Energy Security: A Critical Issue in the European Energy Policy

Ana Bobircă
Paul-Gabriel Miclăuş
Ştefan Ungureanu

The topic of energy security has become an issue of high salience over the last few years. As fears about the stability of the world's energy resources grow, policy-makers tend to merge the security concerns into the climate change policies that they are considering.
There are currently three major challenges of the global energy policy: the oil shock and higher prices, greater threats to security of supply, and climate change. Our paper seeks to bring an analytical perspective on these questions. To this end, it starts by individually analyzing the above-mentioned challenges at the EU level and by exploring strategies for meeting them. The paper subsequently concentrates on the European Emissions Trading Scheme (EU ETS), as the flagship of EU climate change policy, for a number of political, environmental and economic reasons. In the last part of the paper issues related to the climate change policy in Romania are addressed. The paper concludes with a review of the progress towards a single European energy market.

Key words: *security, climate change, energy policy, carbon market, EU ETS*
JEL classification codes: *Q48, G18, F18*

1. Introduction

Security is a multifaceted concept, with the national referent dominating security discourse. Large scale violent conflict is the concern that receives the most attention from policymakers, whilst developing military capability as a response to possible violent conflicts consumes large amounts of public resources. However, alternative risks to security and alternative referent objects (such as humans) are increasingly being considered. Among these risks are *energy supply and climate change*, as the two main elements of energy security topic and the core pillars of energy policy (Campbell, 1992; Dabelko and Simmons, 1997; Dalby, 1994).

As concern mounts over the impacts of growing demand, external dependency on energy supply sources, rising energy prices and global environmental change on economic, social and ecological systems, coinciding with a more fluid international security environment since the end of the Cold War, energy is increasingly being understood as a security issue.

The majority of interpretations of energy security focus on the way energy supply and environmental change issues may interact with the same national security concerns that dominated policy throughout the 20th century, in particular the way these may trigger violent conflict (Homer-Dixon, 1991; Kaplan, 1994; Myers, 1987). However, as recent developments in energy security research suggest, the concern with direct international conflict is misplaced, and the energy security impacts will take less direct and more multifarious routes (Lowi and Shaw, 2000).

Security is an accentuated discourse on vulnerability. Like vulnerability, its assessment requires considering the risk of exposure, susceptibility to loss, and capacity to recover. However, like vulnerability and risk, it is more socially constructed than objectively determined. The distinction is that security is attached to the most important of vulnerable entities – for example the nation (national security), basic needs (human security), income (financial security) and property (home security). The process of discursively 'securitising' vulnerable referent objects, and defining particular risks, is a political one (Waever, 1995).

Energy plays a vital role in our society, underpinning all areas of economic activity. The economic impact of supply disruptions can therefore be high and wide-ranging. This creates an incentive for governments to ensure that secure and reliable energy sources are readily available. A country's energy security policy refers to measures taken to minimize the risks of supply disruptions below a certain tolerable level. Such measures ensure that a supply of energy is readily available and affordable to meet domestic demand. This, therefore, involves a quantity and a price parameter. But it also involves a time parameter: a sudden price hike will have very different effects on both society and the economy than a long-term price increase. Thus, the causes of insecurity in the energy sector include the risks related to the scarcity and uneven geographical distribution of primary fuels, as well as to the operational conditions and reliability of energy systems that ensure services are delivered to end users.

Climate change is a different energy policy driver from supply disruptions. Along with ozone depletion, it is one of the first truly global environmental concerns, and the first with major energy implications. Compared to the supply security policy drivers, it has emerged relatively recently as an energy policy driver of potentially great importance.

The first person to systematically argue that environmental change is a security issue was Richard Falk. Writing in 1971, when climate change was only a nascent concern, Falk outlined what he called "the first law of ecological politics" which is strikingly relevant for the issue of adaptation to climate change, namely: "there exists an inverse relationship between the interval of time available for adaptive change and the likelihood and intensity of violent conflict, trauma, and coercion accompanying the process of adaptation" (p. 353). This is a truism of contemporary climate change research: the faster the rate of change, the less time to adapt and the more "dangerous" climate impacts are likely to be. In 1977, Lester Brown explored the links between environmental degradation – including climate change – and security. His discussion particularly focused on food security, a subject which has subsequently received considerable attention from climate impacts researchers (for example Murdiyarso, 2000; Parry *et al,*. 1999; Sanchez, 2000; Wilkie *et al.,* 1999). After 1989, the argument that environmental change was a security issue for nations and people was increasingly made in both environmental and security journals. This must be considered in the context of dramatically improved relations between NATO and the former USSR, making conventional understandings of security less relevant. Simultaneously, environmental concerns were increasingly coming to the fore of national and international politics and policy (Dalby, 1992).

The accumulation over the course of the '70s and '80s of scientific evidence pointing towards the risks of enhanced climate change due to increasing anthropogenic greenhouse gas emissions led to a first international policy response in 1992, with the adoption of the United Nations Framework Convention on Climate Change. The Convention's ultimate objective is to stabilize "greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". This was subsequently backed in 1997 by the Kyoto Protocol to the Convention which sets a timeframe for emission reductions in industrialized countries.

Accepting the above arguments that energy price hikes together with supply disruptions, on one hand, and climate change, on the other hand can be treated as security issues, this paper seeks to bring an analytical perspective on these questions. To this end, it continues by individually analyzing the above-mentioned challenges at the EU level and by exploring strategies for meeting them. The paper will subsequently concentrate (more specifically) on the European Emissions Trading Scheme (EU ETS), as the flagship of EU climate change policy, for a number of political, environmental and economic reasons. For the EU, emissions trading is one of the crucial pillars upon which both the EU's climate change policy and the global regime should rest. Environmentally, the ETS is important because it covers almost half of the EU CO_2 emissions and more than a third of total greenhouse gas emissions. Economically, the ETS is important as it is the show case for applying this type of economic policy instrument in practice at large, cross-border scale, for CO_2 emissions. The purpose here is to give a comprehensive insight into the EU ETS and the climate change regulatory framework, as well as to identify the challenges the ETS faces and to either explore options and/or to identify the principle policy questions that emerge from the current state of the ETS. Market organization, trading practices, and the new financial assets introduced by the EU ETS will also be outlined. In the last part of the paper issues related to the climate change policy in Romania will be addressed. In developing a competitive domestic energy market, Romania is closely observing the energy policy of the European Union, with the aim of becoming a part of an integrated European market. The paper concludes with a review of the progress towards a single European energy market.

2. EU energy security challenges

For the past two decades Europe has focused overwhelmingly on the completion of the European energy market, and in particular on the liberalization of electricity and gas markets. This process is close to completion, subject to the last phases of market opening and a number of "difficult" cases. Europe's energy is now supplied overwhelmingly by private companies competing in liberalized markets.

Though the internal energy market has yielded considerable benefits, it has been hampered by the fact that there is no integrated European market yet, but rather a string of national markets with bilateral connections (Helm, 2006; European Commission, 2007). Thus physical trade has been limited, and, as a result, Europeans have not reaped the benefits of a fully integrated internal market, and competitiveness has suffered.

This major gap did not matter so much in the '80s and '90s because most member states had excess capacity, and world energy prices were very low. But now it does matter, because the energy sector in Europe has changed fundamentally since. The decades of abundant low-priced fossil fuels, combined with the overhang of the power stations built in (or before) the '70s and early '80s, has given way to a new set of challenges: *the oil shock, security of supply* and *climate change* (Helm, 2005).

(i) The oil shock

(a) The oil price shock from 2000 has resulted in sustained higher prices. The peak of world oil production is now within the planning horizon of the sector. Few new big reserves are being found, whilst the growth of demand from China, India and other fast developing countries will underpin prices. By 2030, the IEA (International Energy Agency, 2005) forecasts that world energy demand will rise by 60% from current levels.

(b) The gas price shock followed that of oil, and gas continues to be priced in contracts which are indexed to the oil price. With European supplies heavily concentrated in Russia and Norway, and new LNG (liquefied natural gas) supplies at a premium to pipeline gas, this linkage is likely to remain for the foreseeable future.

(c) Electricity prices have risen to reflect gas costs, since in most European countries, gas is the marginal fuel. The tightening supply/demand balance has also begun to be reflected in prices, which will have to sustain new investment.

Thus, the European economy, which has developed in the last two decades on the basis of low prices, will need to adapt to a very different set of assumptions.

(ii) Security of supply

Recent increases in energy prices and a steady escalation in global energy demand — expected to rise by nearly 60% over the next 20 years — have led U.S. policy-makers to engage in a wide ranging debate over how best to address the country's future energy requirements. Similarly, energy supply security has become a policy priority for the European Union (EU) and its 27 member states. Together, the United States and Europe represent the world's largest energy market. Although they produce approximately 23% of the world's energy, they consume almost 40% of the world's supply.

The EU imports about 50% of its energy needs. Barring significant changes, the European Commission expects this figure to rise to 65% by 2030. Europe's energy imports come primarily from Russia and the Middle East, where approximately 70% of global oil and gas supplies originate. Yet, the Middle East region is fraught with war, terrorism and politically unstable regimes. Iraq's oil production has not reached pre-war levels, and there is fear that terrorist groups could target pipelines and production facilities throughout the region. Iran has threatened to cut back oil production if forced to abandon its nuclear power program. With regard to Russia, recent political and economic behavior exhibited by Moscow has raised the dual specter of reliability and "energy politics."

High demand has also raised questions regarding the future availability of global oil and gas reserves. Although significant shortages are not projected for the next several decades, uncertainties over future exploration and production in areas such as Russia and the Middle East have raised concerns about long-term supply availability.

