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Response Of The EU Member States To Climate Change In The Context Of EU Policy And Strategy

Abstract

The aim of this paper is to present selected results achieved by the Member States of the EU in the context of the recent global and European strategies oriented toward enhancement of the role of renewable energy sources and on mitigation of negative climate changes in the Earth. Special attention has been paid to those countries that have approached or already reached, in the year 2012, a share of renewable energy indicators at a percentage level higher than the required 20%.

Keywords: *renewable energy sources, electricity consumption, EU and global energy strategies*

1. Introduction

The Earth's climate is changing. The average global temperature is rising because of the increase in greenhouse gases generated from human activities. The cost of not adapting to climate change is estimated to reach at least €100 billion a year by 2020 for the European Union as a whole.

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The EU has long argued for the need to limit global warming, i.e. the increase in the global mean temperature, to no more than two degrees Celsius. This imperative is now recognised by the international community. The EU has successfully reduced its own greenhouse gas emissions by over 18% since 1990. In doing so, it has broken the link between emissions and economic growth, the latter of which has increased by more than 40% over the same period. This shows that reducing emissions does not harm the economy.

The EU's actions to develop a low-carbon economy are also helping to boost jobs and growth by stimulating innovation in clean technologies such as renewable energy and energy efficiency. The idea of creating a green economy in Europe is not only important from the point of view of developing the labour market and creating new jobs - it also strengthens Europe's energy security and allows it to reduce its dependency on imported oil and gas. The renewable energy industry in Europe has increased its work force from 230,000 to 550,000 over the past five years. Meeting the EU's target of obtaining 20% of its energy from renewables by 2020 could create an extra 410,000 jobs across the EU in renewable energy-related sectors.

The key requirement of the EU is to become a low-carbon economy. As part of its goal of keeping the increase in the global temperature to below two degrees Celsius, the EU has committed to the long-term goal of cutting its emissions by 80-95% of the 1990 levels by 2050, in the context however of similar actions by the developed countries as a group.

The current financial and economic crisis should not delay cost-effective investments or programmed energy projects that would create jobs, enhance energy security, and help limit greenhouse gas emissions in the short and medium term. Innovation and knowledge are key factors for supporting the economic recovery and putting the world economy on a path toward more sustainable growth. There is a need to accelerate innovation in relation to the long-term challenges and to encourage the development of those new industries, companies and services which will be decisive to creating new sources of growth. The interlinked challenges of climate change, energy security and the sustainable and efficient use of natural resources are amongst the most important issues to be tackled within the strategic perspective of ensuring global sustainability. The shift towards green growth will also provide an important stimulus to recovery from the economic and financial crisis.

Stable and secure energy availability is indispensable for social and economic development. It is essential to ensure global energy security and access to energy in developing countries. The emergency response to the economic crisis should not overlook the opportunity to facilitate a global green recovery, putting our economies on a path towards more sustainable and resilient

growth. Our fiscal stimulus packages are increasingly investing in measures encouraging the creation of green jobs and low-carbon, energy-efficient and sustainable growth. These include energy efficiency measures, investment in public transportation infrastructure, incentives for recycling and for fuel-efficient vehicles, research into alternative sources of energy, support for renewable energy technologies, as well as in enhanced CO₂ reduction.

Energy is central to our lives. We rely on it for transport, for heating and cooling our homes, and for running our factories, farms and offices. However, fossil fuel is a finite resource and in addition is a major cause of global warming. So we can no longer take energy from fossil fuels for granted. We, meaning the national governments and the EU, must create an integrated energy and environmental policy based on clear targets and timetables for moving to a low-carbon economy and conserving energy. Driving the policy is the EU's bid to achieve a 20% reduction in its greenhouse gas emissions by 2020 (compared with 1990 levels), mainly by boosting the use of renewable energy and curbing energy consumption. These measures will also reduce dependence on imports of gas and oil and help shelter the economy from volatile energy prices and uncertain supplies.

The EU policy focuses on creating a competitive internal energy market offering quality service at low prices, on developing renewable energy sources, on reducing dependence on imported fuels, and on doing more while consuming less energy.

2. Sustainable energy- strategy and policy issues

*The Green Paper. A European Strategy for Sustainable, Competitive and Secure Energy*¹ was an important milestone in developing an energy policy for the European Union (EU). If Europe is to achieve its economic, social and environmental objectives, it has to address major energy-related issues such as its growing dependence on energy imports, volatile oil and gas prices, climate change, increasing demand, and obstacles to a fully competitive internal energy market. The EU must exploit its position as the world's second largest energy market and as world leader in demand management and the promotion of renewable energy sources.²

¹ GREEN PAPER, A European Strategy for Sustainable, Competitive and Secure Energy, Brussels, 8.3.2006; COM(2006) 105 final.

² http://europa.eu/legislation_summaries/energy/european_energy_policy/127062_en.htm

The diagnosis concerning the situation in the European energy sector was based on the following factors:

- The need for investments to meet expected energy demand and to replace ageing infrastructure. The EU's import dependency is rising. Unless we can make domestic energy more competitive, in the next 20 to 30 years around 70% of the Union's energy requirements, compared to 50% today, will be met by imported products – some from regions threatened by insecurity. Reserves are concentrated in a few countries. Today, roughly half of the EU's gas consumption comes from only three countries (Russia, Norway, and Algeria). Based on current trends, gas imports would increase to 80 % over the next 25 years. The EU currently imports 82% of its oil and 57% of its gas, making it the world's leading importer of these fuels.
- The increasing global demand for energy. World energy demand is expected to rise by some 60% by 2030, and along with it CO₂ emissions. Global oil consumption has increased by 20% since 1994, and global oil demand is projected to grow by 1.6% per year.³

The European Commission oriented its European energy policy on three core objectives:

1. Sustainability - to actively combat climate change by promoting renewable energy sources and energy efficiency;
2. Competitiveness - to improve the efficiency of the European energy grid by creating a truly competitive internal energy market;
3. Security of supply - to better coordinate the EU's supply of and demand for energy within an international context.⁴

Since 1990, the EU has been engaged in an ambitious and successful plan to become a world leader in renewable energy. To take one example, the EU has now installed wind energy capacity equivalent to 50 coal-fired power stations, with costs of such installations halved in the past 15 years. The EU's renewable energy market has an annual turnover of €15 billion (half of the world market), employs some 300,000 people, and is a major exporter. Renewable energy is now starting to compete in price with fossil fuels.⁵

³ GREEN PAPER, A European Strategy for Sustainable, Competitive and Secure Energy, Brussels, 8.3.2006; COM(2006) 105 final, p.3; Cf. also: Summary report on the analysis of the debate on the green paper "A European Strategy for Sustainable, Competitive and Secure Energy" COMMISSION STAFF WORKING DOCUMENT; Brussels, 16.11.2006 , SEC(2006) 1500, p.1-5.

⁴ As above.

⁵ GREEN PAPER, A European Strategy for Sustainable, Competitive and Secure Energy, op.cit. p.11.

In the year 2010 Commission proposed a new economic strategy for Europe: *Europe 2020*.⁶ This Strategy presented three key drivers for growth, to be implemented through concrete actions at the EU and national levels:

1. Smart growth (fostering knowledge, R+D, innovation, education and the digital society).
2. Sustainable growth (making our production more resource-efficient while boosting R+D and competitiveness).
3. Inclusive growth (increasing participation in the labour market and the acquisition of skills, and winning the fight against poverty).

On 10 November 2010, the European Commission adopted the Communication "Energy 2020 - A strategy for competitive, sustainable and secure energy." This Communication defines the energy priorities for the next ten years and establishes the actions to be taken in order to tackle the challenges of saving energy, achieving a market with competitive prices and secure supplies, boosting technological leadership, and effectively negotiating with our international partners⁷. The three most important objectives in the energy economy to be met in the EU by 2020, known as the "20-20-20" targets, are as follows:

1. 20% of EU energy consumption to come from renewable resources.
2. A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.
3. A reduction in EU greenhouse gas emissions of at least 20% below 1990 levels.⁸

The EU has even offered to reduce its emissions by 30% if other major economies commit to comparable emission reductions or make adequate contributions. Negotiations on this offer are ongoing within the framework of the United Nations. In the European Commission's "A roadmap for moving to a competitive low-carbon economy in 2050", the Commission also looked at new ways of reducing greenhouse gas emissions by 80 to 95% by the middle of the century.

The Communication "Energy 2020 Strategy" provides also a solid and ambitious European framework for energy policy, defines the energy priorities for the next ten years, and sets out the actions to be taken.

⁶ COM(2010) 2020; Brussels, 3.3.2010.

⁷ http://ec.europa.eu/energy/strategies/2010/2020_en.htm, see also: Energy 2020, A strategy for competitive, sustainable and secure energy, {SEC(2010) 1346}, Brussels, 10.11.2010; COM(2010) 639 final.

⁸ The EU climate and energy package: http://ec.europa.eu/clima/policies/package/index_en.htm

1. *Free movement of energy*

Electricity and gas are transported in grids and pipelines that often cross national borders, thus the energy policy decisions made by one country inevitably impact on other countries.

2. *A technological shift*

Without a technological shift, the EU will fail in its 2050 ambitions to decarbonize the electricity and transport sectors.

3. *Strong International Partnership*

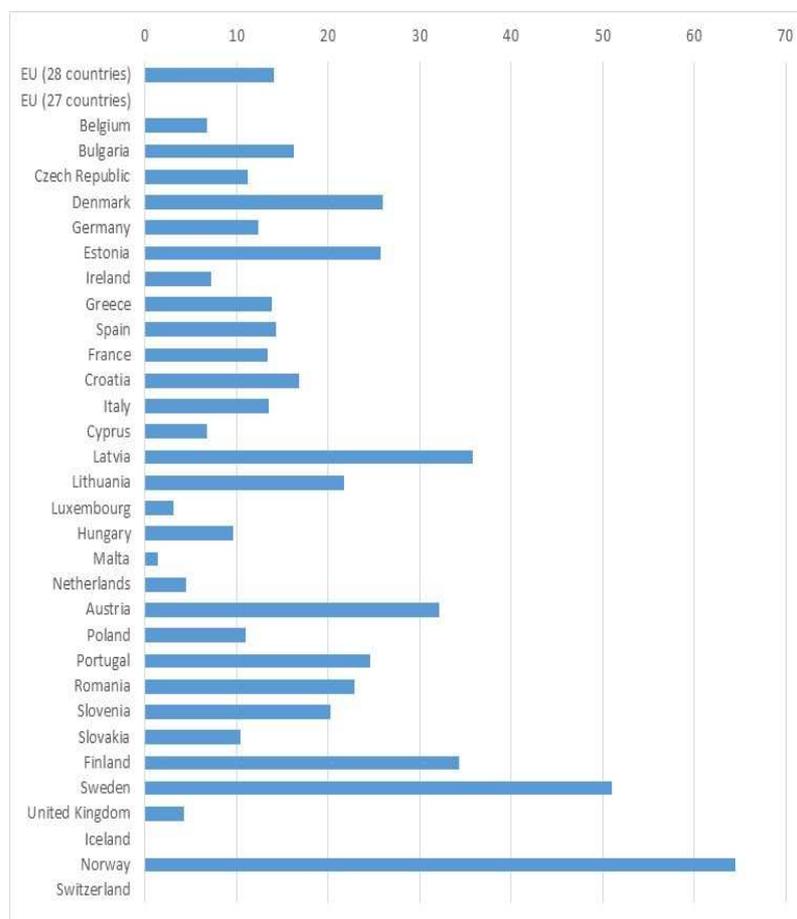
International energy policy must pursue the common goals of security of supply, competitiveness, and sustainability.

While relations with producing and transit countries are important, relations with large energy-consuming nations, and particularly emerging and developing countries, are of growing significance.⁹

3. Comparison of selected economic results of activities undertaken by the EU Member States in recent years in accordance with the EU Strategies in the area of the development of renewable energy sources

