ENERGY – CLIMATE CHANGE PACKAGE IMPACT ON ROMANIAN URBAN AREAS

Virgil MUSATESCU
Romanian Association for Energy Policies
Calea 13 Septembrie 13, Bucharest, Romania
Vimu2309@yahoo.com

Mihaela COMANESCU
Faculty of Management, Academy of Economic Studies
Calea Serban Voda 22-24, Bucharest, Romania
mihaelacomanescu@hotmail.com

Abstract.
Europe recognized the tight link between energy and climate change and took - through a coherent legislative package - the role of a global leadership to tackle climate change, to face up to the challenge of secure, sustainable and competitive energy, and to make the European economy a model for world sustainable development in the 21st century. EU targets to improve the relation between energy and environment are very ambitious and can not be reached without a clear understanding of the requirements of European policies and the effort that each and every Member State has to do. In these conditions, the present paper aims to make a short qualitative analysis on the possible impact that the legal package energy-climate change could have on housing and urbanism in Romanian towns in order to raise some question marks and alert the decision makers.
Keywords – sustainable energy, housing, urbanism, public authorities

1. General issues

According to a Communication of the Commission – based on a large majority public opinion perception – “a political consensus has crystallized to put this issue at the heart of the European Union's political programme: a guiding theme for the Union, central to the Lisbon strategy for growth and jobs, and of primary importance in Europe's relations with partners worldwide” (Commission Communication for 20-20-20 package, 2007). In this context, climate change has become the "main driver of EU energy policy," with EU leaders keen to stress the progress made and to push the self- imposed goals. The agreement by the March 2007 European Council to set precise, legally binding targets was a symbol of Europe's determination.

The process took some time and a series of phases have been passed or planned (EURACTIV, 2008):

- **10 Jan. 2007**: Commission presents ***energy and climate change package*** including a Strategic Energy Review focusing on both external and internal aspects of EU energy policy. The package contains proposals for specific targets on:
- Renewable energy (20% by 2020);
- Biofuels (10% in transport by 2020);
- Greenhouse gas emissions reduction (20% by 2020).
- **9 March 2007**: EU summit endorses package, agreeing on a two-year action plan to launch a common energy policy.
- **19 Sept. 2007**: Commission tables third legislative package to complete the liberalization of EU electricity and gas markets.
- **22 Nov. 2007**: Commission Communication on a Strategic Energy Technology Plan (SET – Plan).
- **23 Jan. 2008**: Commission proposals on EU emissions trading scheme (EU ETS) for the period after 2013; revised environmental state aid rules and Communication on carbon capture and storage (CCS).
- **March 2008**: EU Summit agrees to adopt energy/climate package by end 2008.
- **11 Sept. 2008**: Parliament's industry committee votes almost unanimously in favor of a report based on boosting the share of renewables in final energy consumption to 20% by 2020.
- **7 Oct. 2008**: Parliament's environment committee votes largely in favor of three separate reports on emissions trading, greenhouse gas reduction effort-sharing and CO2 capture and storage.
- **10 Oct. 2008**: European energy ministers agree to open EU gas and electricity markets further.
- **Nov. 2008**: Commission presents Second Strategic European Energy Review, focusing on supply security and fossil fuels.
- **11-12 Dec. 2008**: EU summit agrees final version of energy and climate change package.
- **17 Dec. 2008**: Parliament endorses energy and climate change package.
- **March 2009**: EU summit endorses second Strategic European Energy Review.

- **6 Apr. 2009**: Council of Ministers adopts final legal texts of the energy and climate change package.
- **Nov. 2010**: Commission to present Energy Saving Action Plan for 2010 onwards.
- **Nov. 2010**: EU summit to endorse Energy Saving Action Plan.
- **2020**: Target date to achieve the objectives.

It is clear that this new policy will have to reach even beyond the EU's borders into South-East Europe, the Caucasus, the Middle East and North Africa and will have impact not only to the 27 Member States. It is considered to be implemented through a legal package and this energy-climate package embodies the EU policies of reducing green-house gas emissions, achieving sustainable development, ensuring energy security and realizing the Lisbon Strategy for innovation.

The legislative package includes:

1. a directive improving and extending the greenhouse gas emission allowance trading system of the Community;
2. a decision on the effort of Member States to reduce their greenhouse gas emissions;
3. a directive on the promotion of the use of energy from renewable sources;
4. a directive on the geological storage of carbon dioxide;
5. a regulation setting emission performance standards for new passenger cars;
6. a directive on quality specification of petrol, diesel and gas-oil.

This legislative package has as goals the famous 20-20-20 by 2020, which means 20% share of renewables in the total gross country's consumption, reduction with 20% of greenhouse gases emissions, and decrease by 20% of the final energy consumption.

2. Renewables targets impact

According to the Directive dealing with renewable sources, 'energy from renewable sources' means energy from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases" (Directive 2009/28/EC). Their use reduces greenhouse gas emissions, diversifies energy supply and reduces dependence on unreliable and volatile fossil fuel markets (in particular oil and gas). The growth

Theoretical and Empirical Researches in Urban Management
Number 4(13) / November 2009

of renewable energy sources also stimulates employment in Europe, the creation of new technologies and improves the trade balance.