European concern regarding the security of its energy supply was first prompted by the Arab oil embargo of the early '70s. Since then, much of Europe has not faced any serious threat to the security of its energy supplies. The North Sea has provided oil and gas, whilst world markets in coal and oil have been benign. With the exception of the first Gulf War, the only threats have been internal and temporary, and focused largely on labor problems.

These conditions have now changed, and security of supply is threatened in a number of ways:

(a) The external dependency on gas, notably from Russia, and the reliance on long pipelines through sometimes politically difficult territories.

(b) The external dependency on oil supplies, with production increasingly concentrated in the Middle East.

(c) Terrorist threats to key energy installations.

(d) Network failures, due to the decades of asset sweating in the low return years of the '80s and '90s.

(e) Aging oil refineries and power stations, and low investment in the last two decades.

(f) Poor interconnections between European electricity and gas grids.

(g) Lack of effective European-wide mechanisms for addressing security of supply risks and coordination of infrastructure investment.

Addressing the multi-dimensional security of supply problems will require a major investment program across Europe and much greater cooperation between member countries, and between the EU and its partners, notably Russia[1]. The International Energy Agency (IEA, 2005) estimates that close to $16 trillion in new investments may be needed over the next 30 years to meet future global energy demand.

(iii) Climate change

[1] The EU White Paper on security of supply sets out some of these issues (Commission of the European Communities, 2000).

Climate change was recognized in the EU back in the '80s, but the constraints have only begun to be felt in this decade. The EU has endorsed the ambition of stabilizing emissions of greenhouse gases, adopting specific Kyoto targets, and introduced the world's most advanced emissions trading scheme. It has also adopted a directive on renewables. These initiatives pose major challenges to Europe's energy sector, in particular:

(a) The Kyoto targets, which in the context of global warming trends are modest, are nevertheless proving very hard for most member countries to achieve.

(b) The majority of European electricity assets are based upon fossil fuels, and most are old and coming up to replacement.

(c) Renewables technologies proved expensive relative to fossil fuels, adding to pressure on competitiveness.

(d) The first generation of nuclear power stations are coming towards the end of their lives, taking out significant zero carbon emissions capacity, and some countries are considering a new wave of investment.

The Russia-Ukraine and Russia-Belarus oil and gas crises[1] have corresponded with increasing public calls for concerted European action on climate change, spurring European leaders to renew efforts to establish a more cohesive European energy policy. During their March 2007 summit, EU heads of state adopted a series of European Commission proposals that they expect will form the foundation of an

[1] In late December 2005, Russia's gas monopoly, Gazprom, temporarily suspended gas flows to Ukraine as part of a dispute over gas price increases. Within hours of the shut off, several European countries, including Austria, Italy, Poland, and Germany, reported drops in their own pipeline pressure by as much as 30%. The gas crisis lasted only a few days, and after Russia and Ukraine reached an agreement on gas prices, gas was flowing again. An almost identical dispute between Russia and Belarus with similar consequences for European countries, particularly Germany, occurred in early January 2007. This time, Russian oil pipeline operator Transneft shut down the Druzhba oil pipeline through which Germany receives 20% of its oil imports. Germany and the EU sharply rebuked Russia's decision, and Russia resumed oil delivery after three days of price negotiations with Belarus.

"Energy Policy for Europe." The adopted measures are among a larger group of recommendations the Commission laid out in a March 2006 "Green Paper" and a more detailed action plan unveiled in January 2007. The Commission proposals focus on three broad interconnected goals: increasing European-wide energy security; enhancing sustainability; and fostering competition in Europe's internal energy market. Commission officials place particular emphasis on the links between energy security, energy efficiency, and an EU-wide reduction in carbon emissions.

In what some consider a reflection both of increasing public pressure to address global climate change and continued member state reluctance to cede national economic and foreign policy making authority, the EU's March 2007 agreement focused largely on Commission recommendations on sustainability. Member states did commit to take some steps toward further liberalizing the EU-wide energy market and have broadly endorsed increased foreign policy coordination on securing energy supplies. However, the EU's most far-reaching commitments focus on increasing energy efficiency, decreasing greenhouse gas emissions, and promoting the use of renewable energy and alternative fuels and associated technologies. Specifically, EU member states have committed to reducing total EU-wide carbon emissions by 20% compared with 1990 levels by 2020. They have also pledged to seek international agreement on a 30% reduction target by 2020 in a post-Kyoto Protocol international carbon emissions reduction treaty[1]. In addition, the EU seeks a 20% increase in Europe-wide energy efficiency by 2020 and has mandated that 20% of all EU energy consumption come from renewable sources and 10% of transport fuel from biofuels by 2020. Member states are expected to agree on country-specific targets to achieve these Europe-wide goals by late 2007.

[1] The United Nations Kyoto Protocol, to which the United States is not a party, is set to expire in 2012. European leaders reportedly see 2009 as the deadline for international agreement on a post-Kyoto treaty.

