
The economies of the Baltic Sea Region in relation to green economics, with particular focus on Latvia: environmental sustainability and well-being

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Abstract: Economic activity has an impact on the environment, but the potential degree of this impact will depend on several factors which are mainly determined by the technology used. This paper analyses the potential environmental impact the economies of the Baltic Sea Region have on their respective countries. The Baltic Sea Region countries are characterised by two economic development scenarios, namely, market and transition economies. Income levels, applied technologies and environmental management practices in these countries differ considerably, and affect a variety of complex indices. These are used to evaluate a country's overall environmental situation and the well being of its inhabitants. An examination of the Baltic Sea Region indicates that high income levels and a stable development path in the 'old' EU member states can provide the grounds for technological advancement to reduce environmental impact. The Baltic Sea and good neighbouring relations serve as a common resource and as facilitators for active cooperation in environmental issues in the region.

Keywords: Baltic Sea Region; BSR; green economics; environmental impact; sustainability; environmental management; well-being; Latvia.

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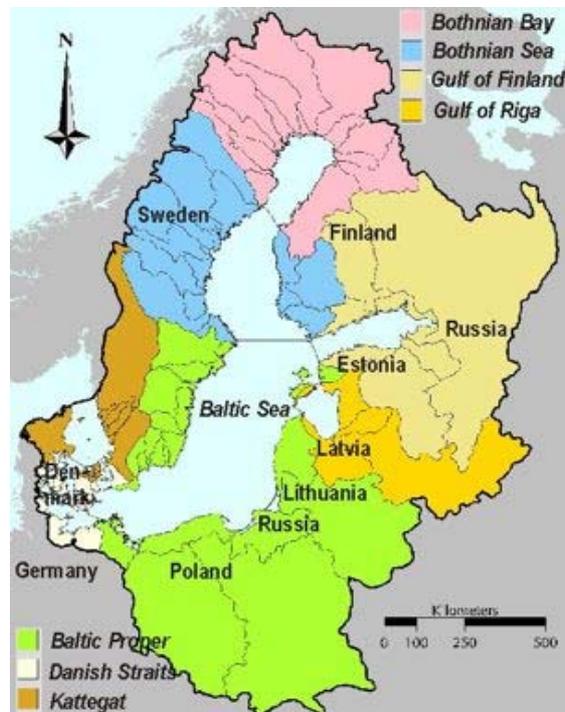
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1 Introduction

The purpose of this paper is to analyse the impact of economies (at different stages of development) upon the condition of the environment and on the wellbeing of the population, and will use the example of the Baltic Sea Region (BSR) countries to draw conclusions about the possibilities of introducing best practises from the region into Latvia.

The BSR is made up of nine countries and a number of metropolitan areas. The region encompasses Estonia, Latvia, Lithuania (the Baltic States) Sweden, Denmark, Finland, Germany, Poland and North-West Russia, with St. Petersburg and Kaliningrad Oblast, the Russian exclave between Poland and Lithuania (see Figure 1). All the countries except Russia are members of the European Union. The paper examines only those BSR countries which are EU member states – Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden.

Figure 1 Map of BSR (see online version for colours)



Source: UNEP/GRID

Throughout the course of an individual's life, their activities are carried out in interaction with nature. Man-society-nature: this triad has created numerous problems over the course of time, and it is of especially vital importance (*Environment and Sustainable Development*, 2010). An ideological conflict has arisen between environmental protection and the need to provide social and technological development, in the industrialised part of the world (Larson, 1996). However, recently opinions have significantly changed in favour of environmental protection. A transition has begun to apply 'clean' technologies and to reduce the senseless waste of natural resources from the production process, and is moving towards sustainable development, for instance, the management of a product's life cycle, waste recycling and disposal in an environment friendly way (*Environment and Sustainable Development*, 2010).

Until the second half of the 20th century a limited understanding of society's interaction with nature prevailed. Now people are aware that natural resources are not perpetual and any human activity influences nature both in the short and in the long term. Environmental management has become a theme of vital importance among entrepreneurs in all BSR countries. Society and the business world have changed their attitude towards the environment – very often issues connected to the latter have become serious arguments in the decision making process. The ability to improve the environment is a significant task for enterprises in order to maintain international competitiveness. This necessity influences BSR countries' enterprises more and more, as there are high environmental standards in the European Union, and these standards are constantly being improved through regulation over the course of time.

