INTEGRATED SUSTAINABLE DEVELOPMENT AND ENERGY RESOURCE PLANNING

Abstract: *Integrated sustainable development of a country cannot be conceived and begun without considering in an intricate tandem environmental protection and economic development. No one can exist without a natural material support of the life he or she enjoys. All economic development plans must include environmental and human civilization's protection implicitly. Integrated resource planning must be done in an absolutely judicious manner, so we can all leave as a legacy for future generations both a clean environment, as well as a healthy and prosperous human civilization.*

Key words: *sustainable development, environmental protection, integrated resource planning, energy types, energy quality.*

JEL classification: O13, O21, O33, P21, Q56.

1. Integrated Sustainable Development

When it comes to the issue of sustainable development, many specialists make the serious confusion of economic development or environmental protection. The essential fact that economic development cannot exist without environmental protection must be understood. This intricate fact derives from the specific character of life, which dictates that nothing can develop under any form, if it has no natural basis. Or, if we do not protect the environment, nature, the planet in the end, no economic development can be stimulated anymore. The tendency of turning Human Civilization into a technological one is not an option.

If things were observed from another angle, the fact that, economic development based on environmental protection can lead to nothing else but one thing only, meaning human development, must be understood. This needs in return a healthy education, a civilized behavior towards our fellow citizens and nature, a high intellectual level from all points of view (ethical, scientific, spiritual). If a definition of sustainable development regarding energy sector were to be adopted, a version could be this: "**Sustainable development is a process in a continual evolution, which demands economy, society and environmental conditions for the benefit of present and future generations to be perfected.**".[2] Plain and simple, from this definition comes the explanation of the delay and observable mistakes in any field, not only in energy field. In an intricate meaning of sustainable development we could take the idea up to a point of stating that people's existence itself is a result of people's relations success with the environment.[3] We must not generalize, and things must be kept under control. It can happen that various persons enjoy the "surf" state on the wave crest created by these ideas, but we must all look around and notice the wreckage, ecological disaster on a global level, human and animal population's suffering due to illnesses caused and let to spread by the very community, and then we must all see if there is anyone who wants such a state of mind any more.

For tens of thousands of years man keeps taking from nature, processing, using, consuming and in the end throwing it all back in nature. At some point nature got fed up with recycling what man threw all over it, and it responded in great upheavals. Thus, a natural or

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An. Inst.Cerc.Ec.„Gh. Zane", t. 20, i.II, Iaşi, 2011, p.155-164

[2] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.

[3] Ibidem.

caused cataclysm through pollution comes into view, people and animals get fewer and fewer. The idea is one of complementarity. That is people and animals should all complement each other in nature, to ensure their life's support, the one that they cannot live without, for generations on a row. When man begins producing through industrial processes a series of primary, secondary, tertiary and adjacent products, and the remains that he does not want to recycle he throws them back in nature, it is obvious that he eliminates even his last chance of salvation without thinking long enough, and it hurts. When someone breaks something off, someone else needs to repair it and that costs a lot, and the community cannot leave it to someone else and trust like kindergarten pupils that "the polluter will pay the caused damage", because there are many cases in which fines were paid, but the Romanian environment,[4] on a local level, still remained polluted. Essentially it should not concern us who came up with this kindergarten idea, but rather who will clean up the environment and who will admonish the polluter in such a manner, that the second time he will not do it again, because man is destroying himself.

Alternative clean solutions for an integrated and integrating sustainable development are known and plenty can be found, but for some industrialists it is cheaper to spill and disperse in nature, than to invest in ultra high costly technologies and be appreciated by future generations. Situations alike are found on a world level, European Union's level, as well as national level, scattered over one or more regions of Romania from sporadic cores. Here lies the problem, not somewhere else. Laudable situations were a few, but with one swallow it does not make spring. It is a matter of will after all, but it seems that people must reincarnate for hundreds of times to realize such a simple, yet so high and great thing. Everything is perhaps more than chained and it is very easy to notice. A high technological level applied in all industries will ensure a clean and healthy environment, which can then sustain life at its full and a high level of an evolutionary intellect from all points of view, which gets to research and discover new and new technologies, more efficient and effective, both for environmental protection, as well as man's towards a natural evolution in a symbiotic, synergistic sphere, which after all is all our planet. Protecting the planet we protect ourselves, the people, future generations, the human civilization, our own clean healthy way of life, civilized and life of Earth.