The challenge of climate change arises at the historical point when much plant needs replacing. This provides an opportunity to use this point of the investment cycle to invest in substantial non-carbon sources. Thus, both security of supply and the climate change challenges need to be met with major new investment.

3. The EU Emissions Trading Scheme

a. The carbon market: some conceptual issues

Carbon transactions are defined as purchase contracts or ERPAs (Emission Reductions Purchase Agreements) whereby one party pays another party in return for GHG (greenhouse gas) emissions reductions or for the right to release a given amount of GHG emissions that the buyer can use to meet its compliance – or corporate citizenship – objectives vis-à-vis climate change mitigation (World Bank, 2006). Payment is made using one or more of the following forms: cash, equity, debt, convertible debt or warrant, or in-kind contributions such as providing technologies to abate GHG emissions.

There are several types of carbon assets currently traded on the market, created under international and national local regimes or through private contracts outside these legal frameworks. Most of these carbon assets share a common base – they are usually based on a common unit of one t CO_2 reduced, or an allowance to emit one t CO_2. Emissions trading can be simplified to cover the creation and sale of these assets (Tang, 2005). Carbon assets derive mainly from the Kyoto Protocol and the EU ETS; thus they are statutory-based rights gaining their existence from statutes or treaties (Tang, 2005) (see table 1).

Table 1. Carbon assets under the Kyoto Protocol and the EU ETS

Carbon asset	**Description**
Assigned Amount Unit, AAU	Units that are issued to Annex I parties to the Kyoto Protocol;

	the amount of AAUs determine how much the Party is entitled to emit
Certified Emission Reduction, CER	Unit of emissions reductions created through CDM projects
Emission Reduction Unit, ERU	Unit of emissions reductions generated through JI projects
European Union Allowance, EUA	Units that are issued to liable installations under the EU ETS; represent an allowance to emit one tonne of carbon dioxide
Removal Unit, RMU	Unit of emissions reductions created through investments in sinks (deforestations, afforestation etc.)

Carbon assets, mainly EUAs (European Union allowances), can be traded according to five basic financial structures: immediate (spot) settlements, forward contracts, futures contracts, option settlements, and swaps. Of these instruments, spot settlements, forwards, and futures are the most used at the moment; options and swaps are still in their emerging stage.

Carbon transactions can be grouped into two main categories:

- *Allowance-based transactions*, in which the buyer purchases emission allowances created and allocated (or auctioned) by regulators under cap-and-trade regimes, such as Assigned Amount Units (AAUs) under the Kyoto Protocol, or EUAs under the EU ETS. Such schemes combine environmental performance (defined by the actual level of caps set) and flexibility, through trading, in order for mandated participants to meet compliance requirements at the lowest possible cost;

- *Project-based transactions*, in which the buyer purchases emission credits from a project that can verifiably demonstrate GHG emission reductions compared with what would have happened otherwise. The most notable examples of such activities are under the CDM (clean development mechanism) and the JI (joint implementation) mechanisms of the Kyoto Protocol, generating CERs (certified emissions reductions) and ERUs (emissions reduction units), respectively.

There are several fragmented carbon markets, encompassing both allowances and project-based assets that co-exist with different degrees of interconnection[1]. These markets are developed to various degrees in different parts of the world, as national and regional policies themselves evolve. In 2006 and the first quarter of 2007, there were important regulatory developments in North America and Australia with initiatives to manage GHG emissions at least at regional levels.

By size and value, the Kyoto Protocol is the largest potential market and the EU ETS, a "tributary" scheme, which has spawned a thriving market in the trade of allowances and for the import of project-based reductions.

Buyers largely engage in carbon transactions because of carbon constraints (current or anticipated) at international, national or subnational levels.

The main compliance buyers are: European private buyers interested in the EU ETS; government buyers interested in Kyoto compliance; Japanese companies with voluntary commitments under the Keidanren Voluntary Action Plan; U.S. multinationals operating in Japan and Europe or preparing in advance for the Regional Greenhouse Gas Initiative (RGGI) in the Northeastern U.S. States; power retailers and large consumers regulated by the New South Wales (NSW) market in Australia; and North American companies with voluntary but legally binding compliance objectives in the Chicago Climate Exchange (CCX).

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[1] These interconnections arise mainly from competition between these different markets for the same type of offset credits (typically, CDM projects may be purchased by installations under the EU ETS, governments facing Kyoto commitment or Japanese companies with voluntary commitments under the Keidanren Voluntary Action Plan) and to a lesser extent, from trades of compliance instruments across schemes (for some time, EUAs were considered as a valid compliance instrument under the Chicago Climate Exchange).