In implementing environmental policy, more and more attention is being paid to the use of economic instruments. These are especially effective in the circumstances of a market economy and they influence producers' possibilities or consumers' behaviour in the market (Central Intelligence Agency, 2008). The aims of using economic instruments are as follows: to limit mismanagement of natural resources; to reduce manufacturing and using of production that pollute environment; to promote introduction of new and advanced technologies, which reduce environment pollution, to create financial provision for environment protection activities.

2 Environmental impact of economic activities

In assessing how green the economies of BSR countries are, we analyse data reflecting impact of economic activities on environment. We use IPAT equation $I = P \times A \times T$, where I – environmental impact, P – population, A – affluence and T – technology (Ehrlich and Holdren, 1971), as an analytic framework of assessing the impact from the economy of each country. This identity is often used in scientific literature, especially in ecological economics to decompose contributors to environmental damages. The IPAT relation shows the main casual factors underlying the environmental problems – population, consumption and technologies used to satisfy the needs and wants of population. We analyse these main factors using the available data. The use of the IPAT equation as an analytic framework means that we do not calculate an exact result for the formula, but we can assess the main factors influencing environmental quality and well being of people in the region, which are both within the scope of green economics.

The population in BSR countries has been stable over the last decade with a slight increase in population in the old EU member states – Denmark, Finland, Germany and

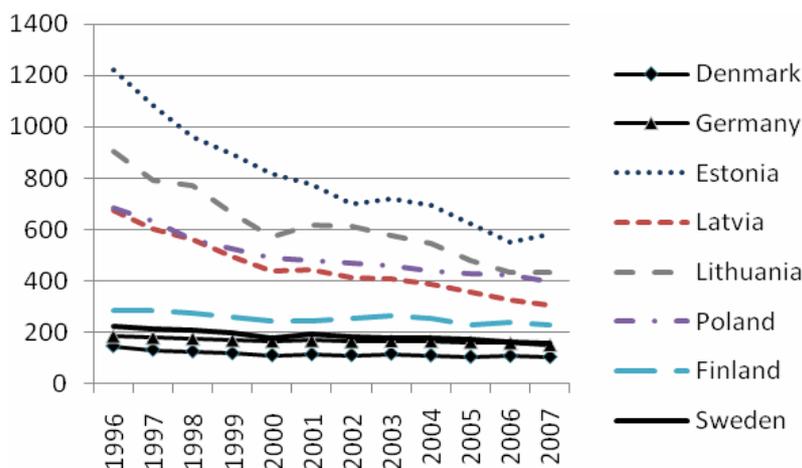
Sweden and approximately the same decrease in the new EU member states – Estonia, Latvia, Lithuania and Poland. As in most countries of Europe, the main demographic concern with the situation is the ageing of the population which is negatively influencing social security systems. This could be a threat for sustainable development from a social perspective because a decreasing number of people in the workforce will have to support an increasing number of retired people.

There are several indicators which can be used to measure affluence and technology. Affluence could be measured by GDP or some other monetary terms. BSR countries differ considerably according to the GDP per capita in comparison to industrially developed countries and transition economies. Old EU member states' weighted average GDP per capita in 2008 was around 31.8 thousand EUR in current prices with a decrease in 2009 around 4.6%. New EU member states or transition countries weighted average GDP per capita in 2008 was around 9.6 thousand EUR in current prices with a decrease in 2009 of around 15%. So in 2009, the average income ratio difference between old and new member states was 3.7 times. Also, the inequality of income distribution reflected by Gini index is higher in transition economies (see Table 2), which means that there is a considerable share of people living in poverty.

Having different consumption patterns in various countries, the environmental impact of affluence can differ considerably. Affluence can be expressed also as capital stock per person and the flows of materials needed to maintain each form of capital, these flows being mainly determined by technology.

Technology advancements in BSR countries which have not undergone a change of economic system are considerably more advanced. They have also succeeded in the development of technologies for energy production from renewable resources – Denmark is well known for its cluster of wind power generator production, Germany – for developments in wind, solar and geothermal energy production equipment and components, Sweden – for its use of hydro power and biomass for energy production. Sweden is the first advanced western economy trying to become oil free for energy production until 2020 without building a new generation of nuclear power stations.