Integrated and integrating sustainable development in the concept of environmental protection cannot be perceived and understood intricately, unless it is judiciously based on integrated resource planning, of any type, nature, belonging and/or obedience, be it human, natural or technological. Through this integral concept, of integrated resource planning, integrated and integrating sustainable economic development of Human Civilization and Society can really be stimulated, supported and started on the whole, as a means for conservation of nature and support for technical, technological and eco-economic[5] progress of future generations. Therefore, integrated sustainable development should comprise in the conception of producing any product, on the basis of integrated resource planning, the following natural sequence:

1. The raise of need/demand for a product of any type, utility and size, be it old, current or new, in an individual, household and/or industrial system.

2. The raise of multiple offer to create, fabricate that product to satisfy the demand.

3. The raise of technical, technological and eco-economic progress on the basis of multiple offer, to stimulate the facile, clean and planned satisfaction of need for a product.

All these clearly plead for integrated resource planning.

[4] Over the decades and up to the present there are plenty cases of pollution caused by Romanian extractive and energy industries, great polluters and resource consumers, and lack of interest of authorities in charge to ecologically rebuild the damaged areas.

[5] "Carpatica Romanian Mountain Development Foundation" – multiple eco-economic ideologic aspects.

2. The Process and Steps of Integrated Energy Resource Planning

According to integrated energy resource planning there are two known resource categories. In the first category of resources are the "consumer" and "supplier" types. It is a known fact that, on an industrial level, one type of industry can be both supplier, as well as consumer depending on the type of energy it produces and supplies and the one that it consumes regularly and/or occasionally.[6] There are various situations of some industries which supply heat (thermal energy) and electric energy to a certain voltage into the national system, but at the same time, either regularly, or occasionally, need electric energy at another voltage for their own installations and equipment to work. These differences, both of production and processing into the National Energy System (NES) are performed at a certain cost due to the need of transforming the voltage to the one proper and necessary to Electric Transport Network (ETN). Beside industrial consumers and suppliers, almost any domestic consumer and supplier of energy, who respects certain parameters specified by the National Energy Regulation Authority (NERA), can supply energy into the National Energy System (NES).[7] The more, the better some specialists would be tempted to say, but not in the current case of Romania, not just yet. Not only that all these energy resources must be taken into consideration for their current administration, but this kind of resources and others must be specified before any integrated resource planning (IRP) is started, otherwise we perpetuate the present situation of a vicious circle of the NES and what is going on is not a pleasant sight at all.

In the second category are all energy resources determined by the economy of energy at final users and the "supplier" type that must be evaluated simultaneously, so we can have an overview before integrated energy resource planning (IERP) and their correct current administration. All this data and information need an impressive volum of technical, economic, law etc. measures and all must be collected and sorted previous to their whole processing and introduced in complex calculation programs. Processing this kind of data demads meeting the specificity of all types of data and information in various energy fields based on diverse energy resources (hydro energy, nuclear energy, coal, natural gases, fuel oil, solar, aeolian (wind), geothermal energy, biomass with biogas, gases from non-dangerous waste landfills, gases from domestic and agro-zootechnic waste water treatment plants, hydrogen obtained through electrolysis (hydrolysis) of water etc.), the quantities produced and the energy that resulted after production processes have completed.[8] Also, integrated energy resource planning has numerous reiterations, analysises, in detail evaluations and optimization steps of all aspects, and the basis for planning is the prognosis of demanded energy services and not the one of consumption.[9] All these aspects lead to integrated sustainable development of NES and need one master brain or more to think things in their integrality, otherwise we are witnesses to very unpleasant things that happen in NES. As **steps**, as succinctly as possible some of the aspects worthy of consideration for a zone's and/or a region's energy development are enumerated below.

1. Beginning with a small area as a surface, around 100 km^2, the approximate surface of a small hydrographic basin, the existing and potential catching and using conditions of energy resources, the theoretical and technical capacities of producing different types of energy based on these resources, as well as the connection, transport, distribution and utilization way at and by the consumers must be researched (prospected, studied and determined).

