

TECHNOLOGY-KNOWLEDGEMENT-SOCIETY-LIFE

Florea OPREA¹

Abstract. *In the last decades, scientists, politicians, representatives of social life have identified new imperious problems: continuous degradation of the atmosphere and water quality, limited character of natural resources, rapid demographical increase, global warming, major changing of climate etc. If, at the beginning, these problems seemed of small interest for a small group of people, in time, they have become concrete and of large interest. The technologies that have become more and more interesting lately are those unpolluting technologies that have penetrated the energetical and chemical industry, the material recycling technologies, biotechnologies, unconventional technologies used for obtaining some special materials destined to some industrial fields' development. Amongst unconventional technologies, some can be mentioned, namely: microtechnologies, nanotechnologies, molecular electronics, cellular biotechnology, adaptronics, biomimetics, and unconventional technologies used to get smart materials, supraconductive materials ultra-pure semiconductors, and hydrogen usage as energetic source.*

Keywords: technological society, informational society, environmental protection

MOTTO: *“We need to think definitely different if we want the world to survive” – Albert Einstein*

In the last decades, scientists, politicians, representatives of social life have identified new imperious problems: continuous degradation of the atmosphere and water quality, limited character of natural resources, rapid demographical increase, global warming, major changing of climate etc. If, at the beginning, these problems seemed of small interest for a small group of people, in time, they have become concrete and of large interest.

The present and future times are under the sign of operationalization reality of sustainable development concept at the concrete level of the existing conditions in a socio-economical segment.

During the years, at the same time with technologies development, pollution occurred, which means “direct or indirect introduction of substances, vibrations, heat and/or noise in the air, water or soil, as a result of human activity, pollution that can affect human health, or environment quality, that can produce harm to goods or can results in a deterioration or a prevention in using the environment for recreative purpose or for some other legitimate purposes”. For this reason, the main task of all of us is to reduce the pollution process at maximum.

¹ Prof. Univ. PhD. Acad. Eng., Titular Member of Academy of Romanian Scientists, head of Targoviste branch, Dambovita (opreaflorea@yahoo.com)

The study developed by the European Union with regard to the climate lead to the conclusion that, in the next 100 years Europe will become a continent of extreme meteorological phenomenon, which will affect not only humans but also the flora and fauna, Europe being thus transformed into an inhospitable place. Having a disposal between 19 and 30 km, the ozone layer is by far a very thin one. Its concentration, at the respective heights does not exceed 10 parts per million, which means very little, not only quantitatively but also from point of view of its benefic effects concerning the life on the Earth.

The destruction of the ozone from the upper layers of the atmosphere leads to the increase of the greenhouse effect and, in time, it can result in life disappearing from the Earth, because of temperature increase.

The ozone layer destruction was possible because of industrial development, CFC substances occurrence (chlorofluorcarbonates), extremely light molecules, impossible to break up at small altitudes and insoluble in water.

The atmospheric ozone layer thinness made the political world aware of the danger. Thus, in 1985 the Vienna Convention was signed. Under the terms of the respective agreement mechanisms of international cooperation regarding research programs on ozone were developed. In 1987, there was signed "The Montreal Protocol with regard to substances that cause the ozone layer impoverishment". The latter was completed by two supplementary agreements, signed in London in 1990 and Copenhagen in 1992. The two of them laid down precise calendars to eliminate CFC and some other ozone-unfriendly substances. By 2029, all these substances will have to be totally eliminated

The so-called tropospheric ozone is formed in the low layers of the atmosphere and results in photo-chemical pollution. The substances that are the basis for tropospheric ozone formation are the nitrogen oxides and the volatile organic compounds. The tropospheric ozone gets into reaction with the vegetal and animal tissues and causes the greenhouse effect.

When inhaled, the respective ozone can provoke some respiratory diseases, from the simplest ones to the most acute, including pulmonary emphysema.

In stratosphere, the ozone insures the absorption of ultraviolet radiation of type B and thus, life on the Earth is protected.

In troposphere, there where human activities take place, the ozone produces more and more serious injuries on human health.