Figure 2 Energy intensity of the economy in BSR countries from 1996–2007 (kg of oil equivalent per 1,000 euro) (see online version for colours)

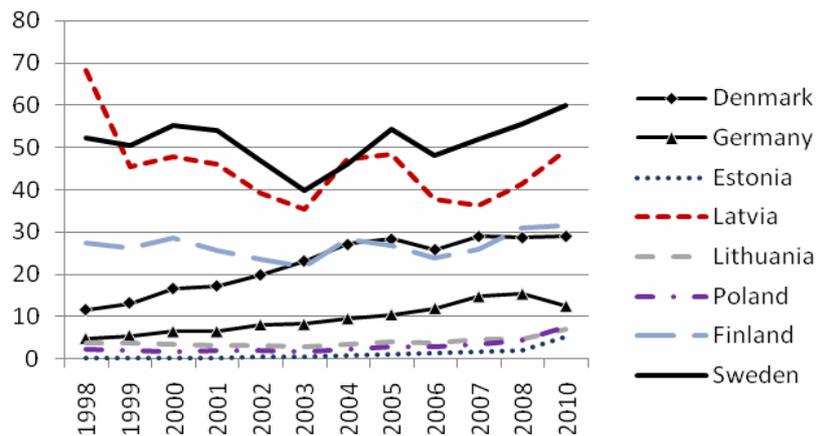


Source: European Union (1995–2010)

The main impacts of climate change on the world population are: energy efficiency and the use of energy resources with less or zero greenhouse gas emissions (GHG) and these are very important factors in assessing an economy's impact on the environment. Figure 2 show that all BSR countries have improved their energy efficiency from 1996 until 2007. New EU member states have succeeded in reductions by a factor of two, but still their average energy intensity remains 2.7 times higher than in the old member states. This can be explained by the advanced technologies of the old member states and also by new member states' negative heritage of energy inefficiency from Soviet times especially in the housing sector. Denmark and Sweden have a vast range of environmentally motivated subsidies in addition to the more traditional economic instruments – charges and taxes (European Environment Agency, 2010).

In addition, the old EU member states, and also Latvia have had a positive experience in using renewable resources for energy production. Sweden, Latvia, Finland and Denmark have the biggest share of renewable resources in total energy consumption (see Figure 3) and these countries also have the highest targets for 2020 set according to the EU Directive on renewable energy. Finland, Sweden and Latvia are EU leaders in biomass production per capita.

Figure 3 Electricity generated from renewable sources in BSR countries from 1996–2007, % of gross electricity consumption (see online version for colours)

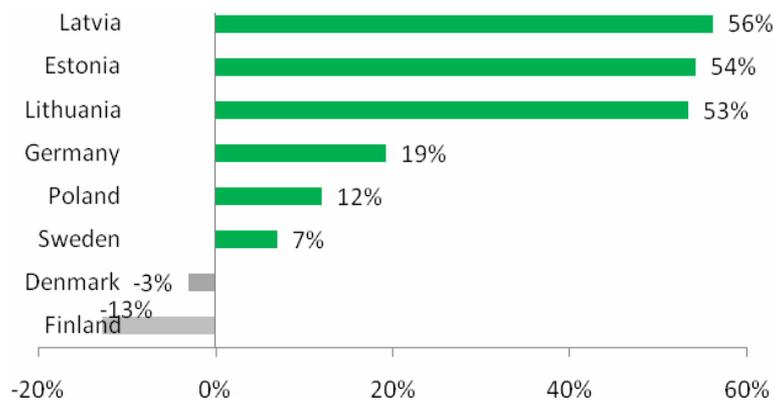


Source: European Union (1995–2010)

There is a continuous debate over biofuels' economic and environmental impacts, mainly, because they compete with food production and may cause an increase in fertiliser and pesticide use, which will negatively impact ecosystems and biodiversity. The use of renewable resources for energy production is a very important factor for development of the local economy. The renewables sector provides jobs, reduces transportation volumes, increases energy independence and for many countries improves import-export balance. These benefits favour the development of a biofuels' industry, but with greater attention to sustainable practices and high environmental standards. According to studies commissioned by the German Ministry of Environment, Germany had 166 thousand jobs related to renewable energy in 2004 which is estimated to considerably increase in the future (UNEP, 2008).