[6] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.
[7] "Ordin nr. 1" and "Ordin nr. 2 din 04/08/2000", published in Monitorul Oficial nr. 369 din 09/08/2000".
[8] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.
[9] Ibidem.

2. Once the potentially existent energy resources in a small area are determined, there must be, by case, applied all known methods in the technical field to convert these types of energy into other types of energy also, that are necessary to the consumers in that area. For example:

a) Hydraulic energy can be transformed, converted into:

- Mechanical energy;
- Electric energy;
- Thermal energy;
- Through the electrolysis (hydrolysis) of water, electric energy obtained also this way can be used for separately obtaining hydrogen and oxygen, for both commercial energy purposes, as well as chemical, technical etc. purposes.

b) Solar energy can be transformed into:

- Electric energy;
- Thermal energy, which can both be used and converted into other types of energy for other purposes like hydraulic energy.

c) Aeolian (wind) energy can be transformed into:

- Mechanical energy;
- Electric energy and like hydraulic and solar energies;
- Thermal energy.

d) Biomass with biogas can be transformed into:

- Thermal energy;
- Electric energy and like hydraulic, solar and aeolian energies;
- Mechanical energy;
- Biomass can further on also be used as raw material for compost platforms, where compost of different degrees of quality can be obtained, as natural fertilizer for agriculture, silviculture, horticulture, dendrology.

e) Geothermal energy can be utilized as:

- Natural thermal energy;
- Basis for treatment with thermal waters;
- Source of salts (sulphates) for different industries.

f) Gases collected from non-dangerous waste landfills and from domestic and agro-zootechnical waste water treatment plants can be transformed into:

- Thermal energy;
- Electric energy and like hydraulic, solar and aeolian energies;
- Mechanical energy.

3. After determining all parameters specified above all settlements (layouts) for catchment installations both in an industrial, as well as in a domestic system depending on the capacities of the source, the catchment possibilities, the connection and transport to consumers and not lastly the financial capabilities must established. Also, tasks as maintenance, reparations, modernizations and eventually possible extensions of all installations and equipment, constructions and instruments specified for exploitation must be fulfilled. Known being the fact that nature, as man, has an evolutionary character, environmental conditions must be according to executed projects, so that the anthropic part developed in diverse settlements will work under optimal conditions, in symbiosis with nature, otherwise wreckage and bankruptcy will install. History is anyway full of such fatal cases.

4. Economic exploitation of the executed projects must be performed in such a manner, that from it will benefit as much population in that respective area as possible, and not only, under the conditions of environmental protection and raising the beneficiary population's living condition. All these must be fulfilled such that the economy will really prosper, not just

in a small area, but on a national, international level, because such cases are similar around the world.

5. Once the economy of the zone is based on such energy resources and technical projects masterfully executed, the respective area can develop incredibly much, both vertically, and horizontally. Thus, anyone can invest by case and possibilities in all energy resources mentioned above, available in that respective area, and it can develop economically up to something like:

a) Social and study centers:

- nursing schools, kindergartens, schools, high schools;
- universities, academies;
- libraries, museums, art galleries, cultural centers.

b) Medical and recuperation centers:

- dispensaries, policlinics, hospitals, sanatoriums, health resorts.

c) Institutes and study and research, creation and industrial exploitation centers:

- Institutes and centers:

- of study and research: environmental, technical, social, economic, medical;
- of design, construction and assembly;
- of exploitation, maintenance, reparations and modernization.
- Factories for diverse industrial installations, equipment, installation assemblies and instruments.

d) Social, relaxation and financial services:

- theaters, cinemas, audio-visual (mass-media);
- turism, agroturism, ecoturism and ecumenical turism;
- banks, consultance and investment firms.

e) Industries, farms and plantations:

- Industries:
- energy;
- transport;
- machine and installation constructions;
- mining;
- raw materials and matters processing;
- technico-medical, pharmaceutical, natural therapeutic etc.;
- food, agro-zootechnical.

- Farms:

- agro-zootechnical, horticultural, avicultural, apicultural.

- Plantations:

- agricultural, silvicultural, horticultural, dendrological.

