CONSIDERATIONS ON ROMANIA’S SUSTAINABLE ENERGY DEVELOPMENT

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Abstract: This analysis looks into the sustainability of the Romanian energy sector against the main trends in the world economy and within the framework of the energy and environment policies of the European Union (EU). The gloom and doom conclusion, that sustainable economic and social development is not possible in Romania under current circumstances, is due not so much to the financial crisis, as it is to the absence of significant economic development, numerous and compounded social problems, underfunding and delays in investments. Other problems such as the very big energy losses, “energy poverty” (very high in Romania), the lowest expenses for social protection in the whole of EU (just 1% of the GDP), dangerous practices such as that of political management of state owned energy enterprises (SOEs), as well as appointing persons without experience and with a low professional quality to management positions, or the dire situation of the urban and rural energy systems aggravate this state of affairs. Some of the constructive proposals include setting up a National Institute for Strategic Planning and a Ministry of Energy and Resources; merging the energy strategy with the environment one in a joint and coherent document; creating a national priority program for the energy rehabilitation of residential and public buildings and drafting a national policy for urban energy, cogeneration and district heating.

Keywords: sustainable development, energy, renewable energy source, greenhouse gas, energy efficiency, social protection.

1. GLOBAL RESTRICTIONS

The world has always been complex: countless factors (endogenous, exogenous, incidental or perennial) caused reactions, connections and influence, good or bad change in human evolution. Not to miss the conflicts, natural disasters, and climate changes. The complexity of the living world is the consequence of the evolutionary process-taking place under conditions far from equilibrium [1], where survival requires adaptation to new factors, the chance being the innovation and intelligence.

Threats of our world are multiple, interdependent, face human history, are started thousands of years ago and have been intensified in the last time, when there is a certain awareness of them. Here are some of the factors that threaten life on Earth, factors that originally were generated unconsciously by man, in his desire to meet the requirements of life, normal or exaggerated: excessive agriculture, which depleted the soil; threat to extinction of some species of animals, birds, fish, plants by altering their habitat; forest cutting for various causes; population growth increases continuously its pressure on the environment; industrial, transport, urban and rural facilities development with multiple environmental effects; growth and diversification of global energy consumption, with a constant pressure on primary energy resources, unevenly distributed; increasing difficulties regarding access to usable water; air, water, soil and subsoil pollution; increasing regional disparities between developed and developing countries, and social, between rich and poor; major climate change and global warming, specifically produced by greenhouse gases; increasing difficulties to access to food, healthcare and education in some regions of the world; social tensions, wars and terrorism development as brutal solutions to solve conflict situations produced by economic and social inequities, by religious differences [2].

Along with a special scale phenomena, such as the high rate at which the world's population continues to grow, and inevitably associated increase in energy consumption, decrease of mineral resources and the resulting reality of worrying deterioration of environment, accompanied by global warming, the contemporary society is facing a triad of very complex issues - economic and demographic growth, energy and resources consumption, environment conservation- in other words, the world is today facing an unprecedented trilemma [3].
Energy is a product with a high economic, social, political and strategic value. It is vital for the entire economy of a country, namely for industry, services and social activities. Lack of access to energy has large consequences, and the strategic and political role of energy was clearly revealed in the last 30-40 years in various oil crises, regional conflicts, which escalated into wars, serious power failures, social tensions or errors in the energy policy of a country.

As specific features of the energy sector one mentioned, in particular, four of them: first, it is characterized by a high inertia, with a time difference between the decision and the practical realization of the order of 4-15 years; second, alongside the transport sector, it is the main contributor to environmental pollution and climate change; third, it requires considerable investment, often very difficult to obtain; fourthly, it is absolutely necessary to have an adequate legal and institutional framework and an energy strategy in the medium and long term, together with national energy policies and tools of free economy [4].

2. SUSTAINABLE DEVELOPMENT AND ENERGY

If ecology and economic development were considered antagonistic some time ago, after the conference in Rio de Janeiro (1992), it was adopted as a key syntagma the sustainable development, based on possible complementarity of economic and ecological solutions for human development [5]. Economic development and protection of the natural environment can be compatible in the sustainable development concept reinforced by UN since the Brundtland Report (1987). Sustainable development is an evolving process, which aims to improve the economy, society and environmental conditions for the benefit of present and future generations [6]. This definition is more comprehensive than that offered by the Brundtland Report, and highlights the complexity of decisions facing legislators, governments and civil society as a whole and suggest measures to be taken to create a world in which one can live.

Sustainable development assumed by a country means meeting simultaneously the following objectives: • general social progress, while paying attention to the needs of every member of society in part; • effective protection of the environment, stopping and controlling the process of global warming and climate change; • ensuring a high and stable economic growth and hence employment work [7].

Evaluation of environmental issues in the last 30-35 years, registered a continuous deterioration of ambient conditions. Successively following steps were: first, one talked about environmental pollution, then the approach was that of greenhouse gas (GHG) emissions, particularly carbon dioxide (CO₂); further, one proved the existence of global warming, with the effects of climate change, so that in the last time to manifest a series of ecological disasters. Tackling the environmental problems during this time changed successively from environmental pollution, to the influence of greenhouse gas emissions, then to global warming, and further to climate change, so that lately to talk about ecological disasters [8].

At the same time, the general context and regulations have changed fundamentally. By 1990, the general concerns related almost exclusively to energy, then the energy-environment dichotomy occurs; nowadays the two major factors were reversed as environment-energy, so that in the coming decades the controlling factor will remain the environment, as shown in Figure 1. It was concluded that the Earth's temperature should not increase by more than 2°C compared to 1900, when the average Earth temperature was 14°C. Today, this value is about 15°C and is already a widespread concern to limit this growth. The main cause of global warming is represented by greenhouse gas emissions, especially CO₂, coming from energy sector and industrial activities.

![Fig. 1. Evolution of the overall framework and regulations in the relation of energy-environment.](image-url)
The economic costs of climate change and the economic benefits of resolute actions on time to control these changes were analyzed in the report of English economist Lord Nicholas Stern, published in October 2006 [9]. Global economic losses from climate disasters have doubled in the last 20 years, reaching 8.5 billion euros annually. The Stern Report estimates that without a further action to limit GHG emissions, damages caused by climate change could lead to a global reduction of GDP, between 5 and 20% per year. If not stopped, climate change may lead to damage of the economic and social activity at the end of this century, at a scale similar to the changes caused by the two world wars and the economic recession of the 1930s. In contrast, the benefits of prompt actions to reduce emissions far outweigh the costs, and operation on time is less expensive. If one starts now to stabilize GHG concentrations at a level that will not lead to dangerous consequences, the cost of these actions would be about 1% of GDP per year.

Sustainable energy development is that model of development which maximizes the long-term welfare of society, while maintaining a reasonable dynamic balance between security of supply, competitive energy services and environment protection in response to the challenges of the energy industry [10].

A sustainable energy policy instruments are: a) diversifying energy suppliers, including increased use of renewable energy sources; b) increasing energy efficiency or reducing energy losses; c) progress in reducing the impact of energy on the environment; d) achievement of strong and modern industrial structures, with cleaner and energy efficient technologies; e) improving the competitive environment and the functioning of the energy market.

Like any phenomenon or ecological, economic or social process, the sustainable energy development has a number of uncertainties that may be grouped into seven categories [7]: a) technological uncertainties: the technology itself, the links between technology and technological infrastructure, availability of alternative technological solutions; b) the uncertainty of resources: quantity and availability of energy, financial and, respectively, human resources; c) competitive uncertainty: the actions of present and future competitors, as well as the effects of these actions; d) the uncertainty of supply: on the timeliness, quality and price of supplies; e) uncertainty about consumers' preferences and characteristics relating to customers, as well as on the development of demand; f) political uncertainties: the blurring caused by, unevenness or lack of regulations, change of legislation or government behavior; g) uncertainty of the future: providing future is difficult, unforeseen events can play a very important role, even the best minds can err, and technological inventions can change any [11].

3. SUSTAINABLE ENERGY DEVELOPMENT POLICY OF THE EUROPEAN UNION

European Union, one of the industrialized areas of the world, is in economic competition with the countries of North America (U.S.A., Canada) and East Asian countries (Japan, South Korea, China). Energy is a major factor that determines the development of the EU and the economic competition. Major issues that are raised by energy in the EU concerns: the energy mix, primary energy supply security, environment protection pressure, oil price, functioning of the energy market.