There is also a growing retail carbon segment that sells emission reductions to individuals and companies seeking to offset their own carbon emission footprints.

b. The EU ETS as the largest carbon market

The EU emissions trading scheme was launched on the 1st of January 2005 in the 25 EU member states to cap CO_2 emissions from heavy industry. The ETS was established through the implementation of the EU Directive 2003/87/EC: "establishing a scheme for greenhouse gas emission allowance trading within the Community" (EU, 2003). The ETS covers only CO_2 emissions from large emitters in the power and heat generation industry and only selected energy-intensive industrial sectors: combustion plants, oil refineries, coke ovens, iron and steel plants and factories making cement, glass, lime, bricks, ceramics, pulp and paper. A size threshold based on production capacity or output determines whether plants in these sectors are included in the ETS. More than 11,400 installations are included, accounting for about 45% of the CO_2 emissions in the EU, or about 30% of its overall greenhouse gas (GHG) emissions (EU, 2005). The ETS-Directive requires the member states to develop a national allocation plan (NAP) stating the total quantity of allowances and how they propose to allocate them.

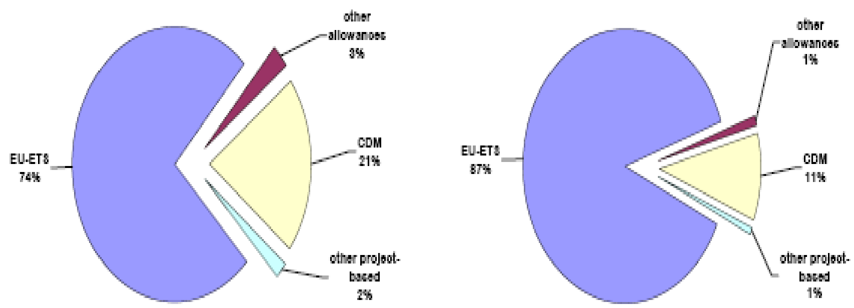
Covering almost half of all EU CO_2 emissions, the EU ETS forms the centerpiece of European policy on climate change. Trade in these emission allowances gives value to reducing CO_2 emissions and has formed a market with an asset value worth tens of billions of euros annually. Putting a price on carbon has been an achievement of global significance, through the linkages to emission credits generated under the Kyoto mechanisms.

Like for any market, the key to prices is scarcity, and the price depends on both the absolute quantity of allowances available and expectations about the future. The most fundamental difference of emissions trading from any normal market is that the amount available depends directly on government decisions about allocations; and expectations about the future are largely expectations about future emission targets.

The legal framework of the EU ETS does not specifically regulate how and where the trading of carbon assets (mainly EUAs) takes place. There are three basic trading platforms through which companies that have obligations under EU ETS can trade their EUAs: bilateral trading, commodity exchanges, and over-the-counter (OTC) brokers. Around one fourth of the total traded volume of EUAs in 2005, 100 Mt CO2, corresponding to € 1.8bn, was estimated to take place in the bilateral market (Point Carbon, 2006). At the moment, a majority of EUA trading takes place in exchanges or through wholesale or retail OTC brokers. The brokered and exchange market of EUAs in 2005 totaled to 262 Mt CO_2, corresponding to € 5.4bn (Point Carbon, 2006). Wholesale OTC brokers provide mainly EUA forward trading for companies and installations with defined contracts, established credit relationships with trading partners, and defined delivery dates. Retail OTC brokers, on the other hand, provide more customized transactions and flexible structures for buyers who seek to address their compliance shortfall (Capoor & Ambrosi, 2006). Over the last years, exchange platforms and auctions have increased their popularity over the OTC brokers. Exchanges simplify the transactions, reduce risks, and help make the trading prices more transparent (Capoor & Ambrosi, 2006). Currently six exchange platforms trade EUAs in the EU area. Of these exchanges, European Climate Exchange (ECX), Nord Pool, and Powernext have the biggest trading volumes, ECX having a share of 63 % of the traded volume (Point Carbon, 2006). Some of the exchanges also trade other commodities such as power (Nord Pool, Powernext), and several of the exchanges are preparing to trade CERs (Capoor & Ambrosi, 2006). In 2005, 79 % of the traded volume went through the OTC brokers, but the share of trading through exchanges was approaching 50 % already in 2006 (Point Carbon, 2006; Capoor & Ambrosi, 2006).

In terms of economic scale, the European emission trading scheme is the biggest such scheme in the world by an order of magnitude (see figure 1).

Figure 1. Shares of Volume (left) and Value (right) Transacted in the Carbon Market (2006 until September 30)



Source: The World Bank, 2006

Actual verified emissions in 2005 were two billion t CO_2 – more than 3% below what had been allocated to countries that year. While as a whole, the scheme was "long", six Member States (Greece, Austria, Ireland, Italy, Spain, UK) together were "short" by some 180 Mt CO_2. On a sectoral basis, the power and heat sector was the only one with a shortfall, of about 35 Mt CO_2 (Kettner et al., 2007). Preliminary verified 2006 emissions data suggested a long market for 2006 as well, although less so, since caps were slightly tighter, while 2006 emissions were slightly higher than in 2005. This overall surplus together with the no-banking rule (rendering EUAs-I worthless beyond compliance year 2007) led to a steady price decline for EUAs-I through 2006. The decline continued as power and heat installations finished hedging their positions for Phase I.