The use of these sources in the base year 2005 is presented in Figure 1, and the increase of energy renewable sources share in total consumption with an average of 20%, in comparison with year 2005, is supported by the new issued Directive 2009/28/EC.

Within that goal, 10% of transport fuels will have to come from renewables, including biofuels. The Commission wants a strict certification system to ensure that only biofuels achieving a real cut of at least 35% in CO2 emissions will be allowed. The use of food-based biofuels is under review because of concern about deforestation and food shortages in developing countries.

The renewables targets for member states differ because they are at different stages in their use of wind energy, solar power, hydroelectric power and other green sources (Figure 2). Romania's proposed target is 24% by 2020.

According to the Commission, the EU must embrace renewables not only to slow climate change but also because the EU's reliance on imported gas is set to increase from 57% currently to 84% by 2030, and on imported oil from 82% to 93%. Other benefits are the opportunity to create new jobs in renewable energy technologies and the improvement of energy security of energy supply for all Europe.

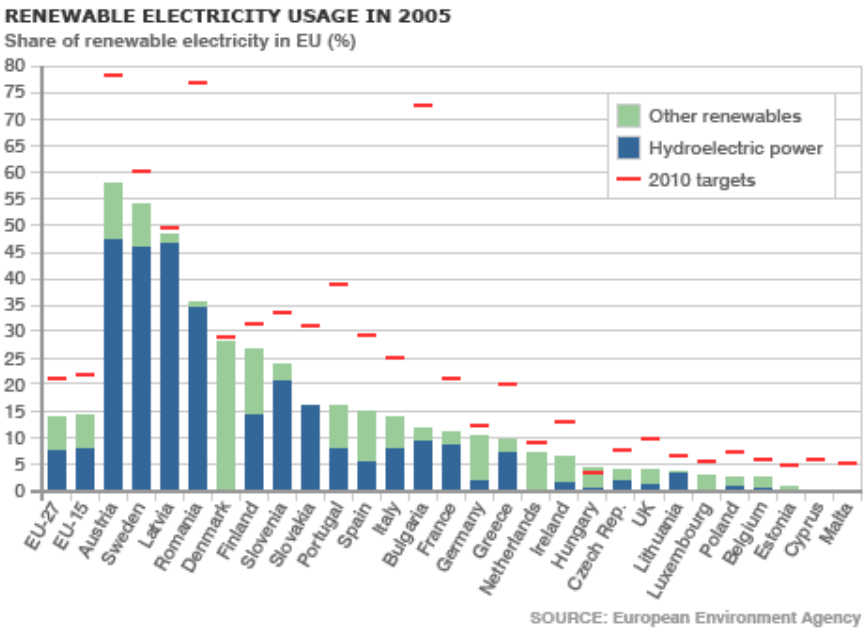

FIGURE 1. SHARE OF RENEWABLE ELECTRICITY FOR MEMBER STATES IN 2005 AND THE TARGETS FOR 2010

Without doubt, the provisions of Directive 2009/28/EC will have significance on the new design of buildings till 2020 and beyond. In this respect, "in order to facilitate and accelerate the setting of minimum levels for the use of energy from renewable sources in buildings" the Directive suggests incorporation of "a factor for energy from renewable sources in meeting minimum energy performance requirements under Directive 2002/91/EC, relating to a cost-optimal reduction of carbon emissions per building" (Art. 13.3, Directive 2009/28/EC).

A higher degree of solar, wind or biomass use as sources for heating, cooling and electricity production will change the buildings' design concept and a series of new standards have to be developed. Architecture of the new or revamped buildings will take into account different new elements (solar panels, photovoltaic walls and roofs, wind generators, etc.) integration in buildings' envelope and resistance structure. For this, "Member States shall recommend to all actors, in particular local and regional administrative bodies to ensure equipment and systems are installed for the use of electricity, heating and cooling from renewable energy sources and for district heating and cooling when planning, designing, building and renovating industrial or residential areas. Member States shall, in particular, encourage local and regional administrative bodies to include heating and cooling from renewable energy sources in the planning of city infrastructure, where appropriate" (Directive 2009/28/EC).

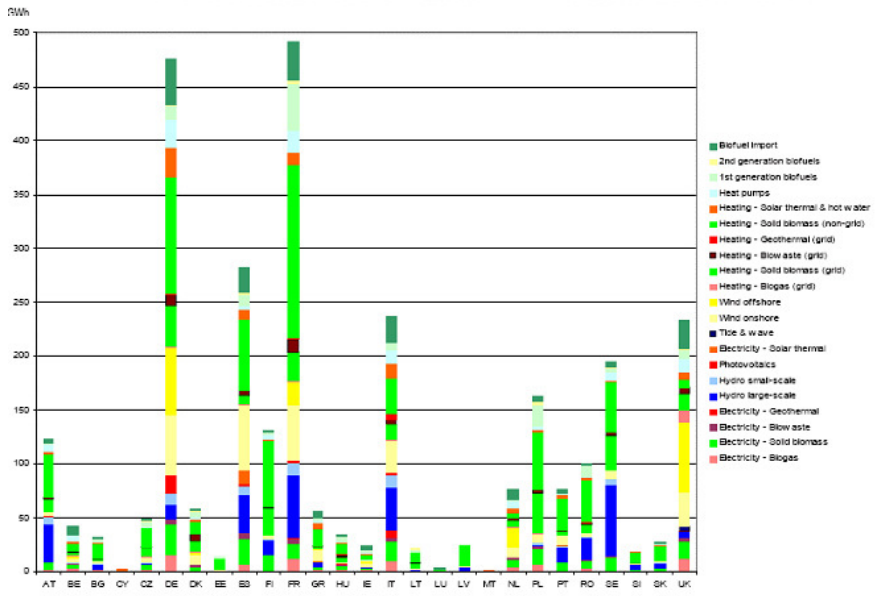

FIGURE 2. FORECAST OF RENEWABLE ENERGY SOURCES CONTRIBUTION IN MEMBER STATES' CONSUMPTION IN 2020
Source: European Commission

Theoretical and Empirical Researches in Urban Management
Number 4(13) / November 2009

At the level of regulatory framework, according to Art.13.4 of the same Directive, Member States shall introduce in their buildings' regulations and codes appropriate measures in order to increase the share of all kinds of energy from renewable sources in the building sector. In relation with the other two objectives (energy efficiency and GHG emissions), "in establishing such measures or in their regional support schemes, Member States may take into account national measures relating to substantial increases in energy efficiency and relating to cogeneration and to passive, low or zero-energy buildings".

In this respect, by 31 December 2014, Member States shall, in their building regulations and codes or by other means with equivalent effect, where appropriate, require the use of minimum levels of energy from renewable sources in new buildings and in existing buildings that are subject to major renovation. Member States shall permit those minimum levels to be fulfilled, *inter alia*, through district heating and cooling produced using a significant proportion of renewable energy sources.

A special attention is given to the public buildings which have to be a real example of good implementation of the Directive. That is why, "Member States shall ensure that new public buildings, and existing public buildings that are subject to major renovation, at national, regional and local level fulfill an exemplary role in the context of this Directive from 1 January 2012 onwards. Member States may, *inter alia*, allow that obligation to be fulfilled by complying with standards for zero energy housing, or by providing that the roofs of public or mixed private-public buildings are used by third parties for installations that produce energy from renewable sources" (Art.13.5, Directive 2009/28/EC).

Also, with respect to their building regulations and codes, Member States shall promote the use of renewable energy heating and cooling systems and equipment that achieve a significant reduction of energy consumption. Member States shall use energy or eco-labels or other appropriate certificates or standards developed at national or Community level, where these exist, as the basis for encouraging such systems and equipment.

Regarding the new neighborhoods, new concepts related to the renewable energy sources have to be implemented starting with the initial solution studies. Recent experience in Romania showed important errors when standard projects have been implemented, especially long delays because using conservative approaches regarding energy utilities and not taking into account possible innovative solutions with a higher degree of renewables participation. A new approach studying all possible solutions incorporating renewables including neighborhood wastes is to be considered.

Most urban population in Romania is environmentally friendly and favorable to renewable energy. For more than half of Romanians, environmental issues are in second place as importance after poverty

ones. These are some results of the first Green Barometer conducted in Romania by Terra Millennium III Foundation and the Alma-Ro Association with financial support of EEC Trust. The study was conducted during June-August 2008 on a representative sample of 1165 persons from all regions of the country. The Barometer is divided into five sections: the typology of green urban population, which represents the individual behavior in relation to the environment, the level and the sources of information for the population, the dominant perception of problems and those responsible for the global, national and local environment, actions and environmental strategies and the attitude towards renewable energy.

3. Greenhouse gases emissions reduction

The greenhouse gases emissions (GHG) in European Union at the level of 2005 which the bases of reference are presented in Figure 3. The European Commission and Member States governments agreed on the target of cutting greenhouse gases (GHG) by at least 20% by 2020, compared with 2005 levels. There is a political consensus that target can be increased to 30% related to 1990 levels if an international agreement is reached committing other developed countries and the more advanced developing nations to comparable emission reductions.

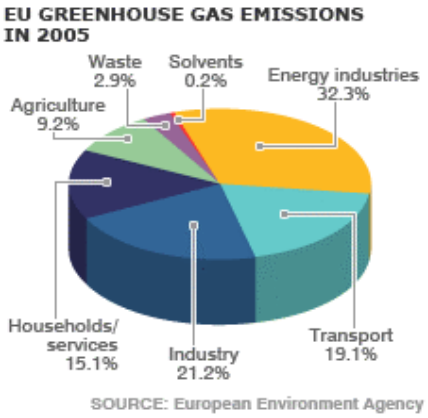

FIGURE 3. SHARE OF EU GHG EMISSIONS ON ECONOMY SECTORS AT THE LEVEL OF YEAR 2005

The main instrument to reduce GHG emissions is the package of flexible mechanisms, especially the Emissions Trading Scheme (ETS) launched by EU in 2005. But to meet the new targets for emissions cuts, there is a need to change the ETS framework. Under the ETS, permits for emitting CO2 are distributed under a system of national allocations agreed at the Member States level. The permits are traded - so big polluters can buy extra ones from greener enterprises.

Theoretical and Empirical Researches in Urban Management
Number 4(13) / November 2009

The EU aims to reduce the allocations by 21% from 2005 levels by 2020. And there will probably be one EU-wide cap on the number of permits, rather than individual national allocation plans.

The ETS covers about 10,000 heavy industrial plants across the EU – most important are power plants on fossil fuels, oil refineries and steel mills – which, according to the Commission statistics, together account for almost half the EU's CO2 emissions. In these conditions, all major industrial emitters of CO2 are to be brought under the ETS eventually and the scheme will also include greenhouse gases other than CO2 - nitrous oxide and perfluorocarbons (BBC, 2009).

The philosophy of GHG emissions changed in time. In the first and second ETS trading periods (2005-2012) the EU decided to give most of the CO2 permits to power plants and energy-intensive industries for free (see Figure 4). The original plan was that from 2013 such enterprises would have to buy all their permits at auction. But industrial lobbies, particularly in Germany and Italy, complained that the cost would be too burdensome, at a time of economic crisis. Other countries from the Eastern Europe as Poland, whose power plants are 95% reliant on coal, argued that their economy will be dramatically impacted with extra cost of buying permits. On the other hand, the green campaigners pushed for drastic measures, so EU leaders made a compromise at their December 2008 summit. Poland and other Eastern European Member States will get about 12% of the revenues from the ETS, as help to clean up their heavy industry. Romania which still has an important solid fuels consumption is also interested to obtain a higher degree of free allocation. At the same time, for industrial sectors, full auctioning will be delayed where there is a proven risk of "carbon leakage" - that is, a risk that jobs or plant could be relocated to non-EU countries where the rules on emissions are more lax. The commission aims to determine those sectors by 2010 because new data will be needed to determine which sectors qualify for this exemption, or "derogation" (BBC, 2009).

Plants in the less developed EU states still heavily reliant on fossil fuel (as in Romania), including ones which were not integrated into the main EU power network in 2007, will only have to buy 30% of their CO2 permits in 2013. Full auctioning will not apply to them until 2020.

A series of flexible mechanisms still can be used to cut the emissions. For example, Commission considers that a substantial amount of the emissions cuts will be achieved through carbon "offsets". This is the practice of international cooperation whereby enterprises in the EU get carbon credits by sponsoring green projects in developing countries when the projects have to comply with the mechanisms set up by the Kyoto Protocol (Joint Implementation – JI and Clean Development Mechanism – CDM). On the other hand, credits for emissions not already used up in the 2008-2012 ETS period can be "banked" and carried over into the 2013-2020 period. According to the Commission's

assumptions, more than one-third of the required 20% emissions cut will be achieved that way. As expected, some environmentalists criticize the use of carbon offsets because in their opinion that will weaken the impact of the EU's climate package in Europe.

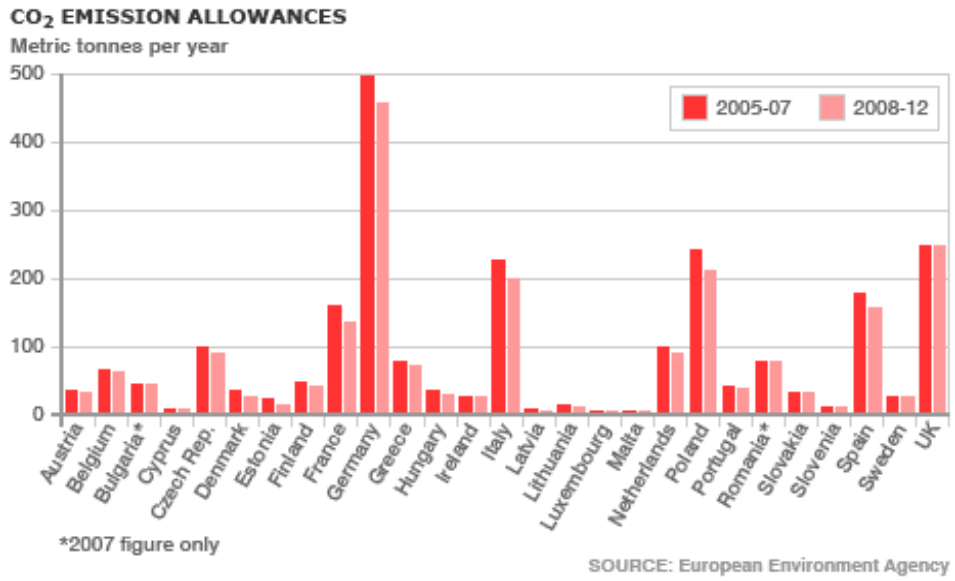

FIGURE 4. MEMBER STATES' EMISSIONS ALLOWANCES DURING THE FIRST AND SECOND PERIOD

The rest of the Member States' economies sectors not covered by the ETS (so-called non-ETS) participate with about 60% of all EU greenhouse gas emissions. The most important sectors are road and sea transport, buildings, services, agriculture and smaller industrial installations. There is a huge effort to reduce them and EU has agreed to cut emissions by 10% overall in these sectors in 2013-2020 interval, which is an important contribution towards the total 20% cut. These sectors face binding national targets for emission cuts, in what is called "effort sharing". Commission intention – expressed many times - is that gradually they will also be brought into the ETS.