In April 2007 the experts from Intergovernmental Group on Climate Evolution (GIEC), after a serious debate, where, the representatives of the huge polluting companies such as USA and China disagreed with a part of the conclusions launched at Brussels an alarming diagnosis on global warming danger. According to the final conclusions drawn by the GIEC experts, a global warming of 2-3⁰ C as against the average medium of temperature in 1990 will have a huge negative impact on all regions of the world. By 2080 about 3.4 million of people will suffer

from hunger as a result of drought, soil degradation and salinization. Poor peoples, even living in flourishing societies are the most vulnerable to climate changing's because they are hard-adaptable.

Global warming has profound effects in most different fields. It causes the seawater level raise, climate extremes, glaciers melting, numerous species disappearance and changing's regarding human health. A serious fight is carried against the global warming effects and its central point is the ratification of the Kyoto Protocol and of BALI action plan with regard to pollutants emission reduction, reduction that influences the warming speed.

The climate changes depending on the influence of the Earth displacement on the orbit around the Sun, volcanic eruptions and greenhouse effect. The percentage of different causes of global warming is being studied, but the scientist's opinion is that the main cause is the increase in greenhouse gasses concentration because of the human activities during the industrialization epoch. In the last 50 years, when real and detailed data are available, this is an obvious thing.

The greenhouse effect is a natural phenomenon through which a part of the terrestrial radiation in infrared is retained by the terrestrial atmosphere. The effect shows up because of the greenhouse effect gasses which reflect this radiation back.

The gasses producing greenhouse effect are: carbon dioxide, methane, nitrate protoxide, hydroflourcarbides, perflourcarbides and the fluoro-sulphur.

The effects on the atmosphere are found in vaporization, rains and storms increasing. Increased temperature is reflected in water vapours increasing contained by the atmosphere.

The most important effects on the hydrosphere are: decreasing of the arctic glaciers thickness and the melting of the polar ice caps.

Global warming represents the almost imperceptible warming of the Earth, probably caused by the human activity. Human beings do not perceive these small increases of temperature, but the effects can be devastating.

The actual theory on global warming indicates man as being on blame for this. The daily activities developed by humans release enormous quantities of gasses, especially of CO₂, these gasses then get into the atmosphere and turn into factors of climatic abnormalities.

Nowadays, of a great interest are those unpolluting technologies used in chemical and energetic industry, the materials recycling technologies, biotechnologies, unconventional technologies to obtain some special materials meant to be used in the development of some industrial fields. Amongst the unconventional technologies, there can be mentioned: microtechnologies, nanotechnologies, molecular electronics, cellular biotechnology, adaptronics, and biomimetics,

unconventional technologies used to obtain smart materials, ultrapure semiconductors, and hydrogen usage as energetic source.

The miniaturization field has spread all over the world as a powerful factor of competitiveness and comprises micromechanics, integrated microsystems with sensitive and motive reactivity, microbionic modelling and simulations, microrobotics, nanorobotics, punctiform metrological testing and prelevation, medicine applications, genetic engineering, environment protection.

The micro, nano, pico and femto-technological possibilities and devices offer new perspectives in the field of knowledge and usage.

Microtechnology and nanotechnology have numerous applications in all engineering fields and, as result they will contribute to the social effects amplification of the other technologies.

Nanotechnology represents the technology research and development at atomic, molecular and macromolecular level within the length interval between 1nm and 100 nm, in order to understand fundamentally the phenomenon and materials at nanometric level and, to create and use some structures, devices and systems with new properties and functions (determined by these small and medium sizes). The new characteristic properties and functions show up at some critical dimensions situated under 100 nm. The research and nanotechnological development assumes the controlled operating of nanostructures and their integration into certain material components, systems and architectures.

Nanotechnology possesses a huge potential in getting associated with some other three actual directions:

- biotechnologies;
- technology of information;
- cognitive sciences.

By defining Nanotechnology, the term “device” shows up, assuming that the term refers to notions such as material, structures and systems, which, at their turn involves the understanding of social and ethic implications of some systems at a higher level, where the nanostructures are just component parts.

The technological convergence contributes to some inherent negative phenomena solving of this century:

- invalidities multitude;
- communications interrupting, climatic changes, pollution;
- economical stagnation;
- national security endanger.

