eco-innovations were examined only indirectly.[11] The figures in the next parts of this article came from the Eurostat's database Results of the community innovation survey 2008 (CIS2008). These figures are expressed as share on the enterprises with innovation activity. As innovative enterprises are considers those of them that launched product, process, marketing or organisational innovations or that had still ongoing and abandoned innovation activities.[12]

Graph 1. Motivation to introduce an environmental innovation - regulation



Source: Eurostat (CIS2008)

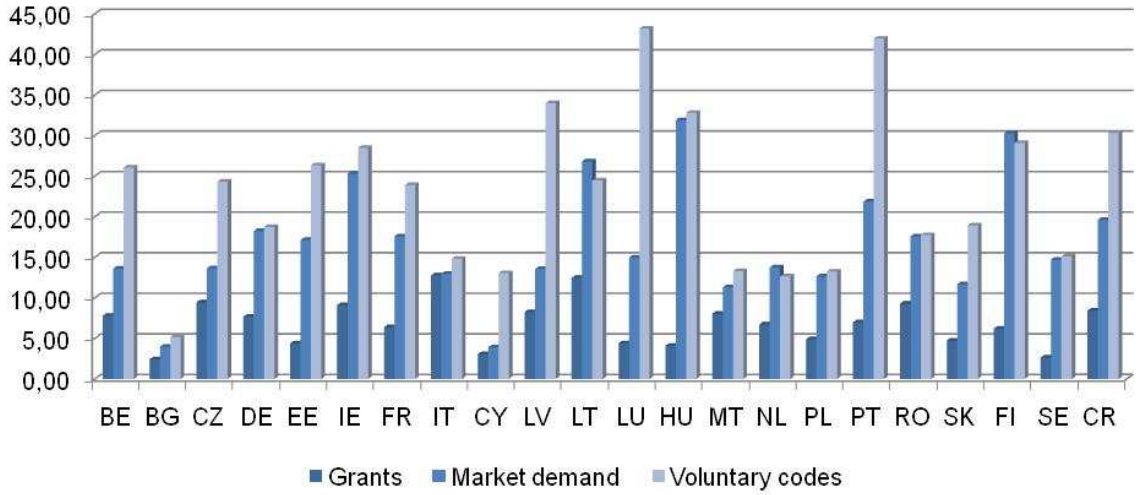
Let's look at some results of first statistical survey on eco-innovations with the EU states. The graphs 1 and 2 show firms' reasons for introduction of eco-innovations. We divided the reasons into two groups. In the first case the firms were forced to innovate by existing environmental regulations and taxes on pollution or regulations that are expected to be introduced in the future. It is evident that this reason is important especially in new member

[11] The surveys studied only results of innovation activities and their importance for companies. Just the ecological aspects were one of the choices.
[12] Czech Statistical Office (2008)

states of the EU (Hungary, Czech Republic, Latvia, Romania, Slovakia or candidate Croatia). Only situation in Bulgaria is different.[13]

The graph 2 is focused on the second case and presents voluntary reasons of firms to introduce eco-innovations. These reasons are represented by availability of government grants or other financial incentives for environmental innovation; current or expected market demand from customers for environmental innovations and voluntary codes or agreements for environmental good practice within company's sector. In this case the differences among individual countries are not so marked.

Graph 2. Motivation to introduce an environmental innovation – voluntary decision