A recent study (Saikku and Soimakallio, 2008) took into account a number of possible scenarios to share this effort. According to this study, there are four scenarios/options:

1. Keeping the annual rate of change in the GHG/GDP ratio the same in all countries between 2008 and 2020;
2. Allowing the GHG/GDP ratio to become equal in all countries in 2020, i.e. equal emissions per GDP for all countries in 2020;

Theoretical and Empirical Researches in Urban Management
Number 4(13) / November 2009

3. Using historical rates of GHG/GDP from between 1993 and 2005 as a base for annual reductions. Countries with decreasing GHG/GDP ratios and moderate projected GDP growth, such as Ireland, Finland, the UK, Denmark and Sweden, would receive strict targets;
4. GHG per capita becoming equal in all countries in 2020.

The result of this simulation showed that reduction targets for each country changed, depending on the scenario chosen. A country's individual circumstances determined how difficult it would be to meet the reduction target under each scenario. For example, scenario 1 provided the toughest target for some countries as Austria and Spain, but the easiest for other countries, such as Poland and Ireland. In addition, the results demonstrated how sensitive the reduction targets were to the underlying assumptions made, the approach used and the input data. The researchers emphasized that the approach used by the study is simple, but made it clearer to see how reduction targets could be distributed among Member States.

Although, the method can be used to indicate trends and targets for future emissions, a major disadvantage is that the detailed data required to model specific national circumstances cannot be included. For example, GHG emissions embedded in imported goods have not been considered in the modeling. In addition, the researchers suggest that adjustment mechanisms should be included, to account for uncertainties in setting reduction targets. From these assertions it is clear that the important decision of instruments to make "effort sharing" functional is difficult and needs more reflection.

Anyway, to the whole car industry it has been set an average emission target of 120g of CO2 per kilometer by 2012 for new cars, compared with current levels of 160g/km. The target for 2020 is 95g/km. But the problem is more complicated because CO2 emissions vary from car to car so the manufacturers have been given some time until 2015 to meet their specific targets for each model. This is especially sensitive for big towns and could be an important conclusion for the next steps of urban transport optimization.

A key area of green innovation is carbon capture and storage (CCS) - new technologies that allow industrial CO2 emissions to be captured and stored in different underground locations. These technologies are still young and there are plans to build 10 to 12 big pilot plants in the EU by 2015, with a view to making CCS commercially viable by about 2020. The plants would be funded by revenue from the ETS. Romania intends to apply for one of these pilot plants.

It is clear that it is impossible to base the whole GHG reduction targets only on industry, so the decision makers have to be careful in combining ETS measures with others. Both buildings and transport sector

are important emitters of CO2 or similar GHG's. They are parts of so called "non ETS" emitters as a share of the common effort of European countries to reduce their impact on environment.

Concerning buildings, the use of renewable energy - as presented in the above sub-chapter - and the improved energy consumption are the key elements that can decrease the GHG emissions. For rural areas dwellings essential is use of biomass in new stoves with high efficiency combined with solar collectors and for the urban buildings a solution could be smart use of heating through co-generation and cooling through tri-generation.

European Agency for the Environment (EEA) has developed, in January 2008, the Report "Better management of municipal waste will reduce greenhouse gas emissions" which emphasizes that municipal waste is continuously growing and that is needed steps to stop filling landfill waste.

On average, each European citizen generated an amount of 460 kg of municipal waste in 1995. This amount increased to 520 kg per person in 2004 and until 2020 it is expected to be up to 680 kg per person. In total, this corresponds to an increase of almost 50% in 25 years.

Transport in urban areas requests a totally changed concept that will allow not only fuel consumption improvement, but also drastic reduction of GHG emissions. A reform in public transportation is doable and can contain the introduction of incentives for using more efficient and greener vehicles: hybrid, electric, bio-fueled cars, bikes. We may add opening of new roads, new itineraries which will better connect different parts of the city, better maintenance of the streets, intelligent systems for public transportation, etc.

Concerning Romania, we consider that a large number of intelligent measures could be used and the fact that majority of our towns are not properly developed in connection with GHG emissions cutting constitutes at the same time a challenge and an opportunity. One essential measure is making of a realistic development master plan which will take into account as driving force emissions reduction and smarter use of energy. One example could be Bucharest which is drafting - with a help of an international consortium - such a master plan for town's energy development with an objective to cut drastically GHG emissions till 2020.

Another project represents an example of best practice regarding the implementation of the waste selective collection. The "Green Parliament" project is to streamline the energy consumption reduction, water supplies and diminishing the amount of waste produced by the largest carbon footprint building in the country. The project also wants to implement a set of actions to inform employees of the Palace of Parliament and officials on the environmental issues and to start the first building energy audit.

Theoretical and Empirical Researches in Urban Management
Number 4(13) / November 2009

4. Energy consumption reduction

Energy consumption for the 25 Member States of EU economy sectors in 2005, as a basis of comparison, are displayed in Figure 5.

