EU Energy Policies Targeting the Environment

PAUL CALANTER
Assistant Researcher, Ph.D.
Institute for World Economy
Governance of European Integration Department
Romanian Academy
ROMANIA
paul.calanter@yahoo.com

Abstract

Activities in the energy sector provide the greatest contribution to the emission of greenhouse gases (GHG), which are assigned primary responsibility for producing climate change. The European Union puts great emphasis on the mitigation of the environmental impact of the energy sector, in particular concerning the combat against climate change, this fact being demonstrated by the implementation of policies by the EU in this field. This paper aims to analyse the most important Community energy policies with environmental effects, such as setting of climate and energy targets for 2030, policies on nuclear and renewable energy or measures to increase energy efficiency.

Keywords*: emissions, energy efficiency, greenhouse gases (GHG), policies.*

JEL Classification: *Q42, Q43, Q47, Q48, Q54.*

1. EU 2030 framework for climate and energy policies

By burning fossil fuels, the energy sector has a major contribution to the generation of GHG emissions — mainly carbon dioxide (CO_2).

The reduction of polluting emissions resulted from the combustion of fuels represents an important mean of protecting the environment and to improve the population health - the major requirements under the sustainable development strategy of the society – being known the association between the greenhouse effect and climate change. In this context, the European Union puts great emphasis on the implementation of energy policies directed toward environmental protection.

On the 22th of January 2014, the Commission proposed the energy and climate objectives that have to be fulfilled by 2030. The targets send a strong signal to the market, thereby encouraging private investments in new pipelines and electricity networks, or in low carbon emissions technologies.

The compliance with the EU's commitment to reduce by 2050 the GHG emissions by 80-95% compared to the reference year is subject to the fulfilment of new targets on energy and climate:

- 40% reduction of GHG emissions (compared with 1990 levels);
- a share of 27% in the final consumption to come from renewable energy sources;
- the energy efficiency role to be an important one, but without being specified a particular target.

The European Union already has a set of policies relating to climate and energy for the next period (by 2020), entitled energy-climate change package. The objectives established by this package, called "20-20-20 objectives " are the following:

- reduction of 20% of the GHG emissions compared with 1990 levels;
- a percentage of 20% of the energy generated in the EU to come from renewable sources (wind, solar, hydro, biomass, etc.);
- increase of energy efficiency by a 20% reduction in energy consumption.

But the forecasts by 2050 suggest that current policies are not sufficient to ensure the energy safety in a competitive and low carbon economy. The energy price and cost study, carried out by the Commission, reveals the causes of the recent price increase and its impact on consumers, assuring that policies are based on a thorough economic analyses and offering an insight into the evolution of international prices. During the 2008-2012 period EU has registered a significant increase in average energy retail (sales) prices for households and industry. However, during the same period, the wholesale electricity price has fallen by one-third, and the wholesale gas price has remained the same. The study showed that energy prices will increase on short term - mainly due to fossil fuel prices and the need for investment in new networks. The following issues were highlighted:

- the electricity prices for household appliances increased by 4% per year, the gas price for domestic use has increased by 3% per year - more than inflation rate in most countries of the EU;
- retail electricity prices for industrial consumers increased by 3.5% per year - but the retail price of natural gas in the industry increased by less than 1% per year, under the inflation of the majority of EU States;
- the wholesale gas price remained the same, despite the fluctuations in this period.

In February 2014, in a study prepared by the Enerdata, there were estimated the costs and benefits due to 2030 Climate and Energy Targets, to EU Member States. Total costs estimated in this study include abatement cost, permit trading cost, the purchase of international credits, and subsidies for renewables (costs from implementing renewable technology specifically). The abatement cost includes the cost of resource for consumption, but it is based on more than just the cost of technology and behavioral change needed to drive the implementation. Default or supporting barriers included in the data on historical energy consumption are also taken into consideration in the abatement costs to reflect the energy systems choices of the Member States. The costs are compared with a Reference Case, to indicate the extra effort necessary to meet the set targets compared to a "business as usual" case. The Reference Case considered in this study includes current European policies until 2020 (EU and Member States), only EU climate policies after 2020 (e.g. maintaining the current cap trajectory of the EU ETS), but do not include Member States legislation or policies after 2020, and conservative estimates of energy efficiency measures. [1]

The results obtained from the analysis are displayed in table no. 1.