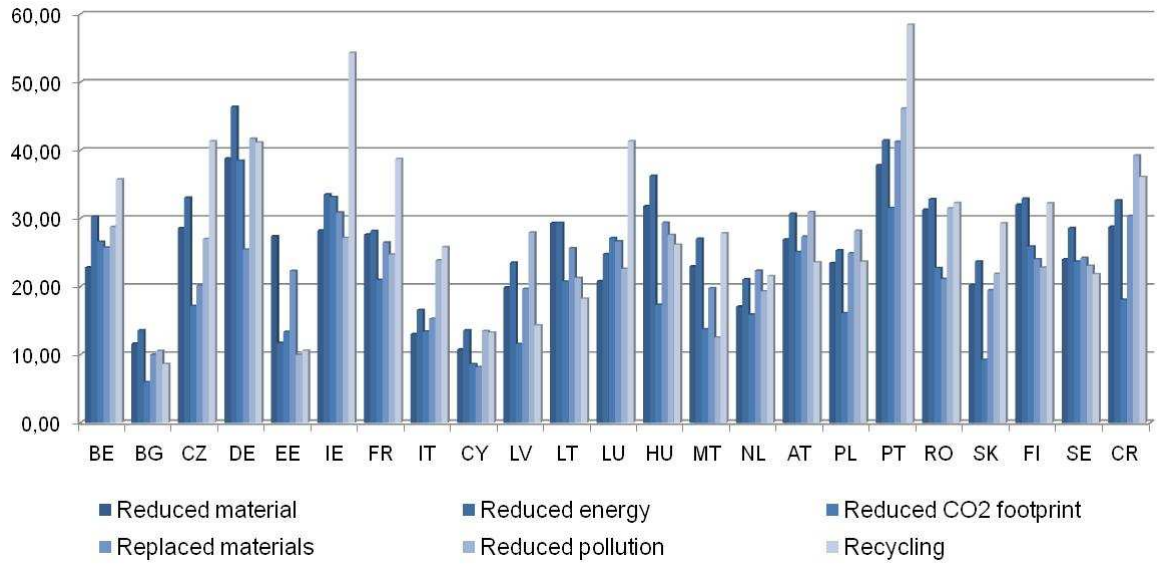


Source: Eurostat (CIS2008)

The following two graphs demonstrate effects of eco-innovations for producers or users. The graph 3 is aimed at producers. On average the most frequent effect for firms is possibility to recycle waste, water or materials. As well as the material and power savings are quite important effects for companies. Less significant effect is possibility to replace materials with less polluting or hazardous substitutes. The least relevant effect is reducing of soil, water, noise, air pollution or CO_2 production.

Graph 3. Innovations with environmental benefits – benefits for producers

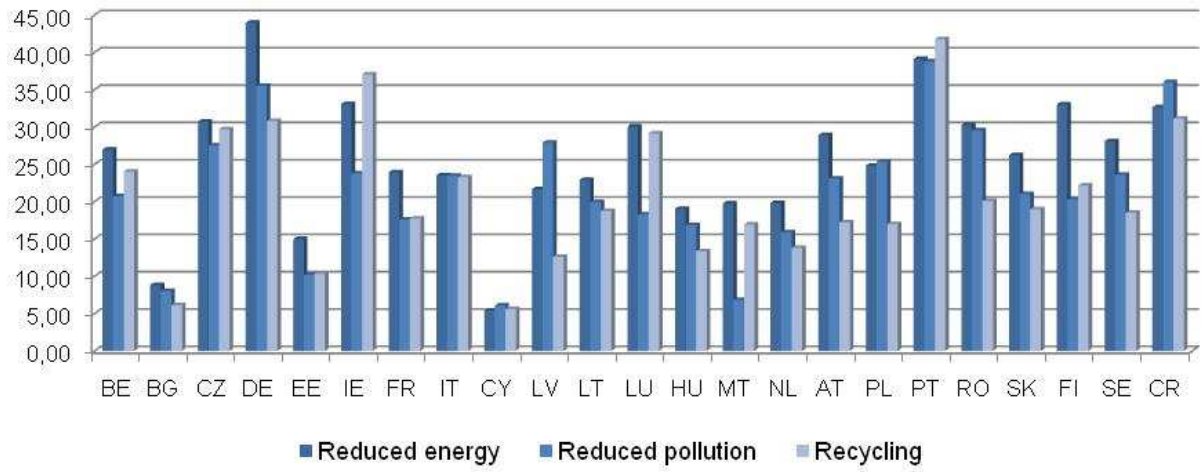
[13] Note: Belgium (BE), Bulgaria (BG), Czech Republic (CZ), Germany (DE), Estonia (EE), Ireland (IE), France (FR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembour (LU), Hungary (HU), Malta (MT), Netherlands (NL), Poland (PL), Portugal (PT), Romania (RO), Slovakia (SK), Finland (FI), Sweden (SE), Croatia (CR)



Source: Eurostat (CIS2008)

The innovation survey showed that companies believe that the most important benefit for users is reduced energy use. This effect is followed by reduced air, water, soil or noise pollution and improved recycling of product after use.