To improve energy efficiency and increase the share of energy produced from renewable resources, new member states are able to use EU structural fund financing and also revenues from the Kyoto protocol emission trading system. The restructuring of economies in transition countries has led to a sharp decrease in the production sector and improvement in technology, GHG reductions in three Baltic countries are even bigger than those countries who have committed within the Kyoto protocol (see Figure 4). Therefore the new member states are able to obtain assets from emission trading and invest them in technologies for reduction of GHG emissions. For example, in 2009 and 2010 the Ministry of Environment of the Republic of Latvia organised contests for investments in energy efficiency and technology development for 81 million EUR. There is a positive cooperation between BSR countries in Joint Implementation projects as well. The BSR is a testing ground and is at an early stage of the overall process of following and implementation of the Kyoto Protocol.

Figure 4 GHG emissions in CO₂ equivalent reductions in BSR countries 1990–2006 (see online version for colours)

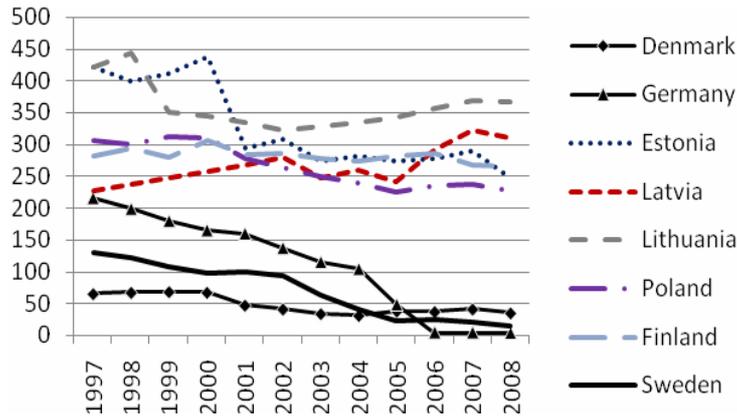


Source: United Nations Framework Convention on Climate Change

Technological improvements are of vital importance not only in energy use, and emissions reduction but also in saving other resources. These improvements in resource use can be obtained through reductions in material input, minimisation of waste, reuse, recycling of waste and improved durability of goods. Figure 5 shows that waste sorting and managements system in the new member states has not been fully developed, because on average in 2008 there was 3.6 times more waste land filled per person in new member states, than in the old member states. Comparing municipal waste created, and land filled from 2001 to 2008, old member states have land filled on average 19% of their municipal waste but new member states 79%. An analysis of reasons for such disparities reveals that old member states have more highly developed waste management systems and also landfill charges are much higher ranging from 30 to 100 EUR per ton of waste, while new member states have very low landfill charges, for example, 4 EUR per tonne in Latvia. Estonia has managed to achieve a considerable reduction of municipal waste, land filled from 95% in 2000 to around 60% in 2006 owing to a land filling cost increase of 700%. Since 2002 in Sweden and since 2005 in Germany it is no longer permitted to landfill organic waste. The graphs in Figure 5 show that it has caused an obvious decrease in weight of the land filled waste per person. An EEA study found that to be

effective, landfill tax rates should be relatively high, although in Estonia rapid increases to a relatively low landfill tax have achieved a similar effect (European Environment Agency, 2009).

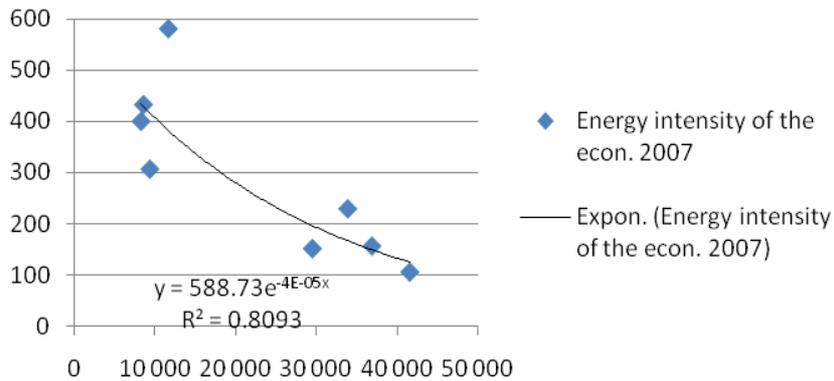
Figure 5 Municipal waste landfilled (kg per capita) in BSR countries 1997–2008 (see online version for colours)