Nanotechnology can contribute to establish some ethic and social standards. In order to avoid any misinterpretations or some errors due to not-knowing the social scientific fundamentals, it is very important to integrate the social and ethics studies in the nanotechnologies development in all activities fields.

The scientific, social and economic research can support the producers and authorities involved in the making decisions on the development of new technologies to turn to amplifying of mankind's advantages. Besides, a qualified technical research on the social implications of nanotechnologies will offer for the politics developers and for the public, in general, an accurate image of reality, without fears or unfundamented hopes.

Engineering on the nanometric scale will have a lot of applications in all technological fields and in the majority of scientific fields.

The moral and social implications of nanotechnologies are established, with our without our permission, by their capacity to involve and amplify the effects of the other technologies.

In 2000 the National Council for Science and Technology (NCST) sponsored a workshop at the National Science Foundation (NFS) from USA where 64 of science academies representatives, governmental laboratories and research corporations participated. On this occasion, the main potential applications of nanotechnologies were synthesized, some were already in use and others that still request lots of researches.

Further on, some feasible examples of applications suggested by partners from vast fields of economy and the social ones are performed:

- component parts more efficient for the semiconductors industry (integrated circuits with carbon nanotubes transistors);
- nanostructural catalyzers for chemical industry and for the more efficient conversion of the pollutants generated by automobiles run or fuels combustion, generally;
- lighter and proofer nanomaterials destined to increase the efficiency and safety of automotive, aerospace and railroad transports;
- improving of pharmaceuticals and programming of their release to the destination place (for example, in the case of tumours) having the possibility to use some water-insoluble drugs;
- costs reduction and safety filters destined to the water decontamination and desalting, industrial pollutants removal and air purifying;
- more efficient conversion of solar energy, reducing the use of oil and offering more alternatives for nuclear energy in generating the electric power for the future needs;
- efficient combustion cells and hydrogen stocking systems with the view to manufacture some automotives and some other non- polluting means of transport.
- sustainable composite materials such as polymers strengthened with nanoparticles, designed for the obtaining of some best performances in particular uses, with the reduction of wastes and considerable improvement of lifetime;

- biodegradable fertilizers and insecticides processed at molecular level, designed for the accuracy agriculture, with the efficient release at the place of destination and with the prevention of the undesired side effects;
- green vehicles with revolutionary supply with high mass proportions, and engines of high power but with low needs of power energy designed for the cosmic space exploration;
- nanocomponents for the sensorial systems that can fast detect both the pollutants and the organisms generating diseases and the chemical and biological agents used in case of war, with the view to fast application of appropriate medical treatments or the security establishing;
- coverings of some usual materials with the obtaining of some particular properties such as glass windows with self-washing or surfaces with external architecture that reflect warming.

In the case of technique, the same as to other fields, engineering has to solve through optimum solutions the relationship of interconditioning between the efficiency of plants and technologies on one hand, and the level of environment quality on the other hand. It is obvious that a such desiderate arises the question of personal training and improvement involved in this direction and implicitly the existence of a high professional literature that offers the solutions necessary to solving technical or technological difficulties. Besides, the last years experience accumulated in the field of systems driving demonstrates the fact that the intervention of specialists confronted with industrial matters in some scientific branches perfecting, which till recently have been strictly part of the economic field becomes necessarily.

Recently, according to the world previsions and forecasts, the MT field (Material Technology) has been placed along with the IT (Informational Technology) on the first positions of high branches rank of a national economy. Fast development on the basis of science and engineering, of materials industry widely-known as *materials industry* imposes the perfecting and permanent effectiveness of prevention and control measures of industrial pollution.

The period we cross at present, as well as the future one, stand under the sign of reality operationalization of concept (model/pattern) of sustainable development at the concret level of existing conditions in a certain socio-economic segment.

The increase of the energetic efficiency is one of the important challenges of the period we are crossing. Communications concerning *Energy Quality from the Fields* that was performed at the last *Scientific Symposium of Romanian Engineering's from everywhere* organized by AGIR in Bucharest, pointed out that the idea that the *energy from fields does not consume anything*, while the thermodynamic energies consume materials and are polluting. A practical aspect should be that of producing these fields without energy consumption.