Graph 4. Innovations with environmental benefits – benefits for users

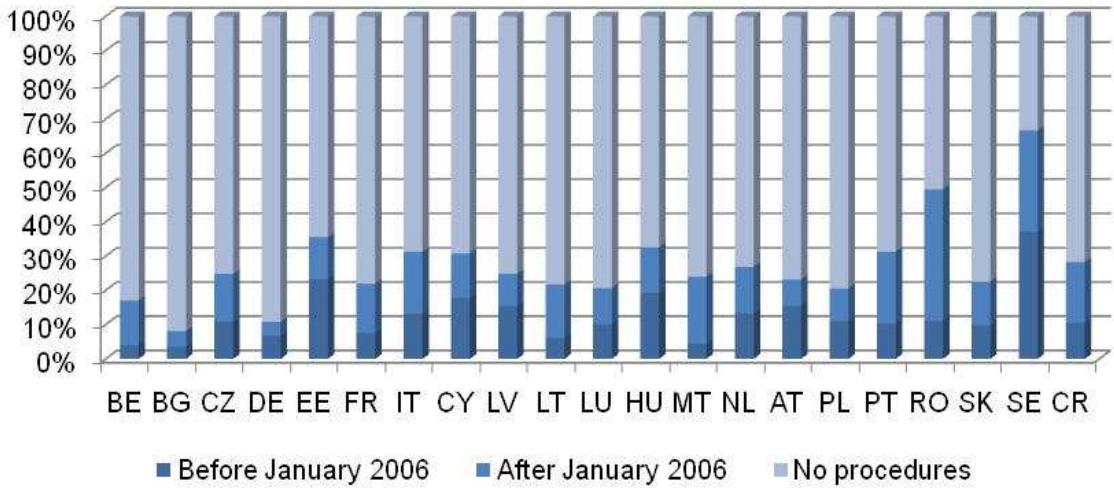


Source: Eurostat (CIS2008)

The statistical survey also tried to find out if the innovative companies had established procedures to regularly identify and reduce environmental impacts and if this procedures had been prepared before January 2006 are after January 2006.[14] As emerged from the results the procedures are available especially among Swedish companies and surprisingly Romanian companies. The procedures are not so frequent in Germany and Bulgaria.

Figure 5. Enterprises with procedures in place to regularly identify and reduce environmental impacts

[14] The survey dealt with the period from January 2006 to December 2008.



Source: Eurostat (CIS2008)

4. Influence of selected economic level indicators on eco-innovation creation and effects

In connection with previous results from statistical survey the next part of our article is focused on assessment of relation between selected indicators of economic level of countries and partial characteristics of eco-innovations (reasons for their introducing, effects for customers and producers, procedures to regularly identify environmental impacts). The elementary dependence, that could be logically expected, is direct relation between higher economic level and higher appearance of selected characteristic of eco-innovations. Therefore we included in our analysis three indicators which we regard as crucial in respect to innovation creation:

- Gross domestic product at market prices (EUR per inhabitant) – for the analysis the average value for the period 2006 – 2008 was chosen.
- Total research and development expenditures (% of GDP) – for the analysis the average value for the period 2006 – 2008 was chosen.
- Turnover from innovation (% of total turnover) – this indicator is available only for 2004 a 2006, for the analysis the value in 2006 was used.

Unfortunately the share of firms with eco-innovations on the total number of enterprises or in the total number of innovative enterprises is not available. Nevertheless, in spite of this fact we tried to formulate hypothesis that were consequently confirmed through correlation analysis.

4.1. Companies' reasons for introduction eco-innovations

Because the existence of present or future environmental regulation is frequent reason for introduction eco-innovations it is not possible to expect any strong influent of economic level on introduction such eco-innovations. But in the case of voluntary established eco-innovations we expected higher influent of economic level on development of these innovations. The values of correlation coefficients are showed in Table 1.

Table 1. Correlation between reasons for launching eco-innovations and economic level of country

	Present regulation	Future regulation	Grant	Market demand	Voluntary codes
GDP	-0.51	-0.36	-0.11	0.08	0.33

Expenditures on R&D	-0.36	-0.11	-0.06	0.29	0.03
Turnover	0.16	0.31	0.02	0.01	-0.23

Source: Eurostat, own calculation

In the case of companies' need to satisfy requirements of present environmental legislation the strongest relation to GDP per inhabitant was proved. This relation is indirect and the value of correlation coefficient is -0.51. On the basis of these results we made separate analysis focused only on countries of the Central and East Europe (CEE). We assumed more significant values of correlation coefficient and it was consequently partly confirmed (see Table 2). Other values showed in Table 1 cannot be considered as enough significant.