Source: European Union (1995–2010)

These examples show that in BSR countries with higher per capita income levels the use of economic instruments and technology advancements do reduce the impact of their economy on the environment. Figure 5 shows the relation between GDP per capita (horizontal axis) and energy intensity (vertical axis) in 2007. The coefficient of determination 0.8 shows that the exponential equation which describes the relation between these factors is quite close.

Figure 6 Relation between GDP per capita and energy intensity in 2007 (see online version for colours)



Source: European Union (1995–2010)

From a green economics perspective it would be very important to develop further cooperation between the BSR countries and to facilitate technology transfer, share the best environmental management practices and to decouple growth in the transition

economies from their impact on the environment. As the Baltic Sea is one of the common resources for this region which suffers a great deal from pollution caused by surrounding countries' economies, such common effort would improve the well being of inhabitants of all BSR countries.

Environmental data from BSR countries reveals that slower growth in transition economies has been beneficial in the context of some environmental issues, such as biodiversity and protected areas. According to Eurostat data, Estonia has the highest percentage area protected for biodiversity, in total 17% of its territory, and Latvia has the highest common bird index 109.7 in comparison to 1990.

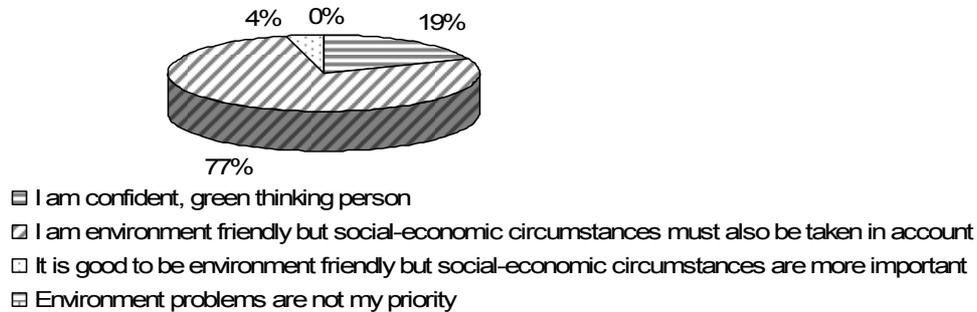
Many authors have stressed that there ought to be a drastic reduction in the environmental impact of economic activities to avoid the collapse of civilisation, and that this change should come by transforming dominant cultural patterns, and by changing attitudes and behaviour (Assadourian, 2010; Jackson, 2009; Daly, 2008).

To reduce an economy's impact on the environment, an awareness of environmental issues is required from society and entrepreneurs. While transition countries do not have enough capacity to develop new technologies for decoupling growth, they would need to pay more attention to education, awareness building and promotion of green lifestyles. In order to assess the actual level of societal involvement in the introduction of environmental protection activities, and to clarify society's attitude towards environmental issues, we carried out a survey of entrepreneurs in Latvia, which could serve as an example for the situation in the Eastern part of the BSR region.

3 Results of the survey of attitude towards environmental issues in Latvia

Economic activities always affect the environment. In order to find out how ready we actually are to green the economy and to approach the economic levels of developed countries, our survey presents results from the leaders of various enterprises, organisations and their branches from different regions-and analysed with computer technology. Coherence between economic characteristics was determined. Answers from 988 respondents in total made it possible to clarify society's attitude and level of awareness regarding important environmental issues. It also led to the estimation of further activities regarding environment protection measures in enterprises and organisations.

Figure 7 How do you assess your understanding of the environment?



As shown in Figure 7, the majority (77%) of respondents estimated their attitude as environmentally friendly and only 4% of respondents considered environmental issues to be irrelevant. Most care about the socio-economic status which is a very positive factor for improving environmental conditions and carrying out green economy measures in organisations.