Magnets are bodies that spontaneously cause magnetic fields. Starting from the iron ore so-called magnetite, known from antiquity, to the memories of mobile telephones, the engineering of this particular material has covered an impressive way, especially due to the accomplished performances. It can be considered that the perspectives of the energy exploitation out of the magnetic field are particularly attractive thanks to the perspectives given by this special material generically named magnet.

Electrets are bodies that spontaneously generate an electric field. During the World War II, the United States Pacific Fleet captured a Japanese ship. They conducted a speciality research which led to an enigma: they could not find the electric accumulators batteries that provided energy to the telephone exchange. Thoroughgoing the research, they found in each microphone a piece of material that spontaneously generated the electric field necessary to the microphone, on this basis, the accumulator batteries that usually supplied energy to the telephone exchange had been given up at.

Litrospheres are self-luminous micro particles. American specialists in the field of energetic efficiency methods have recently perfected an invention a new method of house lighting, which is cheap, non-toxic and having a lifetime guaranteed for more than 12 years. The MKP firm patented the *litroenergy* method.

When they launched the litrospheres, the American specialists said they would use them basically for paints, which thus would have phosphorescent effect more than 12 years without an energy source. The secret is given by the usage of some micro capsules based on betavoltaic technology. More precisely, a radioactive gas is inserted in micro capsules and will emit electrons for 12 years, which is equal to the half-value time specific to the respective radioactive element. Litrospheres are self-lighting, which determined the inventors to use them as lightening bulbs in dwelling. The new lightening fittings are not affected by heat or cold and can resist to over 5000 lightenings.

In this case also, the inventors assure a guarantee of minimum 12 years for such an energy source. The self-lightening material contents about 20% plastic that can be coloured and moulded in different shapes. This new type of lightening does not emit no sort of ultraviolet rays.

Litrospheres have the potential of saving billion dollars, paid at present for the lighting electric energy bills, says Steve Stark, the representative of MPK firm. He has appreciated that the firm would produce litrospheres massively this year, so that this would substitute the present lightening fittings.

It is known that the European Union, for ecological and economical reasons, took the measure of replacing the incandescent bulbs with the fluorescence ones from public lightening (streets, firms, offices etc) by the end of 2008 and from people's places by the end of 2010. On this juridical basis, an expansion of fluorescence

bulbs production has been observed. The competition for the energy exploitation methods from fields is just at the beginning, too. So, the importance of the special materials engineering is increasing.

The global emissions of carbon dioxide increase three times faster than the experts in climatic phenomena have estimated. The United Nations has warned that as a result of global warming acceleration, the water reserves will decrease, the glaciers will melt and numerous species will disappear.

The glaciers from all over the world are melting faster as ever. It is the fastest melting rate since the measuring have started, threatening hundreds of million of people from the entire world. Ecosystems are another victim of glaciers melting. The average of glaciers decrease has increased from 30 centimetres, between 1980-1999, to 1.5 meters in 2006, according to the program of the United Nations for Environment.

The oceans level will decrease in the following 80 million years with 120 meters due to tectonic moves.

The global darkness is a term less known than the global warming, but this does not mean that it is less dangerous. The phenomenon is created by the gradual reducing of light quantity that reaches the surface of the Earth, observed during some decades, since when the 50's systematic measuring have started. It is thought that is due to the increase of pollution particles number (fume, dust, etc) released in the atmosphere by human activities. The effect varies from a location to another, but globally, the light quantity that reaches the surface of the Earth decreased with 4% from 1960 to 1990.

It is imposed the formation of a global alliance for the Earth and our descendents protection.

Fundamental changes in our thinking and acting way are necessary. We must promote in education the universal responsibilities principle. We are citizens of some different nations but we belong to the same world in which local and global are interdependent.

We must live with respect for the creation mystery, with the gratitude for the gift of life, with humility for the place taken in the nature.

The beginning of this millennium is characterized by an impact more and more increased of ozone activities on the Earth. It arises such global changes of environment elements and a series of crisis are generated such as: the increasing level of the Planetary Ocean, the ozone level decrease, the soil degradation, pollution, global warming.

The Norwegian Fjords, crystal waters of Baikal Lake or the waterfalls in Croatia, the waters in Retezat are some of the natural spaces in Europe that must be protected.