6. Once the zone's economy is developed to such a level and even less, an authority to ensure the actions' management in all that area must be created, so things will not take a fatal turn. Thus, for each and every action category a sub-authority must be created and all of them must answer to only one ruling authority, which will coordinate them all in such a manner that all of them will join, work optimally with all of them and in everything, synergistically and symbiotically with nature and that respective community, for which they were created in the first place, so that a sustainable economic development will take place in the context of environmental and human society's protection, to leave something further on to future generations.

It is a known fact that small capacity distribution sources, usually based on hydrocarbons or renewable resources, have the advantage of benefitting from smooth adaptation on demand and exploitation conditions, unlike large and very large capacity sources.[10] Besides, it can be

[10] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.

noticed how the technological "progress" has brought to our attention's and utilization's prime view these energy resources (turbine and thermal engines with cogeneration, aeolian, photoelectric, geothermal installations, combustion cells, heat pumps, atomic rods etc.) and even that of competitivity, thanks to "green house" gases emission reduction down to an insignificant level.[11] The moment human civilization and society gave up once and for all the obsessive idea of profit[12] and adopted a legislation, which it would obey, of supporting the systems based on renewable energy resources (solar, aeolian, geothermal, biomass with biogas etc.), these could be placed on superior positions of merit order, in the concept of environmental protection, by applying advanced technologies into such equipments.[13] At least through the interface of mass-media, the European Union recommends every member country the gradual raise of systems based on renewable resources ratio into the structure of ensuring the need for energy consumption both on national level industrially, as well as individually, domestically or family based.[14]

According to some authors, at least for the moment, externalities are those costs of the energy supply system that are not reflected in the cost of energy and these expenses are a consequence of negatively affecting the surrounding environment and people's and animals' health, through secondary effects on water, air, soil, reproduction, archeological, historical and aesthetic resources' quality, meaning the direct or indirect impact due to production and/or consumption of a good or service, over another entity, for which the responsible part is not imputed costs equal with the caused damage and thus the consumed energy has still a price unaffected by these factors.[15]

There are also some industries that have a positive aspect of the impact upon the environment, for example hydroenergetical assemblies disturb animals' and fishes' habitat, but at the same time they confer people's recreation and protection against flooding.[16] It is a known fact that all technologies of producing one or more types of energy, both conventional, as well as alternative, currently used in energy supply systems, no matter the size of used installation assemblies and equipments, mainly generate the following externalities:

- Nuclear power plants: emissions during routine operations, accidents, long term wastes, nuclear proliferation.[17]
- Thermal power plants: thermal pollution of waters, air, water and soil pollution, negative effects upon climat and people's and animals' health.[18]
- Aeolian installations: noise, affect the landscape, disturb the air currents, kill birds.[19]
- Geothermal installations: pollute the air with hydrogen sulphates.[20]
- Electric lines: electromagnetic fields, cause difficulty in administrating herbicides, disturb the soil during construction, reduce the property value due to passing lanes, which can cause diseases like cancer and tumors etc..[21]

The main problem is the conversion of all these externalities of environmental and technical order, because their perpetuation brings absolutely nothing good, neither from an

[11] Ibidem.
[12] "Zeitgeist Addendum", www.thezeitgeistmovie.com.
[13] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.
[14] Ibidem.
[15] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.
[16] "Hidroenergetică", Popa Bogdan, on-line course, Universitatea Politehnică, Facultatea de Energetică, www.hydrop.ro.
[17] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.
[18] Ibidem.
[19] Ibidem.
[20] Ibidem.
[21] Ibidem.

environmental, technical, nor from an economic point of view. Therefore, new clean, reliable, efficient and very useful technologies to society must be adopted. These technologies exist, they just need to be applied at first cheaply on the market and then freely. This means that all thermal power plants and pertaining industries must be transferred to the metal grinder, with a pretty high initial cost, but, again through high technologies, many raw matters for other industries can be recovered.

Maybe to some specialists these remarks would seem monstrous, but nonetheless the community should think that it is possible to transform the energy industry from a big consumer of resources, large polluter, large and slow one, into a small, efficient, reliable one and a great producer of clean energy in the concept of environmental protection. Transforming installations, equipment and old precincts into grinded metal for recovering raw matters necessary to other industries, depolluting the environment and ecologically reconstructing the old settlements (layouts) would never be conceived that they could be done over the night, but we should realize the fact that only in a decade, no more, if we want to, it can be done.

Perhaps to some esteemed emeriti this would seem an absurdity, but they should know that man has the technology to extract air from a glass of 0.5 l, obtain void in its interior and from that void to extract the necessary energy to light up 100 light bulbs, each of 100 Watts, for approximately one hour. This is called “zero point” technology, through which energy from Terra’s lightnings and superior atmosphere can also be extracted, much like the savant Nikola Tesla, who stated: “The present is theirs, the future is mine!”. When the savant made that statement he referred to the high technology that man owns and to his lack of will to change for his own and the planet’s good. There is one more very important component along this path, population’s education on this matter, which we cannot witness an edifying transformation of the human society on the path of evolution without. The population must be correctly and in a healthy manner educated this way, otherwise destruction knocks on the door.

The sole purpose of planning anything in the world is to get an efficient result out of a system for man to benefit. That is for man to enjoy himself, his way of life and the planet. And enjoyment of anything is only possible after achieving a high degree of quality of man’s creation, be it physical, intellectual and/or spiritual. Since everything in life comes after some hardship to survive, learn and evolve, so is with at least integrated energy resource planning (IERP), which demands that every measure is properly taken, so man can leave something to future generations, and thus make sure they enjoy a good life as well.

Good life and self enjoyment presumes that quality is attained, and since life to exist needs energy, be it in solid, liquid, gaseous or plasmatic state, it all comes down to energy resources. There are plenty energy resources on the planet nowadays, for man to use both industrially, and domestically, but only three are mainly used, either directly or through conversion: electric, mechanical and thermal. Since electric energy is the most familiar and used outcome of energy systems, until other new types of energy are discovered, it should be the one to take most of our time to produce it to higher and higher degrees of quality. If electric energy power plants were shut down, human society as we know it would cease to function. It is as simple as that, and it all depends on one seemingly insignificant aspect, the quality of electric energy.

If the demanded quality level of electric energy is attained, than mankind has a society to run, otherwise nothing can function properly, and even worse, things get from a penal to a deadly turn. Therefore, integrated energy resource planning (IERP), the basis of sustainable energy production systems development, has as one of its pure outcomes the quality of electric energy.

The Quality of Electric Energy

The efficiency of activities in industry, services and domestic sector, that use electric energy, depends largely on its quality.[22] Being a characteristic of electric energy, from an electric system's point of view, evaluated through a set of specific indicators, the quality of electric energy can be affected by electromagnetic perturbations that are specific to electroenergetical system's functioning in normal or perturbed conditions.[23] Beside, it is a known fact that "permitted" slips from quality indicators are more or less established depending on determined damages in production, transport, distribution, supply and consumption of electric energy systems. [24] Perturbations that affect electric energy's quality can emerge in all components of the energy system, in the supply process, but also in final user's processes.[25] It is a known fact that limiting the perturbations into an acceptable and tolerable interval for the appliances through which we use the electricity is an important preoccupation of the specialists in Romanian energy sector.[26]

From a practical point of view, it can be stated the fact that part of the hydroinstallation assemblies built by Romanian cooperations, like CENTROCOOP, for the rural zone ramified by hydrographical networks, could ensure under various conditions the parameters specified on the electric domestic appliances' prospectuses, meaning the normal parameters of the electric current (voltage of 220 V, frequency of 50 Hz), not as it happens too many times to be on Romanian ETN (voltage between 210 and 230 V, frequency between 47 and 52 Hz), which unfortunately are not according to electric equipment's and domestic, commercial and industrial appliances' utilization prospectuses and therefore we many times witness their temporary or total malfunction, with pretty high financial damages.[27]

Of course, we must remember the scarce and sluggish conditions under which electric current is being produced in Romania, to realize what we need to do on this chapter. However, the problem does not lie in this category alone, but in more, meaning: the supply voltage's and frequency's quality, the supply service's quality, the commercial quality etc.. Things are covered in many aspects, to describe them shortly, but this does not mean that they should be left to chance. However, not long ago Romania has celebrated NES's and ETN's connexion to Energy Transport Coordination Union (ETCU) through EMS-SCADA[28] type of networks, but this is a small step on the path of solving problems, compared to what it should have been accomplished on a national level, but for now it is better than nothing.