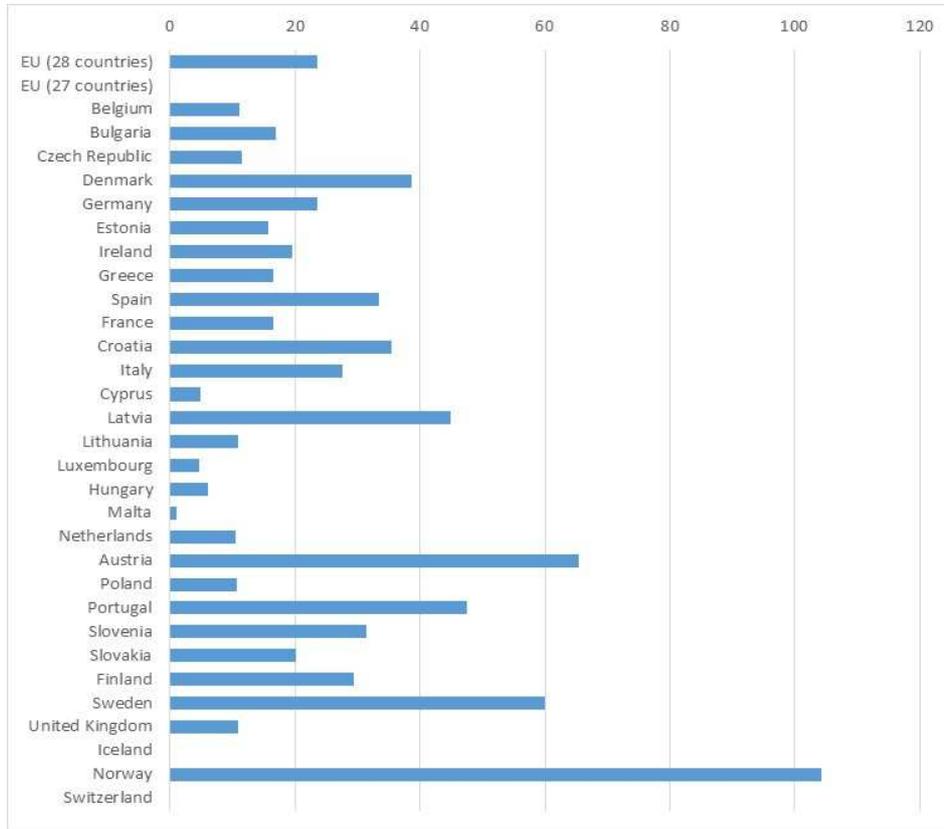
It should be recalled that the goal established by the Communication “Energy 2020” was that 20% of EU energy consumption will come from renewable resources by 2020. According to the results presented in the Table 1., it can be seen that some EU countries, such as Sweden, Finland, Portugal, Holland, France, Slovenia, Latvia, Romania, Estonia, and Latvia set their goals even at a significantly higher level than that aimed at by the EU as a whole and were approaching their established goals already in 2012, and in the cases of Sweden and Estonia had already exceeded them (see Table 1). Those countries which established aimed-for goals lower than that established for the EU as a whole, i.e. lower than the required 20%, include Malta (10%), Lithuania (11%), Belgium, Italy and the Czech Republic (below 13%), Slovakia (14%), Hungary (14.6%), Great Britain (15%), Poland (15.5%), Holland, Ireland and Bulgaria (16%), Italy (17%), and Greece and Germany (18%). Compare also Figure 1.

⁹ http://europa.eu/pol/ener/index_en.htm

Figure 1. Share of renewable energy in gross final energy consumption in 2012 (%)

Source: own calculations based on *Eurostat Database*

One may compare the above results with the data in Table 2, which shows electricity generated from renewable sources as a percentage of gross electricity consumption. In this field the highest results were achieved by Austria (65%), Sweden (60%), Portugal (48%), Latvia (45%), Denmark (39%), Croatia (35%), Romania (34%), Slovenia (31%), Finland (29%), Italy (27%) and Germany (24%). Comp. also Figure 2.

Figure 2. Electricity generated from renewable sources in 2012 (% of gross electricity consumption)

Source: own calculations based on *Eurostat Database*.

4. Powering Development with Renewable Energy Technologies (RETs)

The role of RETs in the world economy continues to increase. According to the UNCTAD Technology and Innovation Report (2011), two-thirds of the total renewable power capacity (including wind-, biomass-, solar- and geothermal power) belonged to the developed market economies, and one-third to the developing countries.¹⁰

¹⁰ Technology and Innovation Report (2011), *Powering Development with Renewable Energy Technologies* United Nations, New York, Geneva, 2011, p. 8-9.

Technological progress and greater investments and deployment are lowering the costs of production and implementation of RETs. Global Investments in renewable energy and related technologies during the period 2004-2010 increased almost sevenfold, from 33 to 211 billion USD. The average annual growth rate amounted to 38.3%.¹¹ The green economy and Rio+20 framework should promote even wider use and development of RETs.