The study of the European Commission (published in 2000 and completed in 2006) "Green Paper - Towards a European strategy for the security of energy supply" analyzes the current energy situation in the EU; later (2006) this was approved as EU energy strategy for 2030 [12].

EU energy policy [12] is based on the concept of sustainable development and defines three main objectives:

Durability: • development of competitive renewable energy sources and other sources and energy carriers with low carbon, particularly alternative transport fuels; • reduce energy demand in Europe; • global efforts to combat climate change and improve local air quality.

Competitiveness: • energy market opening must bring benefits to consumers and the economy as a whole, stimulating at the same time, investments in clean energy production and energy efficiency; • mitigate the impact of higher international energy prices on the economy and EU citizens; • maintaining EU leadership in energy technologies.

Security of supply: tackling the EU's rising dependence on imports by: • integrated approach, consisting in reducing demand, diversifying energy mix with greater use of competitive indigenous
and renewable sources of energy and diversifying sources and import supply routes; • create the 
incentive for appropriate investments to meet the growing demand for energy; • strengthening EU 
capabilities to deal with emergencies; • improving conditions for European companies seeking access 
to global resources; • guarantee all citizens and businesses access to energy.

In March 2007, the European Council approved the "Strategy for Integrated Energy and 
Climate Change", with the strategic objective to reduce by 20% emissions of greenhouse gases 
(especially CO₂) by 2020, compared to the reference of 1990, so as to limit the effect of global 
warming to 2°C in addition to the pre-industrial era temperatures (1900).

Using the package of binding energy-climate change directives in 2009, the EU adopted the 
following targets in the energy-environment field: a) reducing energy consumption through energy 
efficiency by 20% by 2020; b) increasing the share of renewable energy sources (RES) in gross EU 
energy consumption to 20% by 2020; c) increasing the share of electricity produced from RES in total 
consumption to 22% in 2010; d) increasing the share of biofuels in transport to 10% in 2020.

In the 20-20-20 targets of the EU legislative package, Romania has its specific objectives, 
including increased use of RES from 17.8% in 2005 to 24% by 2020, reducing greenhouse gas 
(GHG) emissions for sectors of large polluters by 21% and, in fairness between Member States, 
permission to increase GHG emissions by 19% for sectors of small emitters. It is estimated that the 
package 20-20-20 targets are very difficult even for EU developed countries and is, therefore, 
extremely difficult for a country like Romania, with an emerging economy.

In the context of the economic and financial crisis that began in 2007, it was concluded that the 
Lisbon Strategy, launched in March 2000, has not achieved the development objectives of the 
European Union; as a result, the Europe 2020 Strategy was proposed for the decade 2010-2020, with 
new ways of growth and maintaining the 20-20-20 targets on climate change and energy [13]. A 
number of new directives were issued (Package 3 Energy Directive, Energy Performance of Buildings 
and there are under preparation long-term programmatic documents (Power Outlook 2030, Roadmap 
2050, last document projecting an energy sector characterized by supply, competitiveness 
and decarbonisation, so reducing emissions by 80-95%). Recent events, in the summer of 2014, 
related to the political crisis between Ukraine and the Russian Federation seriously affected gas 
supply to EU countries.

It should be noted two very important elements: on the one hand, the EU’s main instrument in 
controlling climate change is the energy policy and, on the other hand, for perspective, the coming 
decades will surely be dominated by the challenges of developing an energy-efficient, low 
carbon, competitive, with a secure supply economy[15].

4. THE SITUATION OF THE ENERGY SECTOR IN ROMANIA

Romania has adopted a number of official statements and the fundamental concept of 
sustainable development, and as an EU Member State has obligations arising from the reflection in 
the national law and policy of the EU Integrated Strategy for energy and climate change, with the 
strategic objective to reduce emissions of greenhouse gases (especially CO₂). There are many 
opinions of experts that, largely, the Romanian energy sector is not sustainable and this is related, 
first, to the fact that the energy sector has not received due attention as a strategic infrastructure, that 
its development was a long period of time rather inertial, with delayed restructuring of the sector that 
began and was primarily done under the pressure of international organizations and financial 
institutions, and that today there are accumulated a large number of unresolved and unfavorable issues 
[4, 8, 14].

In 1990, the former State Planning Committee was abolished, thought to be a specific structure 
of central command planning, without being replaced by anything until now. An important cause of 
disordered development of the Romanian economy and society, a process that has deepened since 
2009 by an alarming economic and social decline, is the lack of such an institution with permanent 
activity. It was replaced, usually by ad hoc measures and proposals of political electoral programs of 
government, which, due to the alternation in power, had no continuity or significant practical relevance.

In 2007, the Government approved the National Energy Strategy for 2007-2020, an important 
document at the time of its occurrence, but producing no significant practical results, requiring today
urgently to develop a new national energy strategy, which takes into account, on the one hand, the new regulations of the EU Europe 2020 energy-climate change, and, on the other hand, the effects of severe economic and social crisis, which brought considerable damage to Romania, including managing the effects of the conflict between Ukraine and Russia.

Due to many other factors, economic and social development is not sustainable in Romania. This is due to the financial crisis and the absence of a significant economic growth, high external debt, numerous social problems, underfunding or postponing investments, and the large number of warnings from European Commission for late commitments in various fields, including energy and environment, reflects this.

Large energy losses are evaluated at 30-35% of energy consumption (industry 20-25%, buildings 40-50%, transport 35-40%). Energy efficiency and energy inefficiency expresses the distance to accepted international standards in end-use. Major sources of energy inefficiency or energy losses that occur in materials, equipment, construction, technologies are due to their low quality, but also due to the behavior of energy users. Energy intensity, expressed by the energy consumption per unit of GDP, is about 2.5 times higher than the EU average, our country being one of the most EU energy intensive countries. In Romania, both the consumer information and the education to energy savings are very low. In its simplest form, a consumer bill is the product of the unit price of energy and the amount of energy consumed. If there have been numerous disputes on energy prices, the concerns for reducing energy consumption were insignificant. Recent Energy Efficiency Law 121/2014 created the legal framework for reducing energy losses in our country.

Electricity market was gradually opened to competition since 2000, to complete opening on 1 July 2007, but it has been only partially effective and with transparent competition. There have been and there are still major contracts in the long term, especially with Hidroelectrica (producer of "cheap energy"), obtained preferentially with political support, which led to considerable profits undeserved, at the expense of the national interest in favor of private providers and interest groups. A significant market disruption was caused by unbalanced promotion of RES (wind, photovoltaic), accompanied by a big increase in electricity prices.

"Energy poverty", defined as the family income to cover a decent cost of household consumption of energy (electricity, heat, gas, transport), is very high in Romania. If for EU, this indicator is 18-20%, in Romania is over 40%, given the low monthly incomes of residents (16% have incomes above 2000 lei, 34% between 1000 and 2000 lei and 50 % are below 1000 lei).

Romania has the lowest expenditure on social protection in the EU, i.e. about 1% of GDP. In the past 24 years, social protection was done by lowering the price of energy and fuel, respectively by regulated prices. This policy used too long, harmed economic and financially energy suppliers. A correct decision, but with serious consequences, imposed by the IMF, World Bank and the European Commission was the liberalization of electricity and natural gas prices: the effect was that of a the high rise in energy prices, particularly gas, reducing energy consumption, i.e. the severe decline of affordable energy bills for disadvantaged consumers.

In recent years, political management of state owned energy enterprises has expanded, and also the appointment of leading people without experience and professional quality, low adverse consequences arising from this practice.

The urban energy is the most deficient energy subsector, while rural energy, affecting almost half of the population, is practically omitted in official documents. There are a number of over 80,600 multi-storied buildings, designed and built for centralized heat supply, with about 3 million apartments and 7 million residents, with large energy losses. Of these less than 5-6% are rehabilitated. In general, the centralized district heating systems (SACET) of localities have considerable difficulties: from 251 operators in 1989, today works about 80, most in insolvency or bankruptcy; it was officially encouraged individual heating of flats with natural gas and disconnections from centralized systems. District heating was based on heating fuel subsidies and social protection measures to tenants; abolishing subsidies few years ago increased heating bills by 30-50%. This subsector (assisted by four ministries and two regulators, but without any coordination and clear responsibility) followed an involution of demolition, contrary to EU policy, which urges promotion of energy efficient cogeneration and modernization of buildings, including public ones.