[1] Enerdata, (2014), *Costs and Benefits to EU Member States of 2030 Climate and Energy Targets*

Table no. 1: Cost of energy policies by scenario

In 2030		40% GHG	% GDP	40% GHG + 30% RES	% GHG	50% GHG	% GDP	50% GHG (10% credits)	% GDP
Total cost vs. Ref, bn Euro		30	0.2%	41	0.3%	94	0.6%	67	0.4%
Average health cost vs. Ref., bn Euro (not captured in total costs)*		-18	0.1%	-18	0.1%	-27	0.2%	-19	0.1%
Energy import bill vs Ref, bn Euro (captured in total costs)**	Fossil fuels	-72	0.4%	-78	0.5%	-111	0.7%	-58	0.4%
	Biomass	4	0.0%	5	0.0%	6	0.0%	3	0.0%
In 2030		**40% GHG + Alt NTS burden shares**	**% GDP**	**40% + Alt split ETS/NTS**	**% GDP**	**40% GHG + 30% EE**	**% GDP**	**40% GHG + 30% RES + 30% EE**	**% GDP**
Total cost vs. Ref, bn Euro		30	0.2%	41	0.3%	100	0.6%	121	0.8%
Average health cost vs. Ref, bn. Euro (not captured in total costs)*		-18	0.1%	-18	0.2%	-27	0.1%	-24	0.1%
Energy import bill vs Ref, bn Euro (captured in total costs)**	Fossil fuels	-72	0.4%	-66	0.4%	-101	0.6%	-107	0.7%
	Biomass	4	0.0%	5	0.0%	-1	0.0%	1	0.0%

* Avoided health costs are not accounted for in the total cost, and so provide an offsetting benefit from reduced local air pollutants.

** While reduced fossil fuel use is captured in the total cost, the change in the energy import bill illustrates the potential for wider macroeconomic and energy security benefits not captured in the total cost.

Source: Enerdata, 2014

2. Nuclear energy

The European Union has the highest safety standards for all types of civilian nuclear activities, for example power generation, waste storage, research and medical usage. The safety of the nuclear plants is the responsibility of their operators, which are supervised through the national legislation. The Commission wishes to enhance security rules in the European Union, following the Fukushima accident. The Commission cooperates with countries outside EU, particularly with its neighbours. In cooperation with the International Atomic Energy Agency (IAEA), EU provides support to countries

that wish to comply with the international safety standards in the utilization of nuclear energy and for making the necessary infrastructure in terms of security.[2]

In June 2013 The European Commission proposed the amendment of the 2009 Directive on nuclear safety, by:[3]

- introduction of new safety objectives at EU level;
- establishment of an European system of peer evaluations of nuclear installations;
- establishment of a mechanism for the development of nuclear safety guidelines, harmonised at European Union level;
- strengthening the role and independence of the national legislators;
- increasing the transparency of the issues related to nuclear safety.

The European Union needs its own verification mechanism to ensure the fulfilment of the common objectives relating to safety. At least once every six years the nuclear facilities will be subject to specific inspections relating to issues of nuclear safety and to the peer review assessments in the European Union.

3. Renewable energy sources (RES)

Due to the negative environmental impacts of the energy production through the burning of fossil fuels and the fact that these are an exhaustible resource in the European Union and beyond, the emphasis is placed on the promotion of renewable energy sources. On March 27, 2013, the European Commission published the first progress report on the renewable energy, under the provisions of 2009 Directive on the renewable energy framework. From the enactment of this Directive and the introduction of the renewable energy, most Member States have experienced a significant increase in the consumption of this type of energy. The 2011 statistics indicates that EU is on the right track (13%) in terms of respecting the 2020 target - 20% share of energy from renewable sources.

In terms of the sustainability criteria of the European Union relating to bio-fuels and bio-liquids, the implementation of the scheme for bio-fuels in Member States is considered to be too slow.

In accordance with the requirements of the 2009 Directive on renewable energy, every two years the Commission shall publish a progress report. The report assesses the progress of Member States in the promotion and use of renewable energy, taking into account the targets for 2020. The report also describes the development of RES policies in each Member State and their compliance with the measures from the directive and the renewable energy national plans. Furthermore, in accordance with the Directive, the report contains information on the sustainable use of bio-fuels and bio-liquids consumed in EU and on the impact of their use on consumption.