The opinion of respondents regarding their routine behaviour can be estimated as a positive trend (see Figure 8). Nevertheless one should pay attention to directing behaviour towards more effective results through education and the information process, because people are not always capable of evaluating the real impact of their behaviour on the environment.

Figure 8 Do you think your everyday activities are environment friendly?

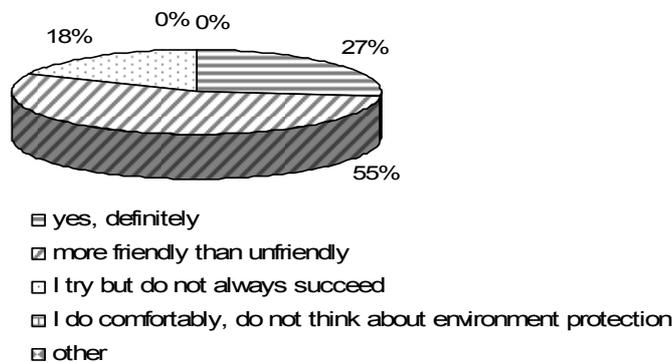
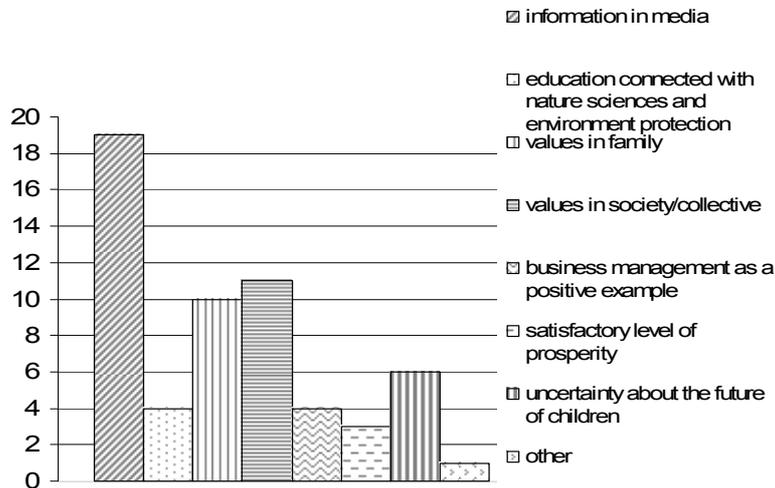


Figure 9 What do you think contributes to the desire of people to act environment friendly everyday?

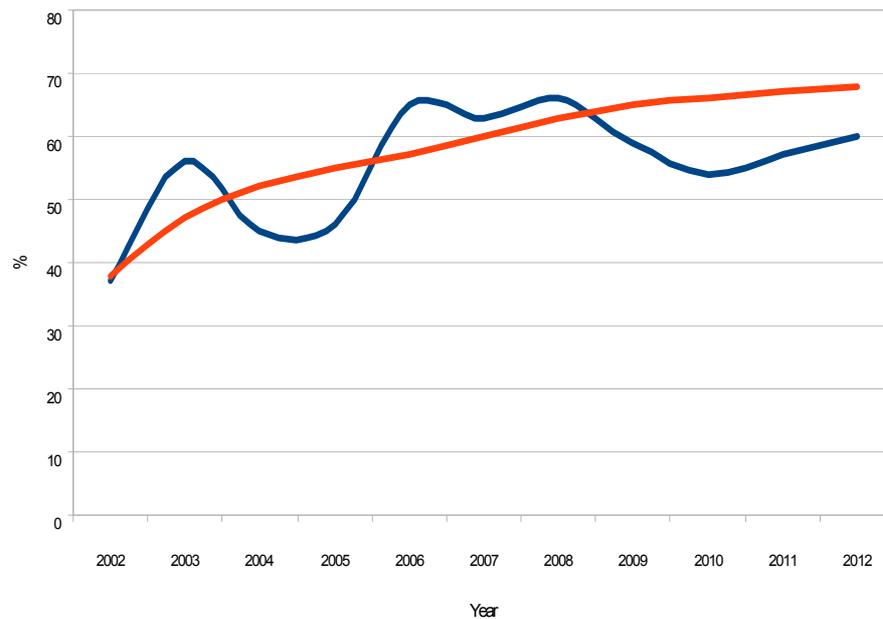


In the framework of the survey, an attempt was made to establish the most significant trends that promote or reduce the will for a person to act in an environmentally friendly way. The knowledge that information and the mass media have an impact could be useful when formulating certain laws, regulations and policies. Next, the most important factor