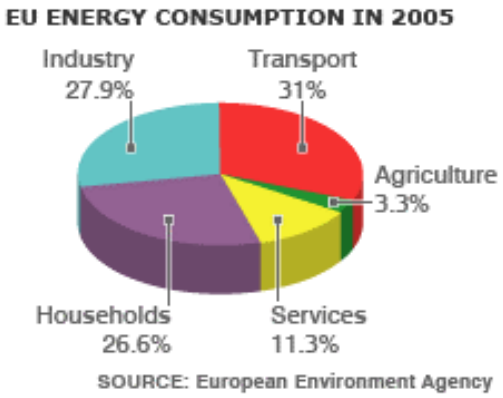

FIGURE 5. 2005 EU ECONOMY SECTORS ENERGY CONSUMPTION

Adding the new members Romania and Bulgaria energy consumption in the same year, the package imposes that this total consumption is to be cut by 20% by 2020 through improved energy efficiency.

Moderation of global energy demand is one of the key factors in meeting the 20% energy efficiency and renewables targets, building on the EU's three core energy objectives of sustainability, competitiveness and, above all, security of supply (BBC, 2009).

In the framework of the EU Energy Security and Solidarity Action Plan, submitted by the Commission in November 2008, and the Transport, Telecommunications and Energy Council conclusions of 19 February 2009, the Spring European Council laid down orientations aimed at increasing the Union's energy security in the medium and longer term in the following areas:

- developing energy infrastructures in Europe;
- improving gas and oil stocks and crisis response mechanisms in the interests of security of supply;
- improving energy efficiency;
- diversifying the Union's sources and routes of energy supply, including renewables;
- promoting the Union's energy interests in its relations with all relevant partner countries.

According to the data provided by International Energy Agency, in 2006 Romania used for residential sector around 30% of its total energy consumption. That means heating, sanitary water preparation, cooling, and electricity for lighting and appliances. If we take into account different data provided by Romanian specialists who evaluate the buildings losses to an average of 30-35%, we can conclude that 9 – 10.5% of the total energy consumption is used to cover the losses only in the residential sector.

The transport sector in general used in the same year around 16.8% of the total energy consumption, but the urban areas transport adds more complexity to this picture: reduced mobility because of suffocated transport systems, not a real promotion of public transportation, only one town with underground network, not very homogeneous policies at the local level, no incentive for promoting green vehicles, small streets with no or little proper maintenance, high levels of pollution, etc.

At the national level, there are different support instruments to improve energy efficiency. For example, Romania promotes Long Term Agreements to help some industry sectors reduce their energy intensities. However, the Commission is very sensitive to avoid breaching EU competition rules and avoid promoting unfair state aid. In this respect, the Commission came up with new proposals for the EU to co-finance national and local schemes, to promote energy-efficient housing which participates more than a quarter (as Figure 5 shows) at the total energy consumption. If the plan is adopted, the EU will help Member States install double glazing, wall insulation and solar panels in housing, especially targeting low-income households.

Energy efficiency is a key component of the whole package to reaching EU Energy Green Paper's objectives in the context of Lisbon Agenda: energy security of supply, mitigation of energy impact on environment, and competitiveness.

One of the most important problems of a city is improving energy performance of buildings. Since it was adopted, the European strategy has been received with enthusiasm by local authorities, and now more European cities are starting to work on the insulation performance for public buildings, which significantly reduced consumption of heating and air conditioning.

The first European program of integrated environmental planning began in 2004 when ten countries have signed a European partnership that aims to change the use of resources. Local authorities then began to give authorization for ecological building, not only to be energy efficient, but how to integrate better into urban plans.

Chief architects have special criteria for the granting of construction permits. Buildings must be properly oriented to the south, allowing the use of solar energy, both photovoltaic cells and using the sunny

Theoretical and Empirical Researches in Urban Management
Number 4(13) / November 2009

façades materials that retain heat, together with thermoinsulation quality. Experts give great importance to the location of windows. Thus, the southern ones absorb heat of the sun, while the northern ones lose it. Placing trees on the right sunny fronts is useful and recommended. Trees are meant to block the sun during the summer, so to reduce the need for cooling the interior space. Pines can be planted on the northern side of buildings to protect them from cold winds.

The Program for environmental planning not only contributes to the fight against global warming, but also brings major changes in business achievement, because of reduced energy consumption.

Romania has a number of around 83,000 blocks of apartments, majority of these very old and not properly insulated. These blocks are dwelt by 7 million people who pay costly energy bills because of high energy losses. An important part of these people is formed by vulnerable population. The obvious answer to this important problem is promotion of thermal rehabilitation programs which can help these people to reduce their energy losses and make the bills affordable.

Romania promoted such a program with a very important state aid both at the central and local level. Subsidies to rehabilitate the blocks envelopes are shared between central budget, municipality one and population has to pay a small amount (only 20%). Even if this financial scheme is the most convenient for apartments' owners in Europe, the program is still delayed because of many reasons: limited budget allocation, unjustified length of the works, and even owners' reluctance to pay even that small portion.

Related to these types of programs, European Commission adopted on December 3, 2008 a proposal that will allow Member States - for the first time – to invest in measures for energy efficiency and renewables for buildings with financial support through cohesion European policy, especially for vulnerable population. In practice, that means that EU can co-finance programs initiated by national, regional, and local authorities for better insulation, change of windows and doors, and solar panels.

Another solution is to use high efficient co-generation which – in Romania as in other EU countries – benefits by specific support mechanisms. Romania has adopted a bonus system which can help investors to modernize and build co-generation units; however the problem which still exists is the distortion of natural gas market prices and this distortion promoted the idea to use individual gas fueled boilers instead of the common co-generation plus district heating system.