Table 2. Correlation between reasons for launching eco-innovations and economic level of country – CEE

	Present regulation	Future regulation	Grant	Market demand	Voluntary codes
GDP	0.51	0.57	0.16	0.32	0.64
Expenditures on R&D	0.17	0.40	0.20	0.60	0.66
Turnover	0.56	0.42	0.13	0.05	-0.28

Source: Eurostat, own calculation

In accordance with previous premise in the group of economics that have been recently transformed the direct relation between launching eco-innovations due to environmental legislation and economic level was proved (0.51). At the same time it was found out that in countries with high share of innovative products on turnover the environmental legislation is more frequently reason for development of new innovations. Another reason for development of eco-innovations that is connected with indicators of economic level (GDP and expenditures on R&D) is existence of voluntary code for environmentally good practice (correlation coefficient 0.64 and 0.66). The last reason with statistically significant relation to R&D expenditures is market demand (0.66). This finding is quite interesting, however from the practical point of view it is hardly possible to interpret it.

4.2. Benefits of eco-innovations for producers

As it was said above, the eco-innovations have a lot of direct positive effects on environment. In advance it was not possible to estimate the relation between economic level of the country and preferred effects of eco-innovations, nevertheless we assumed that at least one effect of eco-innovations will be related to economic level of the country.

Table 3. Correlation between benefits of eco-innovations for producers and economic level of country

	Reduced material	Reduced energy	Reduced CO2 footprint	Replaced materials	Reduced pollution	Recycling
GDP	-0.05	0.09	0.52	0.22	0.03	0.37
Expenditures on R&D	0.10	0.12	0.36	0.23	-0.02	-0.04
Turnover	0.32	0.29	0.18	0.02	-0.07	0.22

Source: Eurostat, own calculation

As you can see in table 3 the only effects of eco-innovations for producers where some slight dependence on economic level was proved is reduced CO_2 production (the value of correlation coefficient is 0.52).

4.3 Benefits of eco-innovations for users

In the context of existence of alternative products or services (eco-friendly vs. eco-unfriendly products) on market and demand of customers it was possible to assume some relation between the effects of eco-innovations for users and economic level of country. On the other side we didn't want to overestimate this assumption because the economic level of customer's country is more important than the economic level of producer's country and the relation between effects and economic level of customer's country it is not possible to examine. This part of our analysis was supplemented with indicator of existing procedures to regularly identify and reduce environmental impacts where it was possible to expect that in more developed countries these procedures will be more frequent than in less developed countries (but presence of such procedures is low in whole Europe).

Table 4. Correlation between benefits of eco-innovations for users and existence of procedures and economic level of country

	Reduced energy	Reduced pollution	Recycling of product	Existence of procedures
GDP	0,30	-0,03	0,33	0,02
Expenditures on R&D	0,15	-0,08	-0,02	0,13
Turnover	0,23	-0,10	0,16	0,11

Source: Eurostat, own calculation

The results of correlation shown in table 4 are not too interesting, all the analysed relations are only slightly or not at all significant. On the other side the confirmation of independence of these effects and procedures on the economic level of countries can be positive finding of carried out analysis.

5. Support of eco-innovations in the European Union

Especially the Competitiveness and Innovation framework Programme 2007-2013 (CIP) is focused on support of eco-innovations in the EU. The total budget of this programme is 3 600 million EUR. The main objective of CIP is to contribute to the competitiveness and innovative capacity of the Community as an advanced knowledge society, with sustainable development based on robust economic growth and a highly competitive social market economy with a high level of protection and improvement of the quality of the environment. The Framework Programme should contribute to elimination of gap between research and innovations and support all kinds of innovations.[15]

This programme is the second most important instrument for small and medium-sized enterprises, only support from structural funds is more important. The CIP replaces some older autonomous programmes. The interventions of CIP are considered also as a complement for other policies of the EU. Besides support of innovations, the programme finances also better access to finance (especially activities of European Investment Bank and European Investment Fund), delivers business support services in the regions, development of the information society and the increased use of renewable energies and energy efficiency.

The CIP programme consists of three subprogrammes:[16]

- The Entrepreneurship and Innovation Programme (EIP) – 60 % of total budget
- The Information Communication Technologies Policy Support Programme (ICT-PSP) – 20 % of total budget
- The Intelligent Energy Europe Programme (IEE) – 20 % of total budget.

[15] Decision No 1639/2006/EC of the European Parliament and of the Council
[16] Decision No 1639/2006/EC of the European Parliament and of the Council

The EIP subprogramme EIP is divided into 5 fields and just the support of eco-innovations is one of them. The promotion of eco-innovations through the Framework Programme aims to contribute to the implementation of the Environmental Technologies Action Plan. The eco-innovations are supported by three ways:

- better access to finance (through financial instruments of European Invesment Fund);
- networks of national and regional actors (e.g. Enterprise Europe Network or initiative Europe INNOVA);
- pilot and market replication projects.