is values in society and family. Changes in education and support for a green lifestyle in mass media are especially crucial. If it was possible for people to create consumerism through the mass media, it might be possible in the same way to persuade society that consumption is not the only way of life (Atstaja and Brivers, 2008). Courses in environmental economics and sustainable development are already included in some study programmes in Latvia's higher education establishments. Soon a project in close cooperation with Uppsala University (Sweden), financed by Norway financial instrument will be completed, introducing a sustainable development course for all study programmes in higher education.

Only a small sample of the survey results can be included in this paper but nevertheless they permit an evaluation of society's understanding of environmental policy and the basic principles of an environmentally friendly enterprise. These survey results made it possible to link the development of the state economy with environmentally friendly enterprise forming measures. The results are further fed into the model *SimQuest*, see Figure 10. The curve shows that regardless of the economic situation in the country, there is an increasing trend in choosing an environmentally friendly solution.

Figure 10 Establishments willing to join environment activities (see online version for colours)



A survey of future entrepreneurs' students was carried out in addition to the survey of the heads of organisations. Introduced to the calculated result of their individual ecological footprint, students suggested measures to reduce their ecological footprint and the impact of their lifestyle on the planet. The survey shows that those students who have taken classes related to ecological issues had smaller ecological footprints than the average in that country. One can conclude that introducing study courses related to environmental issues can help stimulate an interest and desire to change behaviour, which tends to favour environmentally friendly solutions.

We argue that public awareness and willingness to choose environmentally friendly solutions appears to be increasing in other transition countries in BSR in parallel.

4 Performance indicators

In assessing how the state of the environment, technological advancements and also public opinion have contributed to the quality of life and well being of inhabitants in BSR countries, we used mature indicators such as the environmental performance index (EPI) and happy planet index (HPI). The EPI was developed by a team of environmental experts at Yale University and Columbia University. EPI ranks countries on their performance across 25 metrics aggregated into ten categories including: environmental health, air quality, water resource management, biodiversity and habitat, forestry, fisheries, agriculture, and climate change. An analysis of the policy drivers underlying the 2010 rankings suggests that income is a major determinant of environmental success. At every level of development however, some countries achieve results that exceed what would be anticipated, demonstrating that policy choices also affect performance (Yale Centre for Environmental Law and Policy Yale University, 2010). Table 1 shows that in comparison to 163 countries all BSR countries are ranked in the first half, while the old EU member states from BSR and Latvia have higher scores. Owing to changes in the data and methods used in 2010, the results cannot be directly compared to 2008.

Table 1 EPI ranks and scores for BSR countries in 2008 and 2010

	2010		2008	
	<i>EPI rank</i>	<i>EPI score</i>	<i>EPI rank</i>	<i>EPI score</i>
Sweden	4	86	3	93.1
Finland	12	74.7	4	91.4
Germany	17	73.2	13	86.3
Latvia	21	72.5	8	88.8
Denmark	32	69.2	26	84.0
Lithuania	37	68.3	16	86.2
Estonia	57	63.8	19	85.2
Poland	63	63.1	43	80.5

Source: Yale Center for Environmental Law & Policy Yale University (2010)

The HPI report identifies health, and a positive experience of life as universal human goals, and the natural resources that human systems depend upon as fundamental inputs. A successful society is one that can support good lives that do not cost the Earth. The HPI measures progress towards this target – the ecological efficiency with which happy and healthy lives are supported (The New Economics Foundation, 2009).

HPI scores range from 0 to 100 – with high scores only achievable by meeting all three targets embodied in the index – high life expectancy, high life satisfaction, and a low ecological footprint. The ecological footprint measures our use of ecological resources and represents the amount of biologically productive land and sea area needed to regenerate the resources a human population consumes and requires to absorb and render harmless the corresponding waste. The Earth currently has just 2.1 global hectares

available per person (WWF, 2008). Among the BSR countries Lithuania and Latvia have the smallest ecological footprints but still these footprints are almost twice as large as what would constitute an equal share for every person on Earth. Estonia's large footprint can be explained by the fact that it produces electricity from oil shale which is very polluting (Streimikiene and Roos, 2009). Nevertheless, shorter life expectancy and lower life satisfaction ranks new member states behind the old ones according to HPI.