Table no. 2: The share of energy from renewable sources in gross final consumption (%)

Country	The share of energy from renewable sources in gross final consumption (%)									Prediction		
	2004	2005	2006	2007	2008	2009	2010	2011	Target 2020	2013-2014	2015-2016	2017-2018
UE-28	8.1	8.5	9	9.7	10.4	11.6	12.5	13	20	-	-	-
Belgium	1.9	2.3	2.6	2.9	3.2	4.4	4.9	4.1	13	5.4	7.1	9.2

[2] European Commission, 2014

[3] European Council (2013), Draft proposal for a Council Directive amending Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations

Country	The share of energy from renewable sources in gross final consumption (%)									Prediction		
	2004	2005	2006	2007	2008	2009	2010	2011	Target 2020	2013-2014	2015-2016	2017-2018
Bulgaria	9.2	9.2	9.4	9	9.5	11.7	13.7	13.8	16	11.4	12.4	13.7
Czech Rep.	6.0	6.1	6.5	7.4	7.6	8.5	9.2	9.4	13	8.2	9.2	10.6
Denmark	14.9	16	16.4	17.8	18.6	20	22	23.1	30	20.9	22.9	25.5
Germany	5.2	6.0	7.0	8.3	8.4	9.2	10.7	12.3	18	9.5	11.3	13.7
Estonia	18.4	17.5	16.1	17.1	18.9	23	24.6	25.9	25	20.1	21.2	22.6
Ireland	2.4	2.8	3.1	3.6	4	5.2	5.6	6.7	16	7.0	8.9	11.5
Greece	7.1	7.2	7.4	8.4	8.3	8.5	9.8	11.6	18	10.2	11.9	14.1
Spain	8.3	8.4	9.1	9.7	10.8	13.0	13.8	15.1	20	12.1	13.8	16
France	9.3	9.5	9.6	10.2	11.3	12.3	12.8	11.5	23	14.1	16.0	18.6
Croatia	15.2	14.1	13.8	12.5	12.2	13.3	14.6	15.7	20	14.8	15.9	17.4
Italy	5.1	5.1	5.5	5.5	6.9	8.6	9.8	11.5	17	8.7	10.5	12.9
Cyprus	2.7	2.6	2.8	3.5	4.5	5	5.4	5.4	13	5.9	7.4	9.5
Latvia	32.8	32.3	31.1	29.6	29.8	34.3	32.5	33.1	40	34.8	35.9	37.4
Lithuania	17.3	17	17	16.7	18	20	19.8	20.3	23	17.4	18.6	20.2
Luxembourg	0.9	1.4	1.5	1.7	1.8	1.9	2.9	2.9	11	3.9	5.4	7.5
Hungary	4.4	4.5	5	5.9	6.5	8	8.6	9.1	13	6.9	8.2	10
Malta	0	0	0	0	0	0	0.2	0.4	10	3	4.5	6.5
Netherlands	1.8	2.1	2.3	3	3.2	4	3.7	4.3	14	5.9	7.6	9.9
Austria	22.8	23.8	25.3	27.2	28.3	30.2	30.6	30.9	34	26.5	28.1	30.3
Poland	7	7	7	7	7.9	8.8	9.3	10.4	15	9.5	10.7	12.3
Portugal	19.3	19.8	20.9	22	23	24.6	24.4	24.9	31	23.7	25.2	27.3
Romania	17	17.6	17.1	18.4	20.3	22.3	23.4	21.4	24	19.7	20.6	21.8
Slovenia	16.1	16	15.6	15.6	15	19	19.6	18.8	25	18.7	20.1	21.9
Slovakia	6.7	6.6	6.9	8.2	8.1	9.7	9.4	9.7	14	8.9	10	11.4
Finland	29	28.6	29.8	29.4	3.7	30.4	31.4	31.8	38	31.4	32.8	34.7
Sweden	38.7	40.4	42.4	43.9	45	47.7	47.9	46.8	49	42.6	43.9	45.8
United Kingdom	1.2	1.4	1.6	1.8	2.4	3	3.3	3.8	14	5.4	7.5	10.2

Source: Eurostat, 2013

4. Energy efficiency

According to the definition given by the Business Dictionary, energy efficiency is the ”percentage of the amount of energy consumed by an equipment for a useful activity, and not consumed in the form of heat". Energy efficiency is a concept that groups the ways and means by which energy consumption (primary and secondary resources) can be reduced as a result of a technical and economical analysis. A low energy efficiency generates higher levels of consumption and of course higher costs. The new EU directive on energy efficiency was adopted in December 2012. Most of its provisions have to be implemented before June 2014. This Directive establishes a common action framework for the promotion of energy efficiency in the EU, and insures the fulfilment of the 2020 objective, namely 20% increase in energy efficiency.