National Policy Frameworks for Renewable Energy Technologies (according to UN and EU regulations) are mostly oriented on:

1. Defining policy strategies and goals.
2. Enacting policy incentives for R&D, innovation and production of RETs.
3. Enacting policy incentives for developing greater technology absorptive capacity, which is needed for the adaptation and use of available RETs.
4. Promoting domestic resource mobilization for RETs in national contexts.
5. Exploring new means of improving innovation capacity in RETs, including North-South and South-South collaboration.

5. Liberalization of markets for energy products should be one of the most important objectives of the WTO

Much of today's energy supply — particularly fossil fuels and natural gas — is geographically concentrated, fixed in terms of location, and prominent in the production and trade of the countries that possess the resource(s). Thus, trade patterns on the supply side are largely pre-determined and change only slowly, in contrast to the shifting comparative advantage we associate with economies that are less resource-endowed in this respect.

In contrast to the geographical concentration that characterizes the supply side of energy markets, demand is very widely spread because all countries need energy to run their economies. This relationship between supply and demand has important implications for the economic and political conditions under which trade takes place. In the world economy we can observe some significant changes occurring in energy markets, which some argue fortifies the case for closer attention on the part of the WTO to the energy sector. Over time, a larger number of players have entered the field on the supply side. In no small part this is the result of technological advances and the diversification of energy sources.

¹¹ As above, p.10.

Fossil fuels and natural gas increasingly compete with alternative energy sources such as nuclear power and renewable energy, including bio-fuels, wind, water and solar power.

6. Detoxifying Finance and De-carbonization of the Economy: Opportunities for Clean and Sustainable Growth in Developing and Transition Economies - Main Problems

The transition to a low-carbon and more resource-efficient economy provides promising prospects. Promoting sustainable agriculture, enhancing energy efficiency and harnessing renewable energy for sustainable rural development are but three illustrative poles that could yield a triple win: economic growth, creation of jobs and, with them, increased income, as well as environmental sustainability.

Despite the fact that such investments are strategic and can be lucrative, the greening of the avenue for economic and social development in many economies requires the elimination of anachronistic policy frameworks, as well as the availability of public finance where public investment is deficient. It will also require the emergence of the necessary public awareness, skills, capabilities and vision to mobilize the private sector, governments, and society as a whole.¹²

In the context of the current global and financial crisis, “new economic growth” can only emerge if inspired leadership is manifest among a critical mass of countries. Policy measures that undermine change must be reformed or eliminated, such as, e.g. subsidies to agriculture or energy, domestic energy policy (energy pricing), as well as misguided national investment policies.¹³

The liberalization of climate-friendly technologies, goods and services would contribute not only to increasing the choices available to importing countries, but also to lowering the costs of those choices, thus making it easier to mitigate climate change. However, finding a viable negotiating strategy for the liberalization of these goods has proved difficult in the WTO.¹⁴

Agriculture accounts for 13 percent of global greenhouse gas (GHG) emissions. This rises to almost 30 per cent if land clearance for farming, agrochemical production, and trade in agricultural and food products are attributed

¹² Trade and Environment Review 2009/2010, United Nations, New York, Geneva, 2010, p. 3.

¹³ As above, p. 23.

¹⁴ As above, p. 178.

to the sector.¹⁵ Innovative management options, such as organic farming, offer promising opportunities to reconcile the objectives of feeding a rapidly growing human population with minimal adverse impacts on the environment.¹⁶

Methane is a significant contributor to climate change, and the bulk of methane emissions, i.e. 52%, are emitted by the agricultural sector. While methane emissions in the OECD countries as well as in the CIS have declined over the past decade, methane emissions have been increasing in many developing countries and regions. With continuing growth in the demand for livestock products, methane will constitute a large proportion of future GHG emissions, particularly in developing countries.¹⁷

The report entitled “Climate Change 2014: Mitigation of Climate Change” is the third of three Working Group reports which constitute the *Fifth Assessment Report on Climate Change of the Intergovernmental Panel on Climate Changes* (IPCC). Projected scenarios demonstrate that in order to attain the goal of limiting the increase in the global mean temperature to two degrees Celsius, global GHG emissions must be decreased by mid-century by 40 to 70 percent compared with 2010, and to near-zero by the end of this century. Ambitious mitigation may even require removing carbon dioxide from the atmosphere.¹⁸

7. Implications of EU- and global strategies for Poland

Polish energy sector is facing a number of serious challenges. Commitments of Poland in the field of environmental protection, including mitigation of the negative aspects of the climate change, significant dependence on external supplies of natural gas and almost full dependence on external supplies of crude oil, high demand for energy, inadequate fuel and energy generation and transmission infrastructure, compel Polish administration to take decisive actions preventing the deterioration of the situation of fuel and energy customers.