The following analysis dealt with the third way of support to eco-innovations. The direct financial support is provided to pilot and market replication projects, bridging the gap between the successful demonstration of innovative technologies and the market uptake and by removing the barriers to market penetration, promoting voluntary approaches in fields such as environmental management, and networking relevant actors.[17]

The call for proposals for support to pilot and market replication projects was announced for the first time in 2008. Consequently it was announced also in 2009 and 2010. But the call in 2010 was not evaluated yet, so no projects were selected and it is possible to examine only proposals that have been submitted. Support can be provided to consortia (national or multinational) or individual participants. All the 27 member states of the EU and several other states[18] are eligible for funding from this programme. Support can be provided to private sector (either non-profit making or commercial), universities and research institutes, public authorities, financial institutions and others. The budget for support to eco-innovations is about 200 million EUR. Four types of sectors can obtain the grant: [19]

- Recycling sector (recycling processes and technologies, new products from recycled material and new recycling services);
- Green Business (cleaner production, greening of businesses, new materials or products);
- Food and Drink sector (waste treatment, food packaging and labelling, eco-innovative food chain logistics);
- Buildings sector (new construction material and elements which reduce consumption or resources and production of waste).

In table 5 there is shown that number of proposals increases and logically the number of participants is higher and higher. Also the amount of requested funding increases. But the share of small and medium-sized enterprises is slightly decreasing.

Table 5. CIP Programme – Eco-innovations: proposal of the calls

	Call 2008	Call 2009	Call 2010
Number of proposals	134	202	287
Number of participants	444	614	895
Requested funding (€)	110 000 000	150 000 000	264 000 000
Average funding requested (€)	830 000	770 000	921 000
SME (%)	74	70	66

[17] Decision No 1639/2006/EC of the European Parliament and of the Council
[18] Iceland, Norway, Liechtenstein, Albania, Croatia, Macedonia, Montenegro, Isael, Serbia, Turkey
[19] European Commission: Environment – Eco-innovations. Funding areas. Available on: http://ec.europa.eu/environment/eco-innovation/about/funding-areas/index_en.htm

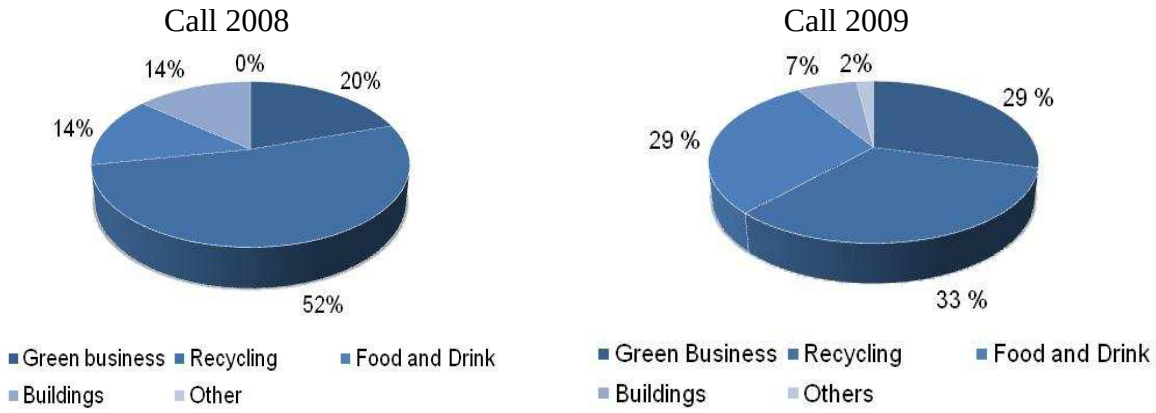
Note: Not all proposals are eligible for funding. Some proposals were submitted by participants from ineligible countries.

Source: EACI (2010b)

Despite the fact that number of applicants increases, number of recipients stays constant. Within the Call 2008 44 projects were supported, in 2009 45 projects. About 85 % of projects is submitted by consortia. The consortia are mostly (70 %) established as multinational (i. e. participants in the consortium come from at least 2 countries). National consortia are not so frequent (about 15 % of selected projects). The remaining 30 % of projects are realized by individual participants. The consortia have on average about 4 (2008) or 2 (2009) participants.

