ROLE OF UNESCO CHAIRS IN ECOLOGICAL WORLDVIEW FORMATION

At modern stage of civilized development rational use of natural resources and environmental safety are acting as expression of integral form of vitality of different biosphere and noosphere objects and are regarded as necessary components of providing the sustainable development of the state. Ukraine's entry into the global civilized society is setting new tasks ahead the system of specialists training, whose qualification has to ensure the growing needs of the state and to comply the level of global education standards proactively.

Today, higher education is training the age group of specialists that are going to form the material and intellectual product in 2020s-2030s. In terms of energy – the basic sector of every states' economies, taking into account the dynamics in technological sphere, in that period new breakthrough technologies should be expected. At the first stage these technologies will provide significant enhancement of generation systems' energy efficiency and reduction of organic mineral resources in energy consumption structure with following transfer to wide range of renewable energy sources introduction in longer-term perspective together with new physical principles energy generation technologies, such as usage of thermonuclear energy, intracrystalline nuclear fusion in metal hydride systems, torsion fields' energy, vacuum energy and oth., standing out due to high energy and environmental effectiveness. This process is a case history of transport power facilities development. The transition from traditional car engines having the operating efficiency coefficient in range of 25-27 % to electrochemical generators based on the fuel elements with hydrogen as energy carrier has allowed to increase the coefficient to 60-65 %. Similar revolutionary changes should be also expected in stationary energy generation using nowadays the energy potential of the fuel not more than 30-35 % that leads to irrational consumption of energy resources and unacceptably severe pollution of the environment.

This problem is acute in Ukraine, where existing fuel shortages requires a fundamental restructuring of the energy resources being for the purpose of state's

energy safety ensuring. Therefore, schooling of ecology and energetics stuff qualified in field of strategic energy management whose knowledge should be based on sophisticated understanding of energy transformation's physical fundamentals along with new environmentally improved technical systems is a pressing task. Mastering of methods of fuel and energy complex development planning taking into account possibilities of own resource potential and restrictions on environmental profitable capacity is an important innovative component of the special lecture course cycle for a new breed experts training.

An essential condition of the cutting-edge training effectiveness – its organic relationship with science: education has to be «built-into» the system of scientific researches. The most important task of the program of the specialists training is forming and implementation of the «environmental education – ecological thinking – environmental world outlook – environmental demand (imperative) in practical activities» logic chain. The terminal segment of that chain assumes such a level of consciousness at which the society will be guided by the principle of assuring the conditions for preserving ecosystem's ability to self-recover, starting at the local, the regional and finishing at the global level.

Taking into account constantly increasing importance of ecological development vector of economy at the present stage when economy of knowledge and communication comes in the stead of outdated structures, the necessity of the system approach towards correlation between basic components forming a single information space in educational and innovative activities spheres should be highlighted.

In Figure 1 the multifunctional scheme of information-integrated system of ecological education and its mutual influence on the material production towards innovative activities is presented.

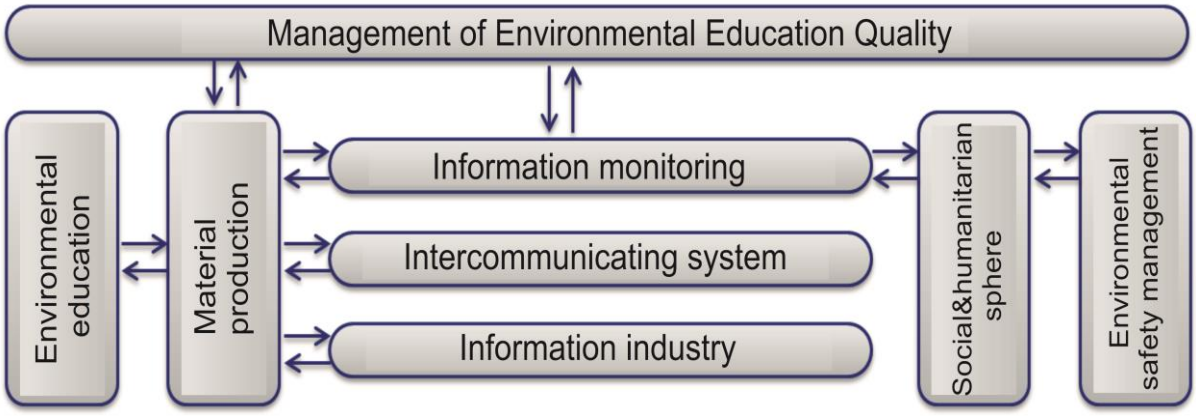


Fig. 1 – Multifunctional scheme of information-integrated system of ecological education

The coordinating unit capable of providing collection, processing and effective management of information flows connected with scientific and innovative activities intended to be the organizational innovation agencies including the UNESCO Chairs.

In Fig. 2 the basic functional connections, securing information analysis and consulting cooperation between the UNESCO Chair personnel and consumers of innovative technologies for the environmental safety are shown.