All 28 Member States are required to use energy effectively in all stages of the energy chain - from the energy transformation/production and distribution to the end user. The new Directive will contribute to overcoming barriers and market failures that prevent implementation of efficiency in energy delivery and usage, and provides the establishment of the specific objectives for 2020.

The new measures include:[4]

- quantifiable defining of the EU target on energy efficiency: "The EU 2020 consumption should not be higher than 1483 Mtoe - primary energy, and not higher than 1086 Mtoe – final energy";
- obligation of each Member State to establish an objective relating to energy efficiency, in the form in which the respective country prefers (e.g. primary/final savings, intensity, consumption) and the requirement that, by April 30th 2013, they will communicate this goal, together with the "translation" in terms of the absolute level of primary energy consumption and final energy consumption in 2020;
- Member States obligation to achieve a certain amount of energy savings during the 2014-2020 period by using energy efficiency schemes and other measures to increase efficiency in households, industry and transport;
- major energy savings for consumers: free and unrestricted access to information in real time, regarding energy consumption through individual metering, thus allowing consumers to better manage energy consumption;
- large enterprises obligation to perform an audit at least once every four years, and the first audit to be performed until December 5th 2015;
- public sector should represent an example, by renovation of 3% of the buildings owned and occupied by central institutions, and at the same time, through the inclusion of energy efficiency criteria in public procurement law, through the acquisition of efficient buildings, products and services, from the energetic point of view.

Table no. 3: Energy efficiency targets of the EU Member States

EU Member State	Article 3 indicative national energy efficiency target for 2020	Absolute level of energy consumption in 2020 (Mtoe)	
		Primary	Final
Austria	Final energy consumption of 1100 PJ	31.5	26.3
Belgium	18% reduction in primary energy consumption by 2020 relative to the Primes 2007 baseline (53.3 Mtoe)	43.7	32.5
Bulgaria	Increase of energy efficiency by 25% until 2020 (5 Mtoe primary energy savings in 2020) and 50% energy intensity reduction by 2020 compared to 2005 levels	15.8	9.16
Croatia	Increase in energy efficiency resulting in final energy consumption reduction of 19,77 PJ in 2016 and 22,76 PJ in 2020	-	9.24
Cyprus	0.463 Mtoe energy savings in 2020 (14.4% reduction in 2020 compared to a reference scenario)	2.8	2.2
Czech Republic	47,84 PJ (13,29 TWh) savings of final energy consumption*	39.6	25.315
Denmark	Primary energy consumption of 744.4 PJ (17.781 Mtoe) in 2020	17.8	14.8
Estonia	Stabilisation of final energy consumption in 2020 at the level of 2010	6.5	2.8
Finland	310 TWh of final energy consumption in 2020	35.9	26.7
France	17.4% reduction of final energy consumption in 2020 compared to a baseline	236.3	131.4
Germany	Annual improvement of energy intensity (energy productivity) by 2.1% pa on average until 2020	276.6	194.3
Greece	Final energy consumption level of 20.5 Mtoe	27.1	20.5
Hungary	1113 PJ primary energy consumption in 2020 (236 PJ savings	26.6	18.2

[4] European Parliament, (2012), *Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC.*

EU Member State	Article 3 indicative national energy efficiency target for 2020	Absolute level of energy consumption in 2020 (Mtoe)	
		Primary	Final
	compared to business-as-usual), resulting in 760 PJ final energy consumption		
Ireland	20% energy savings in 2020 along with a public sector energy saving target of 33%	13.9	11.7
Italy	20 Mtoe primary energy reduction by 2020, 15 Mtoe final energy reduction by 2020	158.0	126.0
Lithuania	17% reduction in final energy use compared to 2009 level (reduction of 740 ktoe)	6.485	4.278
Luxembourg	Preliminary target value for 2020 of 49,292 GWh or 4,239.2 ktoe final energy	4.482	4.239
Latvia	Primary energy savings in 2020 of 0.670 Mtoe (28 PJ)	5.37	4.47
Malta	22% energy or 237.019 toe savings target by 2020	0.825	0.493
Netherlands	1.5% energy savings per year(partial)	60.7	52.2
Poland	13.6 Mtoe primary energy savings in 2020	96.4	70.4
Portugal	Reduction of primary energy use in 2020 by 25% compared to projections	22.5	17.4
Romania	Reduction of 10 Mtoe (19%) in the primary energy consumption	42.99	30.32
Slovakia	3.12 Mtoe of final energy savings for the period 2014-2020	16.2	10.4
Slovenia	10.809 GWh energy savings by 2020	7.313	5.088
Spain	20% energy savings to be achieved by 2020	121.6	82.9
Sweden	Energy use shall be 20% more efficient by 2020 compared with 2008 and a 20% reduction in energy intensity between 2008 and 2020	43.4	30.3
United Kingdom	Final energy consumption in 2020 of 129.2 Mtoe on a net calorific value basis	177.6	157.8

Source: European Commission, 2014

The targets on energy efficiency for the Member States are displayed in table no. 2., in the form preferred by the respective country, and also the "translation" of those objectives in terms of the absolute level of primary energy consumption and final energy consumption in 2020.