Graph 6 shows share of sectors on selected projects. In 2008 the recycling sector was clearly dominant, but in 2009 the share of recycling sector, green businesses and food and drink sector is similar. Only the share of buildings sector is lower. If we examine the share of proposals (not selected projects) the share of individual sectors would be very similar. So we couldn't say that some sector is better in obtaining of grants.

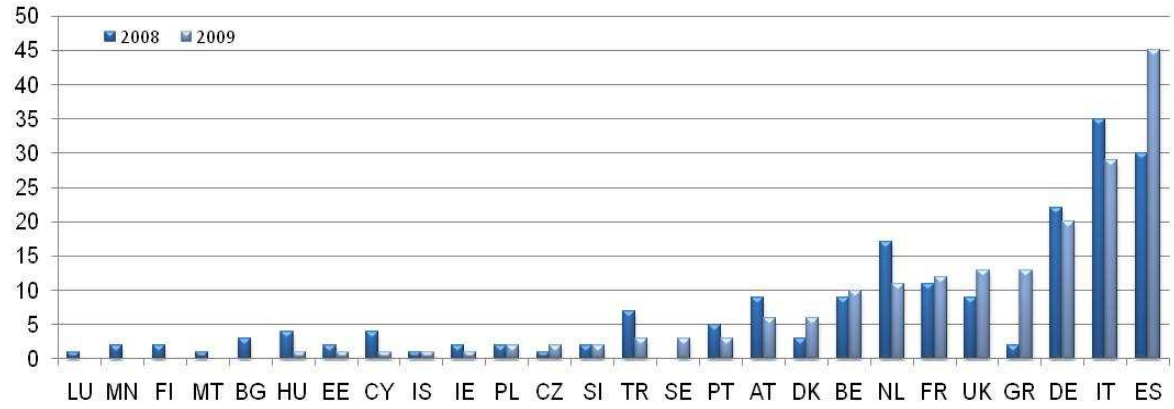
Graph 6. CIP Programme – Eco-innovations: supported sectors



Source: EACI (2009, 2010a)

As it was mentioned above the projects can be submitted by 27 countries of the EU and 10 other countries. In fact only 26 countries were supported so far, which of them 3 is not member of the EU – Montenegro (MN), Israel (IS) and Turkey (TR). It means that 11 countries didn't obtain any grant yet and even some of them didn't submit any project. No grant obtained participants from Slovakia, Lithuania, Latvia, Romania, Norway, Liechtenstein, Albania, Croatia, Macedonia, Serbia and Iceland. Among the supported countries there are quite big differences with respect to number of supported participants. The highest number of participants was support in Spain (75) and Italy (64). Also quite a lot of participants from Germany (42) and Netherlands (28) were granted. It is surprising, that only several participants from highly innovative countries as Finland (2) and Sweden (3) were supported.

Graf 7. CIP Programme – Eco-innovations: supported participants



Source: EACI (2009, 2010a)

6. Conclusions

The future competitive advantage of states, regions as well as firms is not low costs but innovations of products and services. When we try to achieve economic growth we have to also pay attention to environmental aspects of the growth. In connection with this the eco-innovations are widely discussed recently. Eco-innovation is any innovation that reduces negative impacts caused by production and consumption. Development of these innovations can be initiated by manufactures but as well as users (or customers). Also the research sphere can be source of information for eco-innovations. The effects of eco-innovations can be related to producers as well as consumers. The environmental aspects of innovations can be the primarily objective of producers but more often it is only secondary effect (positive externality). Governments through environmental regulation can force firms to launch eco-innovations.

The last innovation survey that was published by Eurostat showed that environmental regulations has big influent on introducing eco-innovations especially in new member states of the EU. Some companies develop eco-innovations with their voluntary codes for environmental good practice. The most frequent effect of eco-innovations for firms is possibility to recycle waste, water, or materials followed by costs reasons (savings of material and power). The most frequent effect for customers is reduced energy used by the new product.

In the article we also focused on assessment of relation between selected indicators of economic level of countries and partial characteristics of eco-innovations (reasons for their introducing, effects for customers and producers, procedures to regularly identify environmental impacts). In the case of companies' need to satisfy requirements of present environmental legislation the negative relation to GDP per inhabitant was proved. It was found out that in countries with high share of innovative products on turnover the environmental legislation is more frequently reason for development of new innovations. The only effects of eco-innovations for producers where some slight dependence on economic level was proved is reduced CO_2 production

The article also deals with support of eco-innovations from the Competitiveness and Innovation Framework Programme. There are big differences among countries of the EU in the use of this support. About 90 projects and 390 participants were supported from this programme so far.

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