Hopefully that will boost new investments in cogeneration plants with high efficiency, including distributed ones, and will extend the idea of a better district heating system. That also will raise new challenges to the local authorities who will be obliged to re-think the way how they will secure to provide

heating and warm water services. Also, that will have to take into account possible integration of alternative sources.

In the perspective of year 2020, the gas market will adopt actual "cost plus" figures and the conditions will changed dramatically so the solutions for heating and cooling of the new buildings, including blocks of apartments, will be reconsidered. There is a need for a coherent approach including better information on buildings thermal performances, labeling and periodical energy auditing.

5. Possible barriers in energy – climate change package implementation

Municipalities carry a lot of weight when it comes to combating climate change and in this task, they – inevitable – expected to face a lot of difficulties. The very first barrier is the lack of information about the package requirements and that it is met not only to small towns, but even in the big ones where someone expects a better understanding and coordination of measures. Not only public awareness is important, but also City Hall staff has to be convinced about the importance and need to implement appropriate measures.

Another hurdle that Romanian localities face is the lack of coherent development plans which should integrate all related measures, including climate change ones, even to consider climate change stop requirements as driving forces in their development. Integrated plans for energy, transport, fight against extreme weather events are essential for these communities and the early tackling and prevention are the key for reducing localities' vulnerabilities.

One possible response to the climate change challenge to municipalities is considered to be a coherent approach, share of good experience, and implementation of best practices at the urban level. EU supported frameworks like Mayors' Covenant can help for best practice sharing and dissemination.

To make it real, a number of 400 European cities and municipalities signed a Covenant of Mayors in order to deal with energy – climate change problems. In this respect, the Covenant of Mayors offers cities a democratic response to climate change. "Tackling climate change at city level goes together with the creation of local jobs and increased quality of life for citizens, the original concept of the city as the "raison d'être" of policy and as the natural space for debate and joint action. Taking action at local level allows for problem-solving approaches – turning climate change into an opportunity for local decision-makers. Moreover, cities are less subject to ideological confrontation and more to finding practical co-operative solutions – nearly all the cities that had signed up to the Covenant by the beginning of 2009 did so by unanimous decision of the councils involved" (Andris Piebalgs, 2009).

Theoretical and Empirical Researches in Urban Management
Number 4(13) / November 2009

The Covenant of Mayors was founded in 2007 as part of the EU's energy and climate protection package (http://eumayors.eu). Through this instrument, local authorities are committed to go beyond the European Union's objectives for 2020 in terms of CO2 emissions and energy efficiency and to tackle climate change measures without further delay. The signatories also undertake to draw up a sustainable energy action plan, with civil society involved in its development, and to share experience and know-how with other territorial units.

A number of 11 Romanian towns (Aiud, Baia Mare, Brasov, Bucharest, Craiova, Giurgiu, Mizil, Ramnicu Valcea, Slobozia, Targoviste, and Targu Jiu) are signatories of Mayors' Covenant.

A close dialogue between the public administration and researchers may help to reduce the vulnerability of Romanian municipalities to climate change by ensuring that resources are allocated on the basis of detailed knowledge instead of political trends. The impacts of climate change in our country will vary among regions and municipalities. This means that along with centrally driven measures, the challenges must be met at the local level, and the municipalities are one of the key players in these efforts.

One of the very first measures would be a more in-depth understanding of the present situation and the future trends in Romanian towns. A good example is the way how this problem is tackled in Norway. In the project entitled "Adapting to extreme weather in the municipalities", seven research institutes are cooperating to help municipalities develop solutions across a wide range of interests and policy areas. The goal is to reduce the municipalities' vulnerability by developing a sound information base that the municipalities can draw on in their efforts to adapt to climate change. The project identifies adaptation strategies, which is a vital part of the information that the project provides to the municipalities. These strategies form the basis for the measures that are implemented (Rauken, 2009).

Surprisingly, Romanian experience did not show a clear connection between municipalities that experienced extreme weather events (floods, drought, violent storms, etc.) and the implementation of preventive measures. Unfortunately, it means that the municipalities did not take action even in case of a severe weather event had occurred. A reaction after the fact is often much more expensive than measures taken in advance. But because there is great uncertainty surrounding extreme weather – as also other countries experience showed - it is difficult to know what measures should be taken and how to gain support for them. For example, in Norway, because there are often enormous costs connected with this and it is difficult to prove that certain measures are the best ones, it is easy for politicians who plan to seek re-election to push the problems into the future. In addition, measures taken after an event are much more visible because they receive a great deal of attention (Rauken, 2009).

Municipalities and their residents may directly experience such impacts of climate change as declining water supplies and damage to infrastructure, buildings and vehicles from severe storms. The local authorities have powerful means at their disposal for limiting the scope of damage caused by extreme weather conditions. These include regional and transportation planning, construction projects and water management. Reducing emissions and preparing to adapt to impacts are both important components of increasing municipalities' resilience to climate change.

