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Environmental, Engineering and Legal Aspects for Sustainable Living

Programm Abstracts

International Seminar

TRANSFORMATION OF THE FINANCIAL WORLD *Fintech:* INNOVATIVE SOLUTIONS & TRENDS

EUROPÄISCHE WISSENSCHAFTLICHE GESELLSCHAFT

APRIL, 26 2019

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- HOW TO ORGANISE AN INITIAL COIN OFFERING (ICO)?
- HOW TO INTEGRATE BLOCKCHAIN TECHNOLOGY IN AN EXISTING BUSINESS
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- THE POTENTIAL OF QUANTUM COMPUTING
- ROBO-ADVISORS AND ARTIFICIAL INTELLIGENCE
- WHAT CAN HAPPEN IF THESE TECHNOLOGIES ARE COMBINED?
- REGULATORY REPORTING + TECHNOLOGY (REGTECH)

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"ENVIRONMENTAL AND ENGINEERING ASPECTS FOR SUSTAINABLE LIVING"

Programm Abstracts

Europäische Akademie für Naturwissenschaften, e.V. Hannover
Europäische Wissenschaftliche Gesellschaft e.V Hannover

ISBN 978-3-00-032886-2

Publisher:
Europäische Wissenschaftliche Gesellschaft e.V. (EWG e.V.)
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CONTENTS

Ganna Aylikova

SIGNIFICANCE OF WORK ON SPATIAL PLANNING FOR SUSTAINABLE DEVELOPMENT OF TERRITORIES

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As is known, one of the main conditions for the sustainable development of territories is to achieve maximum harmonization of various interests in resolving conflict situations occurring in a certain region, and to adopt, on the basis of reliable information and scientific analysis, appropriate solutions to overcome these conflicts. Today, for the implementation of the concept of sustainable development, work on spatial planning (urban planning) has become more urgent, the main task of which is to assess the current state and recommendations for creating the most favorable living conditions in the long term.

The whole system of development of urban planning documentation of Ukraine is based on the hierarchical principle, which is legally enshrined in the Law of Ukraine "On Regulation of Urban Development Activities".

There are three levels: state, regional and local. At all levels, it is imperative to take into account the national, regional, community and local (private) interests of all subjects of urban development activities, which often come into conflict with each other.

It has traditionally turned out that the most acute and most conflict issues of territorial development that are considered in the development of city-planning documentation of any level, are directly or indirectly related to environmental issues.

One of the main environmental components in the implementation of the General Scheme of Ukraine (state level) was the development and territorial (graphic) expression of the main components of the ecological network of Ukraine – the ecological framework, which, along with the planning and historical frames, became the main element for establishing the regime of use of the territory at all levels of city-planning documentation development. In accordance with the methodology for the ecological framework development, environmental nuclei (elements of the natural reserve fund) were identified - the ecological framework nodes, the ecological corridors - the main axes of the ecological framework, connecting the nuclei with each other, and the tissue filling (the territories of different eco-stabilizing purposes, which located outside

the nuclei and ecological corridors). For each of these elements, the land use regime was determined.

Like urban planning documentation, the graphic display of elements of the ecological network has its own hierarchy: conceptual positions of the national level, are detailed at the regional level and find their territorial expression in the development of master plans and the construction of ecological frames of individual settlements or territories as part of a single ecological network of the country.

However, such a clear and logical system of taking into account the environmental component in the development of the territory, in practice, is not realized, moreover, cannot be realized due to the lack of open and reliable information about the processes occurring in the respective territories, the contradictions and ambiguous interpretation of the existing legislative framework, privatization of land plots, during the course of which ecological and urban planning requirements, a number of other objective and subjective factors were practically not taken into account.

The lack of awareness of the inhabitants of the respective territories about the current processes and promising solutions, the lack of mechanisms for influencing these public decisions also negatively affects the development of the territories and generates regular conflicts.

Only spatial planning documentation, especially at the regional level, can really identify problems of a diverse nature and identify ways to address them in the respective territories. First of all it concerns serious environmental problems that exist on specific territories, and which can only be seen “from the outside”.

Svitlana Biriuk
Alla Pleshkanovska

INFLUENCE OF TRANSFORMATION OF INDUSTRIAL AREAS ON ECOLOGICAL STATE OF URBAN ENVIRONMENT (ON THE EXAMPLE OF KYIV CITY)

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The past century has been marked by the characteristic features of the industrial development of society. Numerous industrial plants, communal, warehouse and transport facilities, which formed a powerful city-forming basis of settlements, had a negative influence on the ecological state of cities, especially large and the largest. However, after the collapse of the Soviet Union and the complication of intersectoral linkages, industry in Ukraine greatly reduced its capacity. On the one hand, this situation created problems in economic development, but on the other hand, it promoted the improvement of the ecological state of cities.

The redevelopment of industrial, communal and warehouse territories at the initial stages was unmanageable. Territory transformation was held in several stages: 1) leasing of separate buildings within industrial sites; 2) redemption of entire objects or separate buildings; 3) official registration of property rights to objects or land plots. As this process was chaotic, it led to the inefficient use of territories of industrial units. Within the industrial zones appeared separate fragments of another functional purpose, but the negative influence on surrounding industrial objