

The Analysis of the Reaction of the Romanian Companies Supplying Electrical Energy to the Modification of the Geopolitical Context and of the Internal Legislative Frame

■

Vasile Robu

Ph.D. Professor

Elena Claudia Șerban

Ph.D. Senior Lecturer

Academy of Economic Studies, Bucharest

Marina Bădileanu

Ph.D. Professor

CEIS, Bucharest

***Abstract.** Supplying services in the electrical energy domain that corresponds qualitatively, at acceptable prices, in the context of the respect of the environment preservation standards and of the security of the supply, in accordance with the demands of the economic growth, represents a main component of the lasting development. In the 9th chapter of the 21st Agenda is stated that “energy is essential to the economic and social development and to a better quality of life”. At global level, given the current technological conditions and the permanent growth of the quantity of resources used, a large part of the energy is produced and consumed in an unsustainable manner. The necessity of controlling the greenhouse gas emissions and of other polluting substances imposes the increase of the efficiency of production, transportation, distribution and consumption of the energy and the growth of the use of renewable energy sources. All energy sources must be used in a manner that permits the respect of the environment on the whole. The operational research executed let us state that the defining elements of the geopolitical context influence the behaviour of the companies supplying electrical energy, which has an effect in any branch of the national economy. Such an approach is useful in the determination of the impact of the increase of electrical energy prices on the vulnerable sectors of the national economy.*

Key words: analysis; electrical energy; geopolitical context; market.

■

Energy, in general, and electrical energy, in particular, are essential to the economic and social development of any country, respectively to the growth of the quality of life. At global level it was noticed the unsustainable consumption of a large quantity of the produced energy, including electrical energy. More, the problem of the use of the energy sources with the respect of the environment in its ensemble appears often, practically eliminating the possible polluting sources. Given the role of the electrical

energy in the lasting development of an economy we considered useful to identify the characteristic elements of the geopolitical context that influence in a decisive manner the behaviour of the companies providing electrical energy, in order to, in an ulterior approach, be able to identify the possibilities of increasing the efficiency of the activities of these companies, this one being, in our opinion, the way to the sustainable consumption of the produced energy.

1. Defining elements of the geopolitical context that influence the behaviour of the companies supplying electrical energy as a public utility service

The undertaken research led us to the opinion that the behaviour of the companies supplying electrical energy is clearly influenced by the defining elements of the geopolitical context, such as the degree of energetic security, the degree of energy efficiency, the degree of promotion of the renewable resources, the way of functioning of the energy markets, the competitiveness in the energy field and the new technologies, the restrictions concerning the protection of the environment, the features of the social frame in which the company activates, with an accent on the degree of accessibility of the consumers to the energy services.

The degree of energetic security of a nation constitutes one of the elements with a direct impact on the behaviour of the companies supplying electrical energy. It depends on the degree of diversification of the offer in the electrical energy field, respectively on the security of the distribution networks.

The situation of the electrical energy supplying in the countries members of the European Union is characterized by:

- The increase of the energetic dependence of external energy resources. Taking into consideration the present prognosis, in about 20-30 years the dependence of the EU Member States on importation in the domain of electrical energy will reach 70% (90% for oil, 80% for gas and almost 100% for coal). Even more, the acceptance of new members in the European Union emphasizes the energetic dependence, because the new entered countries will increase the imports in the domain of natural gas (to almost 90% of the present demand), but also in the domain of oil (to almost 94% of the present demand) and they will transform from countries exporting coal, as they are presently, into importing countries of about 12% of the coal necessary in the perspective of the years 2020, given the reorganization of this sector;
- The highly limited capacity of these states to influence the conditions of the energy offer and to answer to the challenge of the climatic change.

The energetic dependence will have different effects on the EU members varying with the degree of economic development and political stability. So, the more emphasized the degree of dependence of a country is, the more the energy offer will be more instable, which will generate an accentuated growth of the electrical energy prices with disastrously effects on the living level and on the territorial economic development. Moreover, the prices of the energetic resources, with a direct impact on the

electrical energy prices, also depend on the extent in which these resources, presently the oil, the natural gas, the nuclear energy and the coal, benefit of an international market.

The future of the electrical energy production depends more and more on these resources, especially on natural gas, the consumption of these being less polluting, so, at a global level, for 2025 it was predicted the doubling of the consumption of natural gas for the production of electrical energy (especially in the countries where the dependence on hydro-energy has created problems due to the large periods of drought). The respective previsions took also into consideration the statistics of the period 1970-2001, according to which the consumption of electrical energy based on natural gas grew annually with 6,9%, occupying the second place from the evolution's point of view, after the evolution of the consumption of electricity based on nuclear energy, which, during the same period, registered a growth rate of 17,5%.

Nuclear energy is another option for the production of electrical energy, but an expensive option in comparison with natural gas or coal, especially because of the restrictions in the domain of the plants' security and of the storage of the radioactive wastage, since the production method and the explored material (uranium) are extremely harmful to the environment. Despite all these, 19 countries insure at least 20% of the electricity necessary using nuclear sources. The global previsions for 2025 in the electrical energy field show a growth of the global nuclear capacity to 385 GW, against 353 GW in 2001, the capacity supplements taking place especially in Asia as it seems (China, India, Japan and South Korea). The European Union has a 95% degree of dependence on the uranium importations, nuclear energy in this area levelling about 23% of the installed capacity of electrical energy production. Nevertheless AIE (Energy Outlook 2004) forecasts a decrease of the weight of nuclear energy in the global electricity offer from 16% in 2001 to 12% in 2025, by taking out of use the groups finding themselves at the end of the normal life period without installing new capacities, given the environment pollution degree that such a capacity implies.

Renewable energy resources contribute to the strengthening of the energetic independence, due to the growth of the offer in the domain. Renewable resources may become in perspective the key to the solution of the problem of the access to the electricity and heating in rural areas, also taking into account the fact that these resources are less polluting, being considered "ecological" resources. In the perspective of year 2025, the global consumption of hydro-energy and of other renewable resources will register a moderate growth. Most of the renewable energy sources will not be able to compete, economically, with fossil fuels, at least for a medium period of time. AIE forecasts for 2025

a growth of 57% of the consumption of electricity produced from renewable resources. In the European Union it was established, by the Directive regarding the promotion of electricity from renewable energy sources on the internal electricity market (2001/77/EC), a goal of 22.1% of the gross consumption of electricity of the 15 member states at that time for the electricity resulting of renewable sources.

The degree of energy efficiency represents another element that influences the behaviour of companies providing electrical energy. The more the energy production increases reported to the quantity of primary energetic resources consumed, the more the companies activating in this domain will reduce the investments necessary in the energetic infrastructure and the expenses for the growth of the competitiveness of their economic activities. Presently, the measures for the increase of the degree of energy efficiency didn't lead to the valorisation of the economic potential of energy preservation not even in the market economies, because the specific markets do not function yet perfectly, and in front of the measures for the growth of the energy efficiency there are barriers such as:

- The lack of information in the domain of knowledge and procedures;
- The lack of the capital necessary to the accomplishment of the investments, respectively to the financing possibilities, especially because of the uncertainty related to the investments' efficiency determined by the extremely high costs in the field of the implementation of new electrical energy production technologies, but also by the high transaction costs for the end product;
- The consumers' behaviour, the habits, the inertia.

According to the statistics in the domain, presently more than 60% of the primary energy obtained is lost during different stages of its transformation and of its use and more than 60% of this loss takes place in the stage of the final consumption. So the electrical energy production technologies are not responsible for the waist in the domain, they are even advanced and capable of catching a large part of the entire economic potential of energy preservation.

The same statistics show that, presently, AIE countries use with 45% less energy to create a GDP unit (Gross Domestic Product), which reveals the growth of the energy efficiency degree of these countries (the growth of the energetic intensity) and, indirectly, the development of the technological level in the electrical energy production domain. The situation was possible because of the structural changes of the economies of these countries, by the reduction of the importance of the energy-intensive sector in the economy, but also due to the change of the consumers' behaviour, further to better information in the domain and to the state's intervention in the field by

establishing norms, quality standards and financial arrangements.

The EU objective concerning the intensity of the final consumption of energy is its annual reduction by 1% starting with 1998. The European directive regarding the energy efficiency of the final consumption and of the energetic services (COM (2003) 739) establishes for the years 2006-2012 the annual saving of 1% of the entire provided energy. All these because, according to the previsions, the growth of the energy efficiency rate with 1% would mean the valorisation of two thirds of the available economy potential until 2010, which will mean the avoidance of 200 million tons of CO₂ emissions. Romania must also become a part of this objective and as a member of the EU Romania must respect its strategy in the energetic field and align to any legislative stipulations in the domain at the Union's level. So, from the year 2000, at the level of the European Union two legislative acts have been adopted that have been laid at the foundation at the Union's strategy regarding the energy efficiency, strategy comprised in:

- The Action Plan for Energy efficiency;
- The European Climate Change Programme.

The European Commission has also adopted in the energetic field, on 22 June 2005, the Green Paper on Energy Efficiency (Doing more with less), whose objective is to realize energy savings equivalent to 20% of the Union's actual consumption, by a number of multi-annual programs among which there is "Intelligent Energy for Europe" (2003-2006) and which suggests a series of actions meant to contribute to the increase of the energy efficiency, such as:

- The elaboration of annual action plans by which it would become easy to identify the measures that have to be taken at national, regional and local level. The action plans may be completed with comparative analysis at European level in order to insure a fast dissemination of the best examples at the Union's level;
- The insurance of a good information of the citizens by advertising campaigns and a better labelling of products;
- The improvement of the taxes' system in order to respect the principle "the contaminator pays", without increasing the general level of the taxes;
- The improvement of the administration of the state aid for the stimulation of efficient energy use;
- The creation of new technologies for the energy preservation;
- The use of new or improved financing instruments at the Union's level, but also at national level, in order to offer stimulants (not aids) to the firms and households;
- The focusing of the attention on the improvement of the buildings' isolation.

The European Commission's decision in the energy field supports the Union's efforts for lasting development. Also in this purpose, the European Commission decided to constitute the European Sustainable Energy Forum, by the model of those in Florence and Madrid – successful examples in the accomplishment of the consensus on the liberalization of the energy market. The forum, which will put together the European Commission, the member states, the European Parliament, the national agencies for regulation, the representatives of the energy industry and NGO, will outline, in 2006, a concrete action plan in the domain.

The energy markets reform aimed especially the transfer of the taking the decisions process from the state to the private companies and to the consumers, the gradual substitution of regulated monopolies with open and competitive markets. The countries which have passed to the reform of the energy sector benefit from a more dynamic and more transparent industry, from an accelerated technological development and an entrepreneurial approach of energy exploration, production and distribution activities. The reform of the energy markets allows their efficient functioning with lower costs. It isn't less true that the involvement of the state is still necessary for various reasons: the long-term uncertainties, the fact that the markets don't always take into consideration the ecological and social objectives (including those of the security of the exploitation and the health of the population), the character of natural monopoly of the natural gas and electricity transportation, the global nature of some problems such as the climate change. It happens that the market's prices do not reflect the integrated ecological and social costs, disorienting the consumers' choices. The correction of the market's signals in order to encourage the rational use of energy – including by the reduction of the consumption and the change of its structure in favor of ecological goods and services – can be realized by a large scale of economic instruments such as taxes or the commercial pre-requisites.

The liberalization of the energy markets in Europe contributed a lot to the reduction of the market's prices for the consumers and exposed a large part of the energy providing chain to the pressure of the competition. Moreover, the liberalization process influences directly the energy security level and the prices' variability on medium and long-term. On a liberalized energy market, there must be a mechanism of stimulation of the investment projects which take into account the long-term priorities determined by the imperatives of the energy security treated at national level, but also at the level of the European Union.

On the 1st of July 2004, the new Directives of the European Union concerning the Gas and the Electricity became valid and they opened the way to the complete

and coordinated opening of the energy markets in Europe. In what concerns the electrical energy, *The Directive of the Electricity* and the other trans-border regulations that find themselves at the foundation of the *Single European Market* impose common rules regarding the access to the networks, the structure of the energetic companies, their obligations in the public utilities domain, the harmonization of the tariffs. In these conditions, the success of the integration of the energy markets depends on the ability of the decision factors in the elaboration of energy policies and the regulative-legislative frame, on the capability of the actors on the market to anticipate the new challenges that will stay in their way and on their commitment to cooperate for the accomplishment of an single market.

The model of the liberalization of the energy market of the Union is an unprecedented global experience which imposes finding the answers to problems such as maintaining the reliability of the electrical energy providing services in a competitive environment, the methods by which the electricity market can become attractive and profitable enough in order to bring sufficient investments in the energy production capacities, the ways by which the tradition of quality public services can be maintained, the possibilities which can provide the concordance between the environment preservation policies and the appropriate functioning of the single energy market, the possibilities of the companies providing electrical energy to remain powerful and profitable in higher risk conditions.

The Directive of the European Union no. 92/1996 established for the member states and for the candidates the obligation to create the mechanisms of the competitive market for the activities of energy production and supply, respectively the possibility of the consumers (who respect the eligibility criteria) to change their supplier.

The competitiveness and the new technologies represent other defining elements of the electrical energy supplier behaviour. The World Economic Forum, in its report regarding the global competitiveness (*Global Competitiveness Report*), uses two main competitiveness evaluation indicators: the growth competitiveness index and the current competitiveness index (WEF, 2002). The first indicator takes into account variables such as *innovation* (the technological sophistication degree, the engagement in the superior education, the expenses for research-development etc.), *the information and communication technology* (Internet access in schools, the number of Internet users, the competition's quality in the communications' sector etc.), *the corruption level*, *the legislative and contractual frame* (the favouritism promoted by the decisional factors, the independence of the justice, the rights of property, the organized crime) and *the macroeconomic environment* (the budgetary surplus/deficit, the real exchange rate, the access to credits). The indicator of the present

competitiveness takes into account variables such as *the complexity of the companies operations and strategies* (the innovation capacity, the products design oneness, the production processes complexity) and *the business environment quality* (the development stage of the industrial or company chains, the level of collaboration for products and processes, the level of the state's subventions).

The United Nations Industrial Development Organization proposes, in addition to all the above, the classification of national economics by the competitive industrial performance index – IPI, which informed of four primary industrial performance index: (a) *the added value in the processing industry, per capital (VA)*; (b) *the exportation of processed products per capital* (the quantificational the export catches, among others, the capacity of national industry to follow the technological changes, at least for the exported products); (c) *the weight of medium an high technological activities in the VA* (the bigger the weight of medium and high technological activities in the VA is, the more technological complex the industrial structure of a country is and the more competitive the industry is); (d) *the weight of the medium and high technological activities in the exports*. The analysis of the technological structure of the exports may reveal the industrial structures that lay at the grounds of competitiveness at an international level. During the last 10 years, the highest growth rate of exportations was registered for the products based on science.

The classification of countries by the industrial performances indicator shows that, among the countries with an economy in transition, the leaders are the Czech Republic, Hungary and Slovenia. Hungary has improved its position by 7 places, while the positions of Romania and Poland have deteriorated (table 1).

The classification of countries by the industrial performances indicator

Table 1

| Classification | | Country | The indicator value | |
|----------------|------|----------------|---------------------|-------|
| 1998 | 1985 | | 1998 | 1985 |
| 1 | 6 | Singapore | 0.883 | 0.587 |
| 2 | 1 | Switzerland | 0.751 | 0.808 |
| 3 | 15 | Ireland | 0.739 | 0.379 |
| 4 | 2 | Japan | 0.696 | 0.725 |
| 5 | 3 | Germany | 0.632 | 0.635 |
| 6 | 5 | USA | 0.564 | 0.599 |
| 7 | 4 | Sweden | 0.562 | 0.633 |
| 8 | 7 | Finland | 0.538 | 0.494 |
| 9 | 8 | Belgium | 0.495 | 0.489 |
| 10 | 12 | Great Britain | 0.473 | 0.426 |
| 24 | - | Czech Republic | 0.243 | |
| 27 | 34 | Hungary | 0.239 | 0.088 |
| 28 | - | Slovenia | 0.221 | |
| 34 | 25 | Poland | 0.143 | 0.176 |
| 41 | 37 | Romania | 0.095 | 0.072 |

Source: United Nations Industrial Development Organization (UNIDO), *Industrial development report 2002/2003, Competing through innovation and learning*, Vienna, 2002.

In 2005, with the Report Industrial Development, UNIDO completes the IPI structure with another two indicators: *the weight of the processing industry in the GDP and the weight of the processing industry in the total exports*. A new indicator resulted composed of six primary indicators – index of industrial and technological advancement – ITA. So, ITA has two large components: the industrial advancement and the technological advancement.

The durability supposes that the energy offer must be diverse, without CO₂ emissions and the energetic intensity of the economies must be as reduced as possible. In consequence, the most attractive technological domain is that of technologies with zero emissions. That is why, we can say that the present determinant for technical advancement in the electrical energy production field is *the preservation of the environment* the administration of interactions between the public utilities supply services (especially of the energetic ones) and the environment remains one of the most important challenges that is now in front of the decision factors. The production, the transportation, the use of energy affects the environment from the primary energy resources extraction phase to the one final consumption. The dimension of the impact on the environment varies significantly in function the recognition and combat degree of the ecological risks by regulation actions or by the price structure. The fossils fuels burn is responsible for about fifth of the anthropical CO₂ emissions. The energy sector contributes, also, to the methane and azoth oxide emissions by the activities of extraction and transportation of coal, natural gas and oil and to the problems connected to waist management, especially of the radioactive ones.

The European Commission in the domain starts from the premise that between economic growth and the maintenance of an acceptable level of the environment quality there is no inner contradiction, thus the integration measures of economic and environment policies should reduce the pollution and improve the economy functioning performances in the same time. In its report to the European Council and Parliament, the European Commission pleads for a number of solutions of improvement of the environmental products and services markets functioning such as the right establishment of environmental goods prices, the definition of the property rights for environmental goods and services so that these could be applied by law and commercialized, the determination of a price to pay (under the form of a tax) for pollution, the establishment of a reimbursable guarantees system in order to encourage recycling, the subvention of goods and services that generate positive ecological effects, the negotiation of specific agreements with the industry, the intensification of information supply about ecological features of goods and services.

The social frame and the accessibility of energy services represent an important aspect regarding the behaviour of an electrical energy supply company, as a public utility service. The capacity of a nation to identify the role of the energy in the lasting development, respectively in the improvement of the problems occurred due to poverty, will determine that at national level there must be programs allowing an easier access to the energy services.

2. The impact in Romania of the geopolitical context defining elements that influence the behaviour of the electrical energy supply companies

Romania has a high degree of energy security, in the perspective of years 2015-2020, only about 15% of the electrical energy necessary being dependent on gas and oil importation, the rest of the electrical energy being nuclear or coal based. So, Romania has the necessary uranium sources for the functioning of the group 1 of the Cernavoda nuclear-electrical plant for until 2036, respectively for the functioning during 40 years for the group 2. In what concerns the coal in our country, the lignite production satisfies the electric plants internal demand. For pit, on the contrary, thermo-centrals resort to importation. In the perspective of year 2015, coal weight in the electrical energy production will grow to almost 45% (lignite about 35% and pit – 10%), growth due to the competitiveness of the coal centrals in comparison with those based on hydrocarbons.

In what concerns the oil, In Romania, in 2004 were imported 7,312 thousands tip of oil, respectively 1825 thousands of oil products. In the same year, the thermo-electrical energy production based on this type of resource levels 5.4% (in against 8.4% in the precedent year) of the

production total. The future oil pipeline Constanta – Trieste will have a 60 million oil tons capacity, against the initial plans that indicated a level of only 5-10 millions of tons. Among the factors that have determined the modification of the strategically options concerning the oil pipeline there are the development of the oil production in the Caspian sea area, the reduction of the oil reserves in the North sea, the growth of the oil price at international level and the increase of the consumption on the markets in China and USA. The oil pipeline, about 1,360 km long, will be called the Pan European oil pipeline.

Romania's national strategy in the energy efficiency domain establishes a reduction, by the end of year 2015, by 50% of energetic intensity (optimistically script), by 40% (moderate script) and by 30% (pessimistically script), in the conditions of an estimated dynamic of the GDP of 5.4% for the period 2003-2015.

As most of the countries in Eastern Europe, in Romania the energetic efficiency suffers from the existing disequilibrium between the high conservation potential, and the insufficient allocated resources. Romania must learn from the example of some former communist states, like Hungary, Slovakia, Slovenia, that have registered remarkable results in the domain. So, Hungary integrated the energy saving problem in the medium-term economic development plan (the Szechenyi plan, 1999). In 2002 the Slovakian government, with the support of the World Bank, elaborated an action plan for the 2002-2012 period that established a substantial financial aid from the state for energetic efficiency programs and institutions. Slovenia has adopted in 1996 a program meant to improve the energy efficiency, the Energy Efficiency Agency benefiting of 5.3 million euros (in 2003) financial aid from the state.

The evolution of energetic intensity in different countries of the world, for the 1994-2004 period
(kgep/1000 euro)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| EU(25) | 231.3 | 230.4 | 235.0 | 227.6 | 224.2 | 214.9 | 208.8 | 209.7 | 206.5 | 207.6 | 204.9 |
| EU (15) | 206.1 | 205.4 | 209.4 | 202.7 | 201.0 | 195.7 | 190.5 | 191.4 | 188.4 | 189.5 | 187.5 |
| Germany | 177.2 | 175.2 | 179.2 | 174.2 | 170.2 | 163.9 | 159.7 | 162.5 | 158.7 | 161.0 | 158.8 |
| France | 196.7 | 199.7 | 209.3 | 198.6 | 197.7 | 191.0 | 186.6 | 188.3 | 186.1 | 188.5 | 185.5 |
| Italy | 187.3 | 192.4 | 190.1 | 189.0 | 191.4 | 190.9 | 186.9 | 184.0 | 184.1 | 189.2 | 189.1 |
| Hungary | 730.6 | 740.6 | 747.5 | 700.5 | 661.9 | 642.0 | 600.5 | 588.6 | 579.6 | 566.6 | 534.1 |
| Poland | 1064.8 | 962.8 | 972.9 | 878.5 | 792.3 | 730.2 | 680.2 | 673.5 | 654.2 | 623.1 | 586.6 |
| Sweden | 272.4 | 265.5 | 268.4 | 255.4 | 248.5 | 238.2 | 215.0 | 228.9 | 224.3 | 217.1 | 217.5 |
| Bulgaria | 2192.1 | 2326.0 | 2543.8 | 2392.2 | 2250.7 | 1986.6 | 1931.1 | 1930.0 | 1804.3 | 1769.2 | 1628.2 |
| Romania | 1724.3 | 1738.3 | 1793.3 | 1717.1 | 1638.3 | 1481.5 | 1457.2 | 1368.6 | 1316.5 | 1353.7 | 1227.0 |

Table 2

Source: EUROSTAT, www.europa.eu.int/comm/eurostat/

Analyzing the data from Table 2, we notice the very good position of our country from the energy intensity point of view, in report with the European Union, but also

with the other member states. In 2004 Romania's intensity was still six times bigger than in the EU (25), even if the difference reduced each year beginning with 1996.

The situation changes radically, but in what concerns the final consumption per inhabitant, so that in 2004 a

citizen of the European Union consumers twice more energy than a Romanian one (Table 3).

The evolution of the energy final consumption in the household sector per inhabitant, in different countries, for the period 1994-2004 (kgep/inhab.)

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| EU-25 | 602.4 | 607.6 | 652.0 | 627.4 | 622.9 | 616.1 | 625.5 | 659.0 | 637.3 | 658.4 | 656.0 |
| EU-15 | 610.5 | 616.7 | 667.9 | 642.4 | 645.3 | 637.5 | 655.3 | 686.4 | 663.0 | 685.5 | 685.0 |
| Germany | 753.5 | 772.6 | 839.5 | 834.0 | 816.5 | 765.3 | 879.5 | 933.5 | 896.4 | 931.8 | 933.2 |
| France | 622.0 | 608.4 | 671.0 | 631.3 | 646.6 | 659.0 | 635.3 | 679.8 | 630.3 | 667.5 | 675.4 |
| Italy | 431.7 | 469.2 | 479.6 | 466.8 | 489.5 | 518.1 | 497.7 | 519.6 | 497.5 | 519.6 | 519.1 |
| Hungary | 544.4 | 563.1 | 566.4 | 530.3 | 504.5 | 522.4 | 516.5 | 538.6 | 582.5 | 650.4 | 593.3 |
| Poland | 624.2 | 603.5 | 593.0 | 571.6 | 511.8 | 513.0 | 453.2 | 502.4 | 473.3 | 462.3 | 456.2 |
| Sweden | 951.2 | 911.0 | 961.8 | 930.0 | 923.3 | 867.5 | 851.1 | 844.2 | 853.3 | 777.8 | 795.5 |
| Bulgaria | 261.4 | 267.8 | 302.8 | 271.7 | 290.3 | 267.7 | 264.3 | 254.1 | 275.0 | 289.5 | 269.7 |
| Romania | 281.3 | 279.7 | 357.8 | 427.2 | 422.8 | 388.8 | 375.2 | 324.7 | 330.6 | 359.3 | 367.1 |

Source: EUROSTAT data processing.

In Romania the weight of electrical energy produced of *renewable sources* is provisioned to 33% of the gross national electricity consumption, for the same year, 2010. Romania has a technical hydro-energetically potential of 40,000 GWh/year (of which about 50% is already exploited) and an adjustable economic hydro-energetic potential of 23,000 GWh/year. In a medium hydrological year in Romania 16,080 GWh can be produced. Another renewable resource category is the aeolian energy, which for the developing countries represents a solution for rural areas, that can't be connected to the existent electricity networks. According to the evaluation and registered data, the temperate-continental climate of Romania and the variety of the landscapes determines the possibility of aeolian installations emplacement with a total power up to 14,000 MW, which would mass an electrical energy contribution of about 23,000 GWh/year, but because of the financial impossibility of Romania to acquire the technologies and the equipments appropriated for the aeolian energy exploitation in *The valorisation of renewable energy sources strategy* is mentioned that "in Romania, the weight of aeolian electrical energy in the energetic balance remains for now under the real possibilities of its efficient valorisation". In what concerns the solar energy potential of Romania, it levels up to 1,100 KWh/m²/year, the contribution of solar systems to the electrical energy production by photovalvic systems being of about 1,200 GWh/year. The necessary investments for the realization of photovalvic systems in a solar modules network decreased gradually during the last years; they were realized mostly in a differentiated functioning regime in the frame of research – development – demonstration programs for the alimentation of isolated consumers (individual households, social-cultural centres in the Apuseni Mountains, the Black Sea coast, the Danube Delta etc.), for

radio-telecommunication stations, for water pumping installations, public lightening or traffic signalization, all these registered as objectives in the rural electrification program; systems connected to the electrical network (photovalvic pilot stations with mobile panels, integrated immobile system etc.).

In the frame of the *electrical energy market* in Romania, the transaction of electrical energy developed until now on two market segments: the regulated market and the competitive market. According to the secondary legislation, the electrical energy market is competitive at the level of electrical energy producers and suppliers, and the transportation and distribution activities, considered as a natural monopole, are entirely regulated with the respect of the principle of insurance by the network operators of the obligatory public service of connection, transportation and distribution of the electrical energy for the license owners. Beginning with the first of July 2005, the electrical energy market functioning regulations are established by the Commercial Code of the wholesale electrical energy market approved by ANRE. The transaction of electrical energy between economic agents takes place on the following markets:

- the market of bilateral contracts, regulated (negotiated);
- the next day market – PZV, which is a voluntary market, on which the energy is sold one day before the delivery, by selling buying offers;
- the equalization market, which is an obligatory market, where equilibrated energy offers or mode (increase decrease of power/, the producers.

For the first time, in 2002, Romania was included in the International Economic Forum Report. Concerning the competitiveness growth potential, Romania was placed, in 2001, on the 56th place and by the current *competitiveness* indicator on the 61st place.

The classification of countries by competitiveness growth potential and the current competitiveness index

Table 4

| Country | Countries rank by competitiveness index | Country | Countries rank by current competitiveness index |
|----------------|---|----------------|---|
| Finland | 1 | Finland | 1 |
| USA | 2 | USA | 2 |
| Canada | 3 | Netherlands | 3 |
| Singapore | 4 | Germany | 4 |
| Australia | 5 | Switzerland | 5 |
| Norway | 6 | Sweden | 6 |
| Taiwan | 7 | Great Britain | 7 |
| Netherlands | 8 | Denmark | 8 |
| Sweden | 9 | Australia | 9 |
| New Zealand | 10 | Singapore | 10 |
| Hungary | 28 | Hungary | 26 |
| Slovenia | 31 | Slovenia | 32 |
| Czech Republic | 37 | Czech Republic | 35 |
| Slovakia | 40 | Slovakia | 39 |
| Poland | 41 | Poland | 41 |
| Romania | 56 | Romania | 61 |
| Bulgaria | 59 | Bulgaria | 68 |

Source: World Economic Forum, Global Competitiveness Report, 2002.

In Romania, in 2002, the weight of medium and high technology activities in the added value decreased to 27.4%, against 43.5% in 1990. Also, the weight of the same activities in exportations decreased from 39.4% in 1990, to 31.5% in 2002. In what concerns the ITA, Romania registered an important regression in the 1990-2002 period, for the industrial progress component and, especially, for the technological advancement component. The international classification by the ITA in 2002 shows the supremacy of Asian countries.

The industrial performance index, in different countries

Table 5

| Country | Industrial and technological growth index ITA | | Industrial growth index | | Technological growth index | |
|----------------|---|--------------|-------------------------|--------------|----------------------------|--------------|
| | 1990 | 2002 | 1990 | 2002 | 1990 | 2002 |
| Malaysia | 0.269 | 0.457 | 0.523 | 0.646 | 0.515 | 0.707 |
| Japan | 0.466 | 0.456 | 0.620 | 0.590 | 0.752 | 0.772 |
| Korea Republic | 0.338 | 0.439 | 0.625 | 0.652 | 0.540 | 0.674 |
| Germany | 0.418 | 0.407 | 0.619 | 0.589 | 0.676 | 0.690 |
| Malta | 0.300 | 0.400 | 0.609 | 0.614 | 0.492 | 0.652 |
| Hungary | 0.253 | 0.396 | 0.534 | 0.626 | 0.474 | 0.633 |
| Ireland | 0.293 | 0.389 | 0.539 | 0.593 | 0.544 | 0.657 |
| Switzerland | 0.351 | 0.389 | 0.576 | 0.604 | 0.610 | 0.644 |
| USA | 0.338 | 0.371 | 0.496 | 0.529 | 0.682 | 0.702 |
| Great Britain | 0.328 | 0.353 | 0.515 | 0.509 | 0.637 | 0.694 |
| Poland | 0.208 | 0.236 | 0.428 | 0.554 | 0.487 | 0.426 |
| Romania | 0.269 | 0.171 | 0.650 | 0.581 | 0.415 | 0.295 |

Source: United Nations Industrial Development Organization (UNIDO), *Industrial development report 2005, Capability building for catching-up – Historical, empirical and policy dimensions*, Vienna, 2005, pp.161-163.

Regression of industrial performances notion factors is caused, mainly, by the lack of investment funds and the lack of trust of the foreign investors in the Romanian business environment. In addition to these there is also the lack of a coherent industrial policy based on the growth of the branches competitiveness.

The energetically integration of Romania in the European Union structures will signify, besides the fulfilment of the demands imposed by the existent legislation in the chapter “The Industrial Pollution Control and the Risk Management”, and the respect of the conditions established by two important documents in the domain: “The energy chart treaty” and “The energy efficiency protocols”; these establish the cooperation conditions in the energy domain and contain as main subjects the promotion of the fixation of the energy prices on the grooves of the market economy, the reflection in the prices of the environmental costs and benefits on the entire energetically cycle, the promotion of the energy efficiency, the use of clean fuels and of renewable energy resources.

For Romania, the electrification of all the localities needs an ambitious investment program, with a powerful economic and social impact, the finalization of which has as term the year 2007. By the HG no. 702/20 07 June 2003, Electrica engaged unionized credits for the financing of the rural and urban electrification works of 19.6 million Euro. In the frame of these works, it is mentioned that 287 localities with 15,433 households must be supplied with electrical energy.

3. The organizational structure of the electrical energy distribution and supply system in Romania and its main features

The energy sector is a strategically important sector; it constitutes one of the decisive factors for the social and economic evolution of the country. Because the operating mode of this sector has an impact on all the other domains of activity, the Romanian state has founded through the Electrical Energy Law no. 318/2003 the National Authority for Energy Regulation – ANRE, as an autonomic public institution of national interest, with juridical personality, that functions under the direct coordination of the Prime minister and on the basis of its own organization and operating regulation, approved by the Decision of the government no. 1816/2004, modified and completed by the Governmental Decision no. 1847/2005. According to the Law no. 318/2003, ANRE *elaborates, establishes and follows the application of the ensemble of national obligatory regulations, necessary to the functioning of the energy market and sector, in efficiency, competitiveness, transparency and consumers’ protection conditions.*

The present organizational structure of the electrical energy distribution and supply system includes eight

branches, among which two are privatized in favor of the Italian investor ENEL SpA (Electrica Banat SA and Electrica Dobrogea SA), one undertaken by the German company E.ON (Electrica Moldova SA), one privatized in favor of the Cez company from the Czech Republic (Electrica Oltenia SA) and other four owned by the society Electrica SA (Muntenia Sud, Muntenia Nord, Transilvania Sud, Transilvania Nord).

The electrical energy distribution network in Romania includes the electric lines of high tension of 110kV (18.3 thousands km), medium and low tension (117.7 respectively, 170 thousands km), the 110/M.T. and M.T./M.T. stations (1,222), as the transforming posts or the alimentation points (61,754). In the period 2000-2003 investments have been made for the total amount of 325,98 million US dollars, that have had for purpose rehabilitation-modernization works, electrifications (29,623 households have been connected to the electrical energy network) and projects in the automation, telecommunications and process informatics field (the implementation of the SAP R-3 management integrated system, of the distribution automation system etc.). During the same period the electrical energy delivered in the electrical networks has been realized in a proportion of 34.3% by SC "Hidroelectrica" SA, 2.1% by SC "Termoelectrica" SA, 9.8% by SC "Electrocentrale Bucharest" SA, 9.7% by SC "Complexul Energetic Turceni" SA, 9.4% by SN "Nuclearelectrica" SA, 9.3% by SC "Complexul Energetic Rovinari" SA, 6.1% by SC "Electrocentrale Deva" SA, 6.9% by SC "Complexul Energetic Craiova" SA and 12.4% by other producers. The concentration degree of the market power at the electrical energy suppliers' level is lower than in the case of the electricity production. Presently, a number of 112 commercial companies own electrical energy supply licenses. So, the market share of each of the eight branches of Electrica SA (four of them privatized) is comprised between 5 and 11%, insuring the captive consumers necessary. Besides these, a few other tenth suppliers activate that own altogether a market share of about 38%.

The declared purpose of the privatization of the electrical energy distribution companies was the attraction of necessary capital that would lead to their consolidation, the increase of the competitiveness and the insurance of fees that would allow the access of the population to the electricity supply services. The privatization strategy, the one of the capital injection combined with the stocks sale was preferred by the regulatory authorities. The flexibility for the accommodation to the practices used by the investors was also maintained.

The main problem that appears in the privatization field is the degree of novelty of the specific legislation and the lack of experience of the regulating authorities and of the market players in the use of this legislative. The first two electricity distribution and supply companies privatized were Electrica Dobrogea and Electrica Banat. The Romanian Government had to negotiate under the pressure of the international financial organisms. In 2004 the decision was taken to list at the Bucharest Stock Exchange of a 10% amount of the Transilvania Nord and Muntenia Nord stocks.

The electrical energy sector needs a more intense regulation than many other activity sectors, as its organization structure has major implications in the national economy. The main objectives of the electrical energy sector regulation are the guarantee of the competitiveness in the sector, the consumers' protection and the implementation of the European directives regarding the energy market. The 22nd Article of the Electricity Directive stipulates that the member states of the EU create adequate and efficient mechanisms of regulation, control and transparency guarantee. In Romania, the National Authority for Energy Regulation – ANRE has the entire responsibility concerning the fulfilling of this demand. The commercial relations on the energy market determine the appropriation of special responsibilities by the two sides involved in the transaction, namely the supplier (understanding by that the whole chain production – transportation – distribution – supply) on one hand, and the consumer (no matter the nature: household, industry, eligible or captive) on the other. One of the main responsibilities of the supplier in the relations with the consumer is the quality of the delivered energy.

The electrical energy quality is a complex and disputed problem, and its complexity lays in the multitude of factors that influence the quality level, in their interdependence, in the lack of methods and means of precise and expedite getting of the information referring to the electrical energy quality indicators. Assuring a customers' security minimum level, as the transparency of the performances in the achievement of the supply service have imposed a new type of regulations dedicated to this service, *the performance standards*. The stipulations of these documents join those of the supply licenses and frame contracts, on this grounds being realized an unitary and synergetic frame for the supply activity. The introduction of performance standards is one of the measures stipulated in the purpose of the integration of the Romanian energy sector in the European energy system.

References

- *** HG nr. 163/2004 privind *Strategia națională în domeniul eficienței energetice*, Monitorul Oficial nr. 160 bis/24 februarie 2004
- *** HG nr. 958/2005 pentru modificarea Hotărârii de Guvern nr. 443/2003 privind promovarea producției de energie electrică din surse regenerabile de energie și pentru modificarea și completarea Hotărârii de Guvern nr. 1892/2004 pentru stabilirea sistemului de promovare a producerii energiei electrice din surse regenerabile de energie, Monitorul Oficial al României, Partea I, nr. 809 din 6 septembrie 2005
- *** Legea energiei electrice nr. 318/2003, publicată în publicată în Monitorul Oficial nr. 511 din 16 iulie 2003, www.cdep.ro
- ANRE, *Codul Comercial al Pieței Anglo de Energie Electrică*, aprobat prin Ordin ANRE nr.25/22.10.2004
- ANRE, *Raport privind realizarea indicatorilor de performanță pentru serviciul de furnizare a energiei electrice 2004*, București, 2005
- Bădileanu, Marina, „Politici de protecție a mediului utilizate în țările Uniunii Europene”, *Revista de economie industrială* nr.1/2004, INCE, CIDE
- Bădileanu, Marina, „Resursele energetice în contextul geopolitic actual”, *Revista de economie industrială* nr. 3, 4, INCE, CIDE, 2005
- Bulearcă, M. (coord.) ș.a., „Elemente definitorii ale Planului Național de Dezvoltare 2007-2013”, seria *Probleme economice* nr. 214-215-216-217, INCE, CIDE, 2006
- Bulearcă, M. (coord.) ș.a., „Program de acțiune privind aplicarea politicii industriale în România”, seria *Probleme economice* nr. 114-115, INCE, INCE, CIDE, 2004
- Comisia Europeană, „Eficiența energetică în Comunitatea Europeană: către o strategie a utilizării raționale a energiei”, COM (98) 248, 1988
- European Commission, *Directorate General for Energy and Transport*, Energy Demand Management, 2005, www.europa.int/comm/energy/demand
- European Commission, European Communities, *Green Paper on Energy Efficiency- Doing More with Less*, 2005
- European Communities (EC), *Green Paper*, Towards a European strategy for the security of energy supply, Italy, 2001
- Institutul Național de Statistică, *Anuarul Statistic al României 2005*, București, 2006
- International Energy Agency (IEA), *Toward Solutions, Sustainable Development in the Energy Sector*, OCDE/IEA, 2002
- Ministerul Economiei și Comerțului, Foai de parcurs în domeniul energetic din România, Monitorul Oficial al României nr. 581 bis din 14.08.2003
- Muscalu, M.S., Mateescu, Mihaela-Adina, „Decizii investiționale în condiții de risc în domeniul energetic”, în *Revista de economie industrială* nr. 3/2005, INCE, CIDE
- Răgălie, Ș., Ștefănescu, Roxana, Hâncu, Daniela, „Eficiența economică a investițiilor din domeniul hidroenergetic”, *Revista de economie industrială*, nr.4/2005, INCE, CIDE
- Russu, C., „Politica industrială a României. Perspective de evoluție a sectoarelor industriei prelucrătoare”, *Revista de economie industrială*, nr. 4/2005 și nr. 1/2006, INCE, CIDE
- Union of the Electricity Industry-EURELECTRIC, *Post Liberalisation: the Challenges Ahead for a Successful Electricity Market*, iunie 2004, www.eurelectric.org
- United Nations Development Programme (UNDP), United Nations Department of Economic and Social Affairs (UNDESA), World Energy Council (WEC), World Energy Assessment: Energy and the Challenge of Sustainability – cap.12 Energy Policies for Sustainable Development, 2000
- United Nations Industrial Development Organization (UNIDO), Industrial development report 2002/2003, *Competing through innovation and learning*, Viena, 2002
- United Nations Industrial Development Organization (UNIDO), *Industrial development report 2005, Capability building for catching-up – Historical, empirical and policy dimensions*, Viena, 2005
- World Economic Forum (WEF), *Global Competitiveness Report*, 2002, www.wef.org