In order to improve preparedness of local authorities, measures as the fallowing are needed (Taipale, 2008):

- Risk assessments – topography in relation to settlements, vulnerability of water services, alternative electricity sources, etc;
- Planning practices and guidelines need to be revised – stormwater drainage, structural design for wind, snow and frost, etc;
- Cooperation between different actors – extreme conditions have to be taken into account in outsourcing municipal infrastructure services;
- Regulation of land use and construction need to be revised because current legislation does not support climate proof applications within existing settlements.

Finding good solutions is not enough. Implementation and proper using are the ultimate goals. So, another important barrier could the lack of financial means, especially for Romanian localities in a period of hardship. That is in a way understandable; however the prevention is much chipper than tackling with the results of extreme events. One solution of this challenge is to make real smart plans for energy consumption reduction including environmentally friendly measures and to use properly the public money during the implementation of the plans. Once a political decision as the 20- 20- 20 package was made, a minimum local political involvement is desirable. It is in the benefit of local politicians to show palpable results in order to increase their nothingness, but a change of initial well economically designed plans for a party's interest is not a good idea.

To avoid the misuse of public funds, municipalities must think long term. As a result, the various scientific fields must communicate as well. Through a common understanding of the cross-disciplinary challenges, it will be possible to develop appropriate solutions that ensure residents of municipalities feel safe and secure.

Theoretical and Empirical Researches in Urban Management
Number 4(13) / November 2009

The simply lack of money is not a good excuse. There are already a lot of EU instruments that could be used in Romania: structural funds, special programmes under Ministry of Environment leadership, public-private partnership, local budget, etc.

For example, the European Commission intends to award grants to actions in support of the development of sustainable mobility policy for urban agglomerations. These actions should promote the objectives of sustainable urban mobility, as set out in the Green Paper 'Towards a new culture for urban mobility', adopted by the Commission on 25 September 2007 (COM /2007/ 551).

In this Green Paper, the Commission announced its intention to follow up with an Action Plan on urban mobility in 2008. The actions to be selected must be in line with the approaches set out in the Green Paper on urban mobility: more fluid and less polluted towns and cities, more intelligent and more accessible, safer and more secure urban transport. They should also contribute to the implementation of the Action Plan on urban mobility.

Over the past years, EU funded initiatives such as CIVITAS 1 and ELTIS 2 have helped to develop and spread a wealth of innovative solutions and approaches in urban mobility (DG TREN website).

The concept of ecological town planning requires improving the energy efficiency of buildings, new rules for water use, new construction materials, clean air, traffic flow and reduced noise. To meet these standards, all European cities and should establish special programs of ecourbanism.

European Commission strategy for urban environment shows that by 2013, cities will have to provide a favorable environment for people. Through this document, European officials encourage local initiatives that are carried out projects for sustainable development of buildings with the lowest cost to the environment.
Under this strategy, local and central authorities are encouraged to enter into partnerships that promote environmental measures in order to ensure through action, a good air quality, a fluent traffic flow and low levels of noise.

Local authorities have a core tool in their hands. Land use planning is the key for both mitigation and adaptation on local level, which includes (Taipale, 2008):

- Minimizing the increase of car traffic and improving conditions for public transport;
- Preventing flood risks;
- Affecting on selection of the primary energy source with long standing effect;
- Promoting combined power and heat production also in smaller scale;

- Utilizing more renewables, not forgetting the energy of solid waste;
- Monitoring constantly the energy consumption, benchmarking;
- Decreasing the costs of the municipal infrastructure;
- Providing attractive and healthy living environment.

6. Conclusions

Energy – climate change package will put important challenges in front of EU Member States' economies. That is not valid only for sectors as energy, transport, and agriculture, but will have a pregnant footprint on urban areas. The requirements imposed by the package will – inevitable – change the way how urban designers will approach basic problems like heating, urban transport, waste management, buildings' design and realization. The classical solutions are not enough because the ambitious targets imposed by the package can not be reached without launching vigorous measures to use alternative energy sources, including biofuels, a more careful waste management, aggressive energy efficiency measures for buildings and local public services.

That will be difficult and will have implications on all EU State Members budgets, but for Romania will be even more difficult especially in this hard period. Romania has already a certain not-envied position among the other EU countries, a delay in development and a lot of other not solved issues. However the first step to solve a problem is to understand it and identify the risks, costs, and benefits. That is why this paper identified a series of issues that central and local authorities have to tackle with and how possible solutions could be found. It also showed a number of barriers that surely will impede implementation of package requirements and came with some possible suggestions. On the other hand, it underlined the fact that, in selecting their priorities, the local authorities have to take into account package requirements and secure appropriate funding combining smartly public and private money, and using EU support programs.

REFERENCES

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: 20- 20- 20 by 2020 - Europe's climate change opportunity, 2007

Directive 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources.

International Energy Agency: Statistical data. Retrieved from www.iea.org.

Theoretical and Empirical Researches in Urban Management
Number 4(13) / November 2009

Rauken, T. (2009). Adapting to extreme weather in the municipalities, *Climate Magazine Klima*, Oslo, Finland

Saikku, L. and Soimakallio, S. (2008). Top-down approaches for sharing GHG emission reductions: uncertainties and sensitivities in the 27 European Union Member States. *Environmental Science & Policy.* 11: 723-734.

Taipale, P. (2008). Municipalities and the climate change, *Local and Regional Government Finland*, Oslo