Whilst the HPI confirms that the countries where people enjoy the happiest and healthiest lives are mostly in richer developed countries, it shows the unsustainable ecological price we pay. It also reveals some notable exceptions – less wealthy countries, with significantly smaller ecological footprints per head, having high levels of life expectancy and life satisfaction. In other words, it shows that a good life is possible without costing the Earth (The New Economics Foundation, 2009).

In the case of BSR only Denmark lags behind other old EU member states, but in overall higher life satisfaction and life expectancy offsets a drawback of bigger footprints and Germany, Sweden and Finland have better HPI scores than transition countries (see Table 2).

Table 2 Performance indicators of BSR countries

<i>Country</i>	<i>Life satisfaction (0–10)</i>	<i>Life expectancy (years)</i>	<i>Footprint (g ha/cap)</i>	<i>HPI</i>	<i>HPI rank</i>	<i>GDP per capita (EUR PPP) 2008</i>	<i>HDI</i>	<i>Gini coefficient 2008</i>
Germany	7.2	79.1	4.2	48.07	51	29 000	0.935	30
Sweden	7.9	80.5	5.1	47.99	53	30 700	0.956	24
Finland	8.0	78.9	5.2	47.23	59	29 300	0.952	26
Poland	6.5	75.2	4.0	42.75	77	14 100	0.870	32
Lithuania	5.8	72.5	3.2	40.90	86	15 500	0.862	34
Latvia	5.4	72.0	3.5	36.67	101	14 300	0.855	38
Denmark	8.1	77.9	8.0	35.47	105	30 100	0.949	25
Estonia	5.6	71.2	6.4	26.42	131	16 900	0.860	31

Source: The New Economics Foundation (2009), European Union (1995–2010)

Combining HPI, EPI, human development index and Gini coefficient ranks we conclude that Sweden has achieved the best results of the BSR, followed by Finland, Germany and Denmark. This shows that advancements in technology, high income levels and the well coordinated legislation base, and the use of economic instruments in old EU member states, have provided positive results not only to inhabitants of these countries but also for improving the environmental situation.

5 Conclusions

- BSR countries can be considered active from the perspective of an implementation of green economics because of the considerable achievements in several countries of the region using renewable energy, improving technologies, preserving the environment, reducing inequality, improving well being. Although each country has

its own traditions, history, culture and politics this diversity can be mutually beneficial in the case of strong cooperation.

- In total, the old EU member states from the BSR have managed to achieve better results with regard to the impact of their economies on the environment. Energy intensity of economy, GHG emission intensity of output and waste management measures are the most demonstrative indicators. The new member states and the whole region can benefit from technology transfer, knowledge sharing and other forms of partnership.
- The ecological situation in the transition economies improved considerably when industry output reduced and policies changed at the time of the collapse of the Soviet Union. Preparation work for access to the EU also contributed to a better environmental situation as EU environmental standards and basic environmental management principles were introduced.
- We regard Latvia as a green country with plenty of forests, unspoiled nature, favourable culture and traditions where a green economy could develop. Society is becoming more interested in environmental issues and the survey results show that under various economical preconditions, organisations would prefer environmentally friendly solutions.
- The willingness to run enterprises in an environmentally friendly manner may well be similar in other BSR countries, however economical, religious, cultural and historical aspects do remain very important.
- Society's desire to change its habits preferring environmentally friendly solutions is fostered by environmental education, awareness building and publishing the results of different ecological and economical studies (HPI, EPI, ecological footprint).
- Cooperation among BSR countries, including Uppsala University, has largely contributed to the promotion of sustainable development education in the BSR countries. Unfortunately, there is a lack of teaching or promotion of green economics in the new member states.
- High income, sophisticated environmental policies and technology advancements improve environmental health, air quality, resource management, higher life satisfaction and life expectancy all offset the drawbacks of higher consumption in the old EU member states and result in higher rankings in EPI and HPI with some exceptions.
- Common resources – such as the Baltic Sea and strong neighbouring relations can serve as facilitators for active cooperation in environmental issues in the region.

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