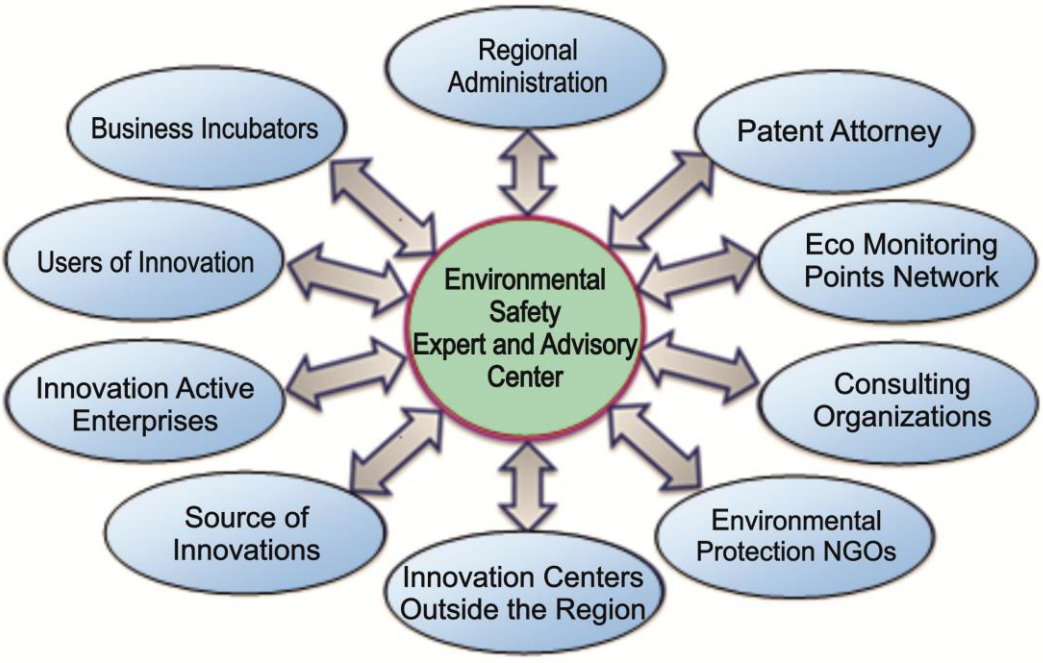


Fig. 2 - Functional connections between the UNESCO Chair and consumers of innovative technologies for the environmental safety

Considering the global trends in the area of R&D and manufacturing relations restructuring towards enhancing the role of the intellectual content the UNESCO Chairs have to initiate the creation of a new structures row including technology platforms and clusters at national and international levels towards the fields of study that have scientific and technical groundworks on creation of the newest environmentally sound technologies.

Integration of technical-scientific and industrial potential for execution of economies' development under conditions of transfer to the 5th tenor of technology innovative strategy. This transfer is effective means of solving the socio-economic problems, based on forming of modern innovative institutional structures. Such an approach predetermines forming of modern vector of sustainable development carried out through processes integration and choice of rational functional mode in ranges of territorial-production complexes in order to improve the production efficiency and minimize technogenic influence on the ecosystem of the region.

Methodological framework for such an approach developed by the department's experts was named as industrial symbiosis.

Particular attention deserves activity of the departments (chairs) that are functioning under the auspices of UNESCO and are formed to make significant contribution to the UN Strategy on education and science implementation for ensuring of ecological compound of Ukraine's economy approach to the principles of sustainable development. For strengthening the positions of the chairs as systemically important structures that provide the innovative component of the specialists training it is necessary to extend the spheres of their activities, including such questions as:

a) inauguration of the universities-based information and advisory centers that target their activities to meet the scientific, technological and educational needs of society;

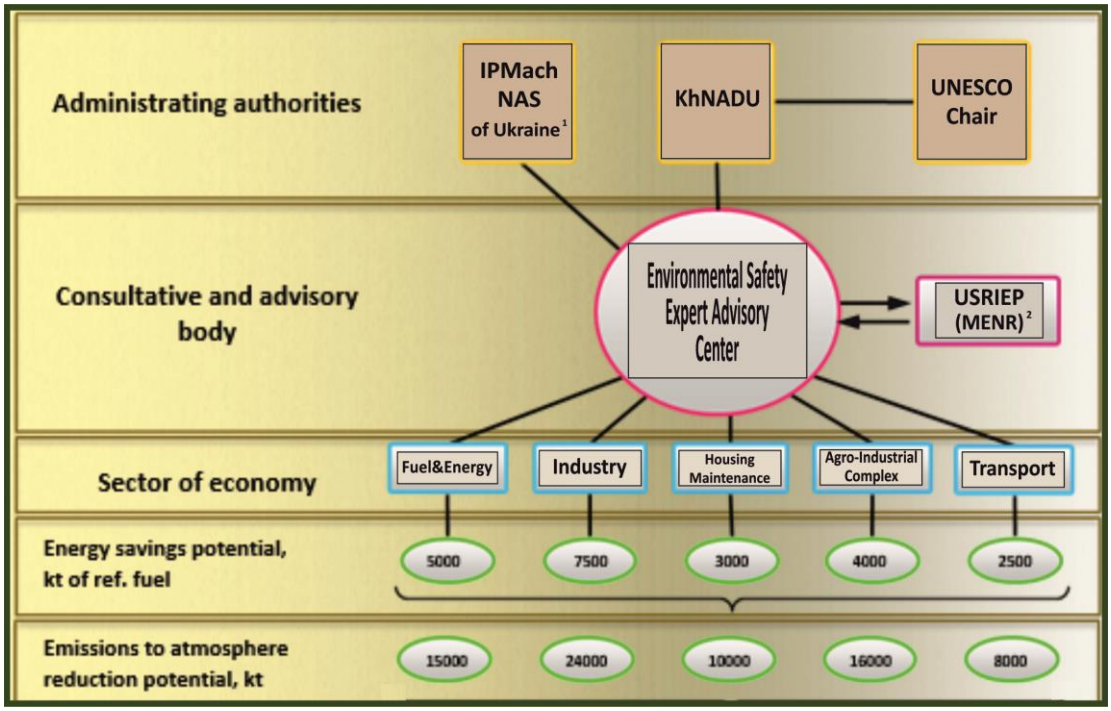
b) marketing researches of new educational technologies of learning from innovative experience, participation in exhibitions, seminars, presentations; collaboration of higher education institutions (IHE) with scientific establishments on introduction of innovative technologies; application of internet resources, forecast of demand on innovative products;