For a while it could be noticed the fact that, under scarce and crisis conditions both the suppliers and final users blame each other for electric current's quality and the damage it caused. Since the truth is always somewhere in the middle, the following must be presented:

$\Rightarrow$ On one side the suppliers cannot always respect 100 % the normal conditions to supply the electric current and so different fluctuations, frequent interruptions and some of them of long periods of time appear, either because of the wearing out of the network both physically and morally, or because of the excessive consumption by the final users and the suppliers' incapacity to produce the necessary quantity of electric energy according to hourly task graphic.[29]

$\Rightarrow$ On the other side there are at present very precise conditions of the sophisticated equipment that developers of new technologies provide on the market, and the suppliers

[22] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.
[23] Ibidem.
[24] Ibidem.
[25] Ibidem.
[26] Ibidem.
[27] "Carpatica Romanian Mountain Development Foundation" – project of microhydrocentrals.
[28] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.
[29] Ibidem.

cannot satisfy and compete with them totally. Also, there are really serious cases in which installations and equipment in energy system that suddenly break and cause much and even repeated damage, fires due to different parameters of the electric current, total unrecoverable malfunctions etc., things that lead to diverse litigations totally unwanted by any of the sides.[30]

All these inconvenients can be solved by adopting the path of high technology both by one side, as well as the other, but all come at a significant cost and not everyone can match up with such expenses, especially people in the Romania rural environment. In these kind of situations the state should intervene, but since the state has privatized on and on, and thus separated itself from all problems, for the reason it sold all its stock market shares, and along them the population's problems. Therefore, for now a middle way to mediate the current problems must be found, and that seems to be bearing the costs of damages by those who caused them in the first place. But this is not the optimal solution, only a temporary one.

As it can be noticed we are going round in a vicious circle, that is not pleasant at all and from which we must get out as soon as possible. To all that the lack of common sense, respect and education during the dialogue between suppliers and consumers can be added, when both sides get overwhelmingly recalcitrant and things get a penal turn, when offered commercial services' and relations' quality suddenly drops.

All these could be easily avoided if we stood and thought what needs to be done, planned and executed everything according to that respective plan, at all its afferent costs, which we cannot work without, but… However, the energy suppliers in both private and state, national energy system should be preoccupied with the sustainability, competitivity and electric energy supply's security for the national energy system (NES). Following, all these three aspects are shortly described.

⇒ **Sustainable development** is the development of competitive renewable energy resources and that of other sources and carriers of energy with low carbon emissions, especially alternative fuels for transport; the reduction in energy demand in Romani; channeling the national efforts for fighting climate changes and locally raising air's quality.[31]

⇒ **Competitivity** is ensuring that energy market openness brings advantages to consumers and to economy on the whole, by stimulating at the same time the investments for clean energy production and energetical efficiency; diminishing the impact of international energy prices' raise over economy and the citizens of Romania; bringing Romania to a proper level regarding high energetical technologies.[32]

⇒ **Energy supply's security** is managing the growing dependency of Romania and that of the European Union towards imports by: integrated approach, through reduction of demand, energy sources diversification with a broader use of local and competitive renewable energy and diversification of sources and supply routes of imported energy; creation of a stimulating frame for proper investments to meet the growing demand of energy; enhancement of Romania's means to manage emergency situations; creation of better conditions for Romanian firms who want access to global resources; guaranteeing access for all citizens and firms to energy.[33]

To all these chapters and many others should Romania work for a long while from now on, but we will live and we will see what exactly will happen in the future.

[30] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.
[31] "Managementul energiei. Principii, concepte, politici, instrumente", Second edition, Leca Aureliu, Muşatescu Virgil coordinators.
[32] Ibidem.
[33] Ibidem.

4. Conclusions

As any other systems imply the fact that man is in symbiotic connection with nature around him, energy production systems too demand that they are sustainably developed up to a point, where they seem to fuse with the environment and function optimally, so man can achieve his purpose to ensure his entire life's support in a synergistic sphere. This implies that sustainable development of at least energy production systems is more than necessary, it is a vital function of man's creation to support himself, his way of life and the planet. One might think that sustainable development of energy production systems too many times demands integrated energy resource planning (IERP). One should not forget that integrated energy resource planning (IERP) is the basis of sustainable development of energy production systems, which in return offers a high degree of quality of energy systems' function, for man to enjoy.

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