Given the experience of Phase I, it was expected that the constraints on Phase II emissions would be tight, including in those newer members of the EU who enjoy a comfortable position *vis-a-vis* their Kyoto targets.

Decisions so far taken on 19 NAPs set, on average, the annual cap at 5.8% below 2005 verified emissions (adjusted for changes in the Phase II perimeter or boundary). Together with a tighter constraint, the penalty for non-compliance will rise from €40 currently to €100, and this remains on top of the obligation to cover any shortfall in that period.

One of the major changes in design between Phase I and Phase II is the inclusion of banking – which will bring market continuity to the EU ETS and possibly encourage additional abatement by installations depending on their current situation and their anticipations of future carbon price. In addition, the scope of the EU ETS has been extended with the inclusion of further installations by Member States. Another significant evolution is the introduction of aviation into the scheme for intra EU-bound flights (from 2011) and for all flights leaving or landing in the EU (from 2012). This is expected to reduce up to 183 Mt CO_2 emissions per year by 2020 in the fast-growing sector.

In 2007, the EU ETS saw over one billion allowances changing hands (1.101 million representing a three-fold increase over 2005) for a financial value of US$24.4 billion or €18.7 billion (also up slightly more than three times from US$7.9 billion in 2005 or €6 billion). This despite a drop in average EUA prices (down 10% from US$24.70 in 2005, or €19, to US$22.10 in 2006, or €17).

EUA transactions were mainly struck over-the-counter (with the London Energy Brokers Association, or LEBA, accounting for more than half the volumes). Virtually every month over the past two years saw an increase, on average, in the number of trades over the previous months. A year that saw the geographical scope of the EU ETS widen to include new member states of the EU (i.e. Romania and Bulgaria), also saw an increase in the number and type of participants (beyond the utilities that were the early players) and more complex transactions occurring (including, for example, options on EUAs and swaps between EUAs and CERs).

The January 27, 2007 announcement by the EU Commission on energy and climate change provided greater clarity concerning the future of a climate regime beyond 2012. However, many features for Phase III of the EU ETS still need to be drawn up – especially in the light of the key recommendations from the review process of the scheme: harmonization across member States or sectors (new entrants and exiting installations, allocations to installations among others) and linking to other mandatory cape and trade schemes.

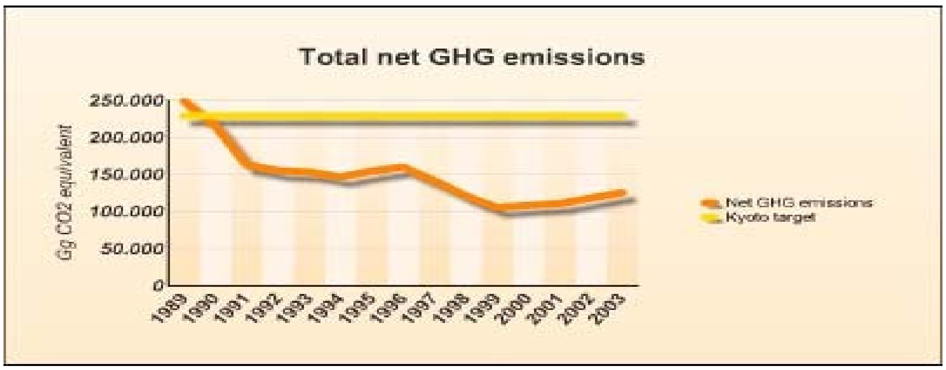
4. The climate change policy in Romania

Romania's current political outlook regarding climate change entails a pro-active approach, mainly shaped by the recent accession to the EU and the approximation of national policy to EU standards.

Important parts of Romania's commitment to reduce GHG emissions are already being implemented, such as the elaboration of the National Strategy on Climate Change (NSCC) adopted in 2005, and the action plan for the implementation of the strategy National Action Plan on Climate Change (NAPCC), also adopted in 2005, as well as the development of institutional capacity at the national level. Other provisions of the government program concerning climate change are under development, as is the Registry for Greenhouse Gases, updates of the GHG inventory, forecasts for future emissions, the development of new joint implementation (JI) projects, adaptation measures and others (Government program, 2005-2008).