c) peer review and choice of technologies that include the analysis of ecological and economical characteristics of innovative projects; approbation of new developments and their adaptation to operating conditions of a certain enterprise;

d) improvement of study programs that provide the increase of ecological education level based on the use of leading foreign higher educational institutions' (IHE) experience and harmonization of educational programs for ecological courses with basic training courses;

e) establishment of environmental support points branched network for the on-line monitoring of the state of the environment with following expanding coverage of a surface right up to a country-wide level.

For the purpose of educational and scientific research activities in fields of innovative technologies coordination Kharkiv National Automobile and Highway University (KhNADU) embarked on forming the Environmental Safety Expert Advisory Center, structure and main activities' directions of which are presented at figure 3.



[1] – Podgorny Institute For Mechanical Engineering Problems, National Academy of Sciences of Ukraine

[2] – Scientific Research Institute of Ecological Problems (Ministry of Ecology and Natural Resources of Ukraine)

Fig.3 – Institutional relationships and tasks of the Environmental Safety Expert Advisory Center

Primary mission of the KhNADU UNESCO Chair Center functioning is informational and analytical securing of decision-making in environmental protection and ecological safety spheres according to the requirements of standardization and certification normative acts with open access to databases concerning rational natural resources management, using modern possibilities of information and communication technologies (ICT) both at the stage of conducting the monitoring and during providing of the factors influencing the environmental situation in a region system analysis.

The task of creation of the environmental support points branched regional network for the ecological monitoring with mobilization for practical activities of as wide range of participants as possible deserve particular attention. Such points

can be established nature sciences-focused departments of IHEs, at government institutions and public organizations.

Consequently, forming of a modern educational system in Ukraine that focuses on entering the global educational environment requires essential modifications of organizational competence in training of the specialists to be in field of ecology and environmental protection. These changes are aimed at active practical activity on implementation of environmental imperative in all spheres of the economy.

On the basis of the expert analysis results of world trends in fundamental and applied researches development in environmental protection we consider that the most important activity streams could be offered to include in the list of actual strategic problems claiming UNESCO's attention are:

1) increase of environmental technogenic safety level, including the power systems using the renewable energy sources considering the influence of entire «lifecycle» of equipment on ecological indicators during its production, exploiting and utilization;
2) development of physicochemical and thermogas dynamic frameworks of water-purifying and desalination technologically-closed cycles for the purpose of highly-effective equipment creation for ensuring stable functioning of fresh-water-supply systems;
3) advances in technologies of carbon-hydrogenous wastes utilization and processing both onshore and in the World Ocean for improvement of the ecological situation of commercial goods achievements;
4) elaboration of the non-linear multiparametric tasks of math physics decision theory when conducting and ecomonitoring for identification of environmental pollution sources and their parameters;
5) development of the technology and equipment methods for changing the traditional motor fuels with more environmentally compatible types of energy carriers including the biofuels obtained from the non-food plant

roughage with order to reduce the technogenic supertoxicants emissions causing a degradation of the natural photosynthesizing system;

6) Control of the carcinogenic components (benzpyrene and its homologs, dioxin etc.) content in the air and elaboration of proposals for the carcinogenic emissions reduction.

Methodological framework for the reported scientific fields are stated in numerous monographs, patents, tutorials and articles from leading research journals published by the UNESCO Chair's employees in recent years.

From our point of view, the proposals on subject area specified above can be forwarded for consideration to the Directorate-General for Research and Innovation of the European Commission DG-R & I to include it to the package of funded areas for the purpose of forming the substantive content of the FP9 Framework Programme.

In conclusion, once more we stress the importance of the set of the activities implementation on assimilation of electrotechnics allowing to solve a number of social-economic and environmental problems and ensuring increase of the sustainability of Ukraine's energy sector functioning, and also will provide obtaining of the new fundamental knowledge in fields of environmental safety in the interest of European and world community.