The main directions of energy policy until the year 2030 for Poland as the Member State of the European Union as the response for the EU and global requirements in this field are as follows:

¹⁵ As above, p. 67.

¹⁶ As above., p.112.

¹⁷ As above, p. 124.

¹⁸ IPCC: Greenhouse gas emissions accelerate despite reduction efforts. Many pathways to substantial emissions reductions are available, 13. April 2014: http://www.cpc.ch/pdf/ar5/pr_wg3/20140413_pr_pc_wg3_en.pdf; comp. also <http://ec.europa.eu/clima/news/articles/news-2014-041401-en.htm>

- To improve energy efficiency;
- To enhance security of fuel and energy supplies;
- To diversify the electricity generation structure by introducing nuclear energy;
- To develop the use of renewable energy sources, including biofuels; To develop competitive fuel and energy markets;
- To reduce the environment impact of the power industry.¹⁹

8. Conclusions

The main objectives in both the world and in the European economy involve promoting poles of clean growth to foster the transition to a more sustainable economy. Sustainable development and a "green economy" are the most important objectives of economic and social development for the upcoming decade, not only in the European but also in the world economy.

Europe, as a leader in environment-related technologies, must promote sustainable growth and standards for integrated environmental goods and services within its new industrial policy and new strategy, both of which are oriented on cooperation with developing world.

The role of Renewable Energy Technologies (RETs) in the world economy continues to increase. Energy efficiency, sustainable agriculture, and renewable energies for rural development belong to the main poles of sustainable development in the world economy and its regions.

As of 2013, the Member States of the EU have made crucial progress in the development of the renewable energy sector and in the reduction of greenhouse gases in the atmosphere, which generally augurs well for its ability to achieve its strategic aims set forth in the Communication "Energy 2020 - A strategy for competitive, sustainable and secure energy."

Some EU countries, such as Sweden, Finland, Portugal, Netherlands, France, Slovenia, Latvia, Romania, Estonia, and Latvia set the goals resulting from the Communication "Energy 2020" (to achieve the index of 20% of EU energy consumption from renewable resources by 2020) even at a significantly higher level than that aimed at by the EU as a whole and were approaching their established goals already in 2012, and in the cases of Sweden and Estonia had already exceeded them.

¹⁹ Polityka energetyczna Polski do roku 2030, (Energy policy of Poland until the year 2030) Załącznik do uchwały nr. 157/2010 RM, z dnia 29.09.2010; Warsaw, September 2010., p.4-5.

Comparison among the EU countries of the share of electricity generated from renewable sources as a percentage of gross electricity consumption shows that the best results in this field have been obtained by Austria, Sweden Portugal, Latvia, Denmark, Croatia, Slovenia, Finland, Italy, and Germany.

Table 1. Share of renewable energy in gross final energy consumption (%)

geo\time	2005	2009	2010	2011	2012	TARGET
EU (28 countries)	8.7	11.9	12.5	12.9	14.1	20
EU (27 countries)	:	:	:	:	:	20
Belgium	2.3	4.6	5	5.2	6.8	13
Bulgaria	9.5	12.4	14.4	14.6	16.3	16
Czech Republic	6	8.5	9.3	9.3	11.2	13
Denmark	15.6	20.4	22.6	24	26	30
Germany	6.7	9.9	10.7	11.6	12.4	18
Estonia	17.5	23	24.6	25.6	25.8	25
Ireland	2.8	5.2	5.6	6.6	7.2	16
Greece	7	8.5	9.8	10.9	13.8	18
Spain	8.4	13	13.8	13.2	14.3	20
France	9.5	12.2	12.7	11.3	13.4	23
Croatia	12.8	13.1	14.3	15.4	16.8	20
Italy	5.9	9.3	10.6	12.3	13.5	17
Cyprus	3.1	5.6	6	6	6.8	13
Latvia	32.3	34.3	32.5	33.5	35.8	40
Lithuania	17	20	19.8	20.2	21.7	23
Luxembourg	1.4	2.9	2.9	2.9	3.1	11
Hungary	4.5	8	8.6	9.1	9.6	14.65
Malta	0.3	0.4	0.4	0.7	1.4	10
Netherlands	2.3	4.1	3.7	4.3	4.5	16
Austria	24	30.4	30.8	30.8	32.1	34
Poland	7	8.8	9.3	10.4	11	15.48
Portugal	19.5	24.5	24.2	24.5	24.6	31
Romania	17.6	22.6	23.2	21.2	22.9	24
Slovenia	16	18.9	19.2	19.4	20.2	25
Slovakia	5.5	9.3	9	10.3	10.4	14
Finland	28.9	31.2	32.4	32.7	34.3	38
Sweden	40.5	48.2	47.2	48.8	51	49
United Kingdom	1.4	3	3.3	3.8	4.2	15
Iceland	:	:	:	:	:	64
Norway	59.8	64.8	61.2	64.6	64.5	67.5
Switzerland	:					

:=not available

Source: own calculations based on *Eurostat Database*.

Table 2. Electricity generated from renewable sources (% of gross electricity consumption)

geo\time	2005	2009	2010	2011	2012
EU (28 countries)	14.8	19	19.7	21.7	23.5
EU (27 countries)	:	:	:	:	:
Belgium	2.4	6.2	7.1	8.8	11.1
Bulgaria	9.8	12.1	13.7	13.9	17
Czech Republic	3.7	6.4	7.5	10.6	11.6
Denmark	24.7	28.3	32.7	35.9	38.7
Germany	10.5	17.4	18.1	20.9	23.6
Estonia	1.1	6.1	10.4	12.3	15.8
Ireland	7.2	13.7	14.9	17.6	19.6
Greece	8.3	11.1	12.5	13.9	16.5
Spain	19.1	27.8	29.7	31.6	33.5
France	13.8	15.1	14.9	16.4	16.6
Croatia	32.8	32.6	34.2	34.2	35.5
Italy	16.4	19	20.2	23.7	27.6
Cyprus	0	0.6	1.4	3.4	4.9
Latvia	43	41.9	42.1	44.7	44.9
Lithuania	3.8	5.9	7.4	9	10.9
Luxembourg	3.2	4.1	3.8	4.1	4.6
Hungary	4.4	7	7.1	6.4	6.1
Malta	0	0	0.1	0.6	1.1
Netherlands	6.3	9.1	9.7	9.8	10.5
Austria	62.5	67.1	64.9	65	65.5
Poland	2.6	5.8	6.6	8.2	10.7
Portugal	27.7	37.6	40.7	45.9	47.6
Romania	28.8	30.9	30.4	31.1	33.6
Slovenia	28.7	33.8	32.1	30.8	31.4
Slovakia	11.6	17.8	17.8	19.3	20.1
Finland	26.9	27.3	27.6	29.4	29.5
Sweden	50.9	58.3	56	59.9	60
United Kingdom	4.1	6.7	7.4	8.8	10.8
Iceland	:	:	:	:	:
Norway	96.8	104.7	97.9	105.5	104.3
Switzerland	:	:	:	:	:

:=not available

Source: own calculations based on *Eurostat Database*.

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Streszczenie

ODPOWIEDŹ KRAJÓW CZŁONKOWSKICH UNII EUROPEJSKIEJ NA ZMIANY KLIMATYCZNE W ŚWIECIE W KONTEKŚCIE POLITYKI I STRATEGII UNIJNEJ

Celem artykułu jest przedstawienie wyników analizy odnoszącej się do krajów członkowskich UE w kontekście założeń strategii globalnych i europejskich w zakresie osiągnięcia wskaźników zwiększenia udziału energii odnawialnych w ogólnym zużyciu energii elektrycznej do co najmniej 20%. Jak wynika z przeprowadzonych badań już do roku 2012 niektóre kraje wskaźniki te znacząco przekroczyły, co wymaga poświęcenia im szczególnej uwagi.

Słowa kluczowe: *odnawialne źródła energii, konsumpcja energii, unijne i globalne strategie energetyczne*