In the period of 2009-2012, energy regulators were deprived of autonomy and financial independence, being subordinate to the Government (ANRE, ANRSC, CNCAN) or abolished.
(ARCE, for energy efficiency), which has attracted severe warnings of the European Commission to address these failures.

In the above, it must still be mentioned: chronic underfunding of investments; still very high environmental impact of the energy sector, in particular as regards the compliance of coal fired power plants with environmental conditions; weaknesses in institutional and legislative framework, in particular as regards the stability and predictability; postponing an analysis and responsible decisions on further nuclear program; low capacity utilization of EU structural funds for energy and the environment; abuse, offenses and corruption in certain activities in the field of energy; research, development and innovation in the energy sector are unfunded, at a very low level as performance and having less numerous specialized and poorly remunerated personnel.

5. PROPOSALS FOR A SUSTAINABLE ENERGY DEVELOPMENT STRATEGY

In the field of sustainable energy development, the World Bank recommends adopting the following definition [16]: integrated energy strategy is a set of interrelated measures that directs energy sector by the efficient, equitable and environmentally compatible use of resources. The strategy requires decisions on both the production, transport and supply and on the energy consumption, the structure of institutions, laws and regulations, ownership, financing, availability of fuels (coal, oil, natural gas), use of renewable energy sources, availability of technologies, market structures of end users, price policy, social protection, standards, service levels, the impact on the environment, etc.

In Romania after 1989, the concept of strategy has trivialized and minimized in importance, meaning that each field has drawn relatively frequently, generally within the various governmental mandates, sectoral strategies, but never these sectoral strategies have was, on the one hand, pursued the practical realization and, on the other hand, what is more serious, assembled into a national economic and social strategy. As a result, the sectoral strategies did not have a common reference and correlation and did not produce noticeable effects.

For the purposes of the above, it is considered necessary the following [4, 14]:

• It is proposed to set up a "National Institute of Strategic Planning" as a non-political institution subordinated to the Romanian Parliament, whose main role will be developing proposals and pursuing economic and social development strategies of Romania, in connection with the carrying capacity of natural capital in the medium and long term, inter-sectoral coordination of programs and ensuring the coherence of government programs and those nationally, Community and internationally funded. The complexity and difficulties of the current and especially of the future period, a crucial one for the sustainable framing of Romania among the EU Member States, definitely requires the creation of a specialized entity for the national strategic planning, specific to free economy, able to find a balance between the national interests, mandatory EU high standards and global economic and financial obstacles of crisis that we still are facing.

• It is outlined again, that the utility of this institution depends directly on the quality and professionalism of the staff, the people being the main source of Romania's progress and opportunity. The lack of such an institution is likely to worsen the economic and social current situation of the country in which the energy-environment is of a vital importance, as strategic infrastructure.

• It is proposed to urgently establish the "Ministry of Energy and Resources", as a governmental institutional structure responsible for the elaboration of the national energy strategy, policies, instruments and mechanisms of primary energy resources, including renewable resources, import resources, production and efficient use of energy, energy impact on the environment, to ensure national energy security, sustainable energy development and affordability of energy costs.

In 1990, the former Ministry of Electricity has been abolished and all activities of the energy sector were introduced as departments or directorates-general in the Ministry of Economy and Resources (Industry etc.). Further, as a mode of representation in government, energy has not been a priority and was treated with low attention, with important economic and social consequences. Unlike energy sector, the sectors "Transports" and "Communication" were recognized as institutions representing infrastructure throughout the period after 1990, and entered as such in the Cabinet.
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Present major problems facing the energy sector (restructuring, large energy losses in the residential sector, transport and industry, heat supply to villages, market energy deficiencies, high energy environmental impact, lower investment sources, lack of qualified human resources and others) make it to be unsustainable today and this is largely due to the absence of an adequate institutional framework. It should be noted that the creation of the Department of Energy in the Ministry of Economy was regarded as a low-efficiency solution for strengthening the energy sector.