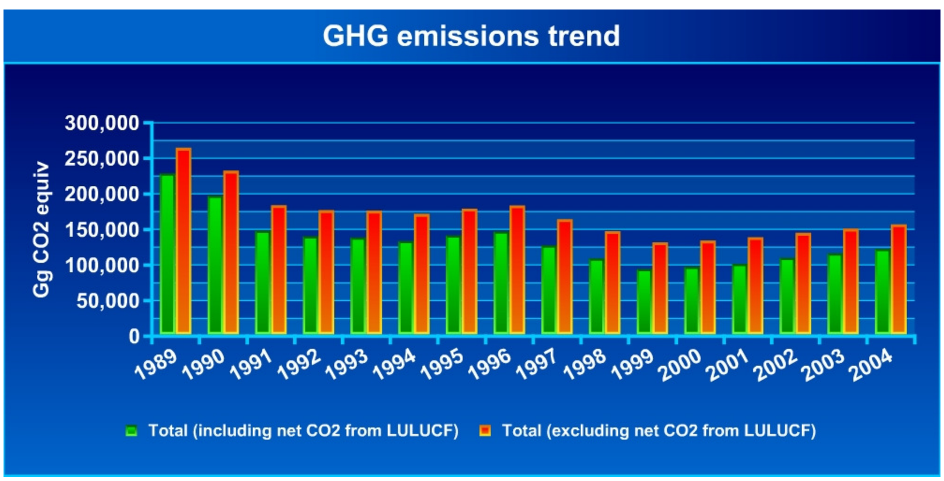
In accordance with the Kyoto Protocol, Romania has committed to reduce GHG emissions by 8 percent in the period 2008-2012 compared to the baseline year of 1989. Total GHG emissions decreased by 41 percent in the period 1989-2004, and net GHG emissions (taking into account CO_2 removals) decreased by 47 percent in the same period (see figures 2 and 3).

Figure 2. Total net GHG emissions in CO_2 equivalent in the period 1989-2002



Source: *National Inventory Report 2002*, Ministry of Environment and Water Management and National Research and Development Institute for Environmental Protection, 2004

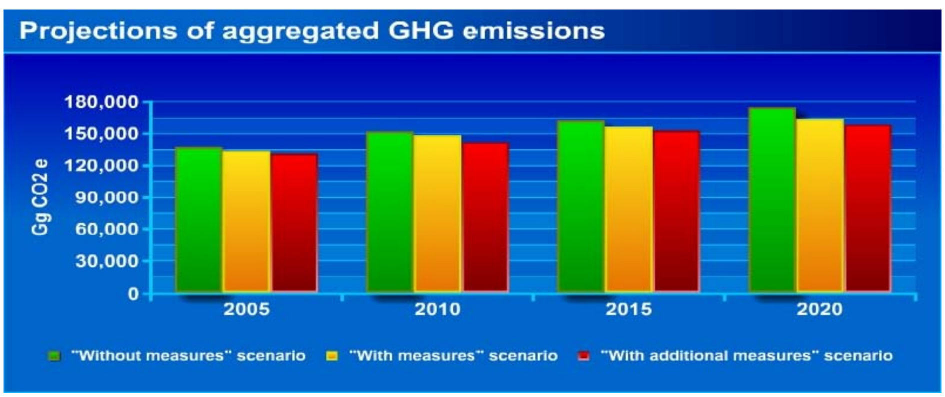
Figure 3. Trends in net aggregated GHG emissions



Source: *Romania — National Inventory Report 2006*

Projections for the period 2005-2020[1] show a great potential for Romania to reduce its GHG emissions. Three scenarios were used for calculating the projected GHG emmisisins, taking into account the macroeconomic and energy indicators for the period 1998-2020, together with the possible measures to reduce GHG emissions: without measures; with measures; and with additional measures (see figure 4).
The projections were based on calculations carried out using the Energy and Power Evaluation Program (ENPEP) developed by Argonne National Laboratory of the US Department of Energy (DOE) and distributed to Romania by the International Atomic Energy Agency (IAEA). The main models used are the Model for Analyses of Energy Demand (MAED), the Wiener Automatic Simulation Program (WASP), BALANCE and IMPACT.

Figure 4. Projection of aggregated greenhouse gas emissions in Romania



Source: *Romania – Report on Demonstrable Progress in Implementing the Kyoto Protocol 2005*

[1] *Romania – Report on Demonstrable Progress in Implementing the Kyoto Protocol 2005*, <www.mmediu.ro/dep_mediu/schimbari_climatice>

Macroeconomic and energy indicators for Romania for the period 1998-2020, together with possible measures for reducing GHG emissions, were used in order to estimate the projections of GHG emissions for the period 2005-2020. The starting point for the projections was the information included in the National GHG Inventory of Romania, submitted in 2003, and the provisional data for the 2004 submission.