5. Other components of the energy policy

5.1. Energy Roadmap 2050

In 2011, the European Union has assumed through the adoption of the Energy Roadmap 2050, that by 2050, the emissions will be reduced by 80-95% below 1990 levels. In the 2050 Roadmap, the Commission examines the challenges stemming from the EU “decarbonisation” objective, under the conditions of ensuring energy supply and competitiveness. The roadmap is the basis for the long-term development of a European framework together with all interested parties.

5.2. European Energy 2020 Strategy

The communication "Energy 2020 - A strategy for competitive, sustainable and secure energy" requires the adoption of measures in areas where new challenges may arise. These areas are:

- energy efficiency
- infrastructure
- energy technology
- external dimension of the internal market in energy

5.3. The single market for gas and electricity

On October 10th 2011, the European Union has adopted strict new rules regarding the wholesale energy trading. The main objective is to prevent the use of internal information, and other forms of market abuse, which distorts the wholesale energy prices and represents the reason for which businesses and consumers pay more for energy than would be necessary. The new legislation will come into force by the end of 2014. For the first time, energy trading will be regulated at EU level, in order to uncover abuses. The national authorities of the Member States may apply sanctions to help stop and prevent market manipulation.

5.4. Energy infrastructure

The European Union aims to complete the energy strategic networks and storage systems by 2020. This objective relates to the production, transport and storage of energy. A modern energy infrastructure is crucial for an integrated energy market and to meet the climate and energy objectives of the EU.

The energy network has to be modernised and expanded in the European Union in order to take energy from RES and provide a safe supply everywhere. Intelligent networks are also needed, in order to save energy and to better manage the distribution. The Commission has identified 12 priority areas for the corridors and networks for electricity, gas, oil and carbon dioxide, and promotes projects to implement them.

6. Conclusions

The energy sector has a negative impact on environment, mainly because it represents the largest generator of greenhouse gas emissions (GHG) - especially carbon dioxide - the main responsible for producing climate change.

The European Union puts great emphasis on mitigation of the energy sector environmental impact, by implementing various policies, in particular those concerning to increasing energy efficiency, promoting the use of renewable energy sources and combating of the negative effect of nuclear energy. The measures for increasing energy efficiency are particularly important because an increased energy efficiency leads to the decrease of quantities of fossil fuels used, and of course to the generation of a considerable lower amount of greenhouse gases emissions in the atmosphere. Promotion of renewable energy sources has a positive impact on the environment, taking into account the limited nature of fossil fuels and the negative impact of burning fossil fuels in the energy production activities. At the same time, policies on nuclear energy play an especially important role, given the serious safety problems, accidents and radioactive waste generation, these waste representing a risk to human health and the environment. In addition to these measures, the European Union's energy policy, also contains other components, like the Energy Roadmap 2050 and European Energy 2020 Strategy. At the same time, it should be mentioned the important role played by the energy sector in the new EU reindustrialisation policy. The success of the implementation of the Energy Community policies with environmental impact is conditioned by the involvement of all decision-makers, respectively the European institutions and the Governments of the Member States.

References:

1. Enerdata, (2014), *Costs and Benefits to EU Member States of 2030 Climate and Energy Targets;*
2. European Commission, (2014), *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A policy framework for climate and energy in the period from 2020 to 2030;*
3. European Commission, (2011), *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Roadmap to a resource efficient Europe;*
4. European Commission, (2011), *Communication – 2050 Energy Roadmap;*
5. European Commission, (2010), *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Energy 2020 A Strategy for competitive, sustainable and secure energy;*
6. European Commission, (2006), *Communication from the Commission - Action plan for energy efficiency: Realising the potential;*
7. European Council (2013), *Draft proposal for a Council Directive amending Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations;*
8. European Parliament, (2009), *Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC;*
9. European Parliament, (2012), *Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC.*