• It is recommended that the Government should unite the energy strategy with the environment one in a joint document, consistently oriented on the requirements of the EU package. Given the obvious fact that energy-environment areas are national priorities with no political color, the strategy must be approved as a law in Parliament, in order to be able to give more authority, stability and predictability and include a long-term support agreement, accepted by political parties. Since energy and environmental problems are found in all areas of activity, it is important to designate a single national coordination to monitor the achievement of the targets of the strategy.

• In recent years, greatly expanded the appointment to senior positions at agencies, authorities and national commissions, as in the state-owned companies in the energy sector, in the framework of algorithm after the general election, of persons representatives of political parties, without experience in the field and, most often, without proven managerial skills. This practice, in a very important sector for the Romanian economy and society, which is facing an intense processes of modernization under the European directives pressure, can only have serious negative consequences, amplifying the existing difficulties through the lack of experience and professionalism of those responsible.

Particular emphasis will be given to reducing the emissions of carbon dioxide and other greenhouse gases (target 20%). In this regard, the Government's actions will be focused towards diversifying the internal and external sources of natural gas supply used for high-performance energy solutions (combined steam-gas cycles, high efficiency cogeneration), ensuring the compliance with the environmental rules conditions for large and small emitters. A special significance is completing a pilot program for CO$_2$ capture and storage in Romania, that began at Rovinari thermal power plant.

• Large investment needs (of the order of 23 to 25 billion euro by 2020) will be covered mainly by private sector and public-private partnership by promoting a stable, attractive and predictable legal framework, through privatization or management or privatization of state energy companies.

• Increasing energy efficiency and reducing final energy consumption (target 20%) are a priority, especially in the new Energy Efficiency Directive 2012/27/EU, which fully meets all requirements of the energy-climate package, implemented in the Romanian legislation by Law 121/2014 on energy efficiency. Therefore, it is considered necessary to take the following measures: a) improving the regulatory framework; b) facilitating conditions of implementation of rigorous energy audits to all categories of consumers; c) solve the fundamental problem of urban congestion warming by reconsidering the advantages of cogeneration/trigeneration of high efficiency and centralized supply with heat/cold; d) establishment of the National Authority for Energy Efficiency as a better solution than the recently created Department for Energy Efficiency of the ANRE; e) promotion of voluntary agreements for energy efficiency in the industrial sector; f) removing difficulties in financing energy efficiency projects, including better use of EU funds.

• Achieving a national priority for energy rehabilitation of residential and public buildings, given that the building sector accounts for over 40% of final energy consumption nationwide. Financing the costs of thermal rehabilitation of buildings in an accelerated manner is a fundamental problem, providing a solution to involve the state to assist the low-income tenants. Under the new regulations, local authorities will have to finance from their own budgets the modernization of 3% per year of the area of public buildings.

• Promoting the use of renewable energy sources (RES) (target 20%) is a national compulsory objective for Romania, under Directive 2009/28/EC. RES cover three major sectors: electricity, heating/cooling and transport, relative to gross final energy consumption. In particular, Romania practically fulfilled the target to increase the use of RES from 17.8% (in 2005) to 24% (2020). A considerable indigenous reserve, virtually unused in the energy sector is the biomass, provided stopping the forest devastation in Romania. The biomass to be used in the process of heating with and without cogeneration, is an alternative to the use of natural gas.
• The condition of cogeneration and district heating in Romania is very critical and very close to a general economic and social collapse. Most existing combined heat and power plants are uneconomic, with lifetime exceeded, subsidized, with financial difficulties and do not qualify according to EU rules.

Romania must urgently develop a national policy in the field of urban energy, cogeneration and district heating. Because of the economic, social and environmental impact importance of this energy subsector it is necessary a unitary coordination of various central institutions and clarified the central and local responsibilities. Regulatory heat issues of ANRSC must return to ANRE for a unified and coherent policy. Promotion of high efficiency cogeneration is required by EU regulations. As solutions for modernization, the concession (with investments) of urban cogeneration and district heating systems and attracting private investments in construction of new plants for high efficiency cogeneration are recommended.

• It is necessary to strengthen the National Regulatory Authority for Energy (ANRE) in terms of autonomy, competence, financial and decision-making independence, professionalism and appointment of staff in accordance with the provisions of Directives 2009 of Energy Package 3. There are considered as justified measures aimed to: a) correct cogeneration regulations, regulated prices of electricity, heat and natural gas; b) control, transparency and ethics of energy market; c) regulate the use of binomial tariff for heat and gas; d) separation of establishing the energy costs from the social protection system, respectively from the social protection by energy prices.