Table 2. Projections of CO_2 removals (in Gg)

Year / **Scenario**	**1998**	**1999**	**2000**	**2001**	**2002**	**2005**	**2010**	**2015**	**2020**
Without measures	19,518.99	18,411.67	17,684.97	18,541.20	15,971.54	16,500	17,500	18,050	18,500
With measures	19,518.99	18,411.67	17,684.97	18,541.20	15,971.54	16,800	17,800	18,450	18,800
With additional measures	19,518.99	18,411.67	17,684.97	18,541.20	15,971.54	16,900	18,050	18,600	19,050

Source: *Romania – Report on Demonstrable Progress in Implementing the Kyoto Protocol 2005*

According to the provisions of Article 4.6 of the Framework Convention, and of the Fifth Session of the Conference of the Parties (COP), the baseline year for Romania for monitoring progress on climate change is 1989, which gives a figure of about 262,281.5 million tonnes of CO_2 equivalent. During the first commitment period (2008-2012), Romania will have to meet the 8 percent reduction level, meaning that no more than 241,000 tonnes of CO_2 equivalent can be released.

Romania has important reserves of AAUs for the period 2008-2012 that could be valuated through the Kyoto Protocol mechanisms as well as through the ETS. The trends for 2020 show an increase in emissions, but all three scenarios are considerably below the level of the baseline year (1989).

With respect to the EU ETS, Romania, as a recent EU member:

- transposed the EU Emission Trading Directive (2003/87/EC) as well as the Linking Directive (2004/1014/EC) by June 2006;
- established a national registry by September 2006, this being one of the eligibility criteria for participation in the implementation of the Kyoto Protocol's flexible mechanisms and in the EU ETS. The purpose of the registry is to ensure the accurate accounting of the issuing, holding, transfer, acquisition, cancellation and withdrawal of assigned amount units (AAUs), removal units (RMUs), emissions reduction units (ERUs), and certified emission reductions (CERs), as well as the carry-over of these units. Furthermore, the Kyoto Registry should be combined with the EU ETS Registry required by the EU ETS Directive, resulting in a unique national registry.
- Prepared and submitted national action plans (NAPs) I and II for (informal) EC approval by mid-2006, in order to allow the start of trade as of January 1, 2007 and to submit the second NAP (2008-2012) for approval as requested by the directive;

- adopted legislation on monitoring and reporting by mid 2006; and
- adopted accreditation procedures for verifiers and institutional arrangements for registration of accredited verifiers by mid-2006.[1]

The implementation of the EU ETS would allow a large number of Romanian companies in the energy sector and general industry to participate in European emissions trading. Where emission reductions are realised, the participating companies can create additional revenues by selling surplus allowances on the market.

5. Concluding remarks

Market failures are endemic to energy markets, and they are multiple. Energy policy is the design of a framework within which a number of different objectives can be met through markets, supported by appropriate instruments. For the last two decades of the twentieth century, these failures were largely masked by excess supply and low fossil-fuel prices. Since 2000, this context has gradually changed.

As we have outlined in this paper, Europe faces major security of supply and climate change challenges, and the myriad of current national energy policies as well as the underlying market structures are not fit for purpose. Europe requires major investment in its energy sector, after two decades of asset-sweating and cost reductions. This investment needs to meet not only the new realities of gas import dependency, particularly from Russia, but also the transformation from a high- to a low-carbon capital stock. To be fit for purpose requires a new European energy policy framework.

Energy policy in Europe – as elsewhere – has been chasing to catch up with the agenda of the 1980s and 1990s, and liberalization and fos-

[1] The National Strategy on Climate Change and National Action Plan on Climate Change.

tering competition have been the main instruments. The latest policy proposals (European Commission, 2007) are aimed at completing that agenda. However, the world has moved on, and while competition might have many benefits, it cannot alone solve the other market failures. Recent fears over Ukraine and Belarus, combined with growing alarm over climate change, have begun to shift this complacency.

Despite these challenges and the interdependency of Europe's energy market, remarkably after a decade and a half of trying to complete the internal energy market, Europe still consists of a set of national markets, many with national champions, connected together by a series of bilateral links. There is not yet much of a European market at all, and only the rudiments of a European electricity grid and pipeline network. This is reflected even in the EU Emissions Trading Scheme (EU ETS), which is very much national in its workings. This national, rather than European, physical structure of the market is reflected at the policy level too: almost all European countries have national energy policies, and indeed almost all are engaged in national energy policy reviews. In many of these cases, the European dimension has to date received scant attention. A national approach would not matter if the domain of the problems confronting energy markets remained national too. But a core characteristic of energy policy is that the objectives of security of supply and climate change are now, respectively, European and global. The former necessarily requires a European policy response, and the latter requires Europe to take the lead in gaining global agreement and reducing its own emissions. The other objective of the energy policy - competitiveness – is also better addressed at the European level through the economic efficiencies that arise from integrating energy markets and their networks.

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Ana BOBIRCĂ, Lecturer, PhD., Department of International Business and Economics, Academy of Economic Studies, Bucharest, Romania.

Paul-Gabriel MICLĂUŞ, Associate professor, PhD., Department of International Business and Economics, Academy of Economic Studies, Bucharest; Romanian National Securities and Exchange Commission.

Ştefan UNGUREANU, Assistant professor, PhD. candidate, Department of International Business and Economics, Academy of Economic Studies, Bucharest, Romania.