• Further development of Romanian nuclear program is an alternative to reducing greenhouse gas (GHG) emissions and to increasing of fossil fuel prices. It should reconcile the achievement of units 3 and 4 at the Cernavodă nuclear power plant with EU requirements, primarily nuclear safety. It is necessary to ensure a firm-funding scheme, since the currently funding is still uncertain. An obligation of Romania is to ensure the autonomy and independence of the National Commission for Nuclear Activities Control (CNCAN), the regulatory authority in this area.

• The social protection system should be urgently reconsidered, given the major impact of energy bills on residential consumers. The current system is fragmented, dispersed, multiple grants were practiced, not addressed, especially, the poor. A number of measures are recommend, including: a) implementation of a uniform system of social protection for energy in order to improve affordability of energy costs, improving the affordability of energy costs for vulnerable consumers; b) a clear separation of competences and responsibilities of ANRE and the Ministry of Labor and Social Protection; c) developing a policy on the interaction of rates, poverty and energy use; d) determining how to take over the energy tariff increase as a result of higher gas prices, the development of renewable energy sources (RES) and take over in the energy cost of emissions of greenhouse gases, GHG (especially CO₂).

• It is considered necessary to create a national body to manage climate change-energy package in terms of reducing emissions of greenhouse gases (GHG) by trading schemes of ETS emissions (Emission Trading Scheme) for large and non-ETS polluters (for small emitters: construction, transport, agriculture, waste). Although GHG emissions result from practically the whole economy and all sectors of activity, there is no evidence and a unitary and efficient coordination. An important aspect is to internalize the cost of emissions from post-Kyoto big polluters (i.e. the effect of increasing the price of electricity from power plants by 2013, after the termination of the Kyoto Protocol).

• Research, development and innovation (RDI) in the world today have become a force of economic progress. Worldwide, RDI expenditures have doubled in the period 1996-2007, while in Romania they are underfunded (below 0.2% of GDP), our country being on one of the last places in the world.

Given the objectives of the Europe 2020 Strategy it is absolutely necessary to update national research, development and innovation and its inclusion in economic realities and in light of developments in Romania. CDI adequate funding must be provided at least 1% of GDP from national budget, plus 2% of GDP from private sector. The Sectoral energy strategy should be framed within the National strategy, open to all entities on objectives, aiming to motivate staff. Romania must frame RDI in the EU Strategic Energy Technologies Plan (SET-Plan), designed on six priority initiatives (wind, solar, bioenergy, CO₂ capture and storage, smart electric networks, sustainable nuclear fusion).
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CONSIDERAȚII ASUPRA DEZVOLTĂRII ENERGETICE DURABILE A ROMÂNIEI

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Rezumat: Lucrarea analizează sustenabilitatea sectorului energetic românesc în contextul principalelor tendințe ale economiei mondiale și în cadrul politicilor pentru energie și mediu ale Uniunii Europene (UE). Concluzia pesimistă, conform căreia dezvoltarea economică și energetică durabilă nu este sustenabilă în condițiile de astăzi din România, se datorează, nu atât crizei financiare, cât absenței unei dezvoltări economice semnificative, numeroaselor probleme sociale acumulate, subfinanțării și amânanții investițiilor. Alte probleme cum ar fi pierderile energetice foarte mari, “sărâiea energetică” foarte mare din România, cele mai mici cheltuieli pentru protecția socială din UE (doar 1% din PIB), practice periculoase prin consecințe ale managementului politic al întreprinderilor energetice de stat și numirea unor persoane de conducere fără experiență și cu o calitate profesională scăzută sau situația precară a energiei urbane și a celei rurale agravează această stare de fapt. Câteva dintre propunerile constructive prezentate includ înființarea unui Institut Național de Planificare Strategică și a Ministerului Energiei și Resurselor; unificarea strategiei energetică cu cea de mediu într-un document comun și coerent; realizarea unui program național prioritar de reabilitare energetică a clădirilor publice și rezidențiale; elaborarea de urgență a unei politici naționale în domeniul energiei urbane, al cogenerării și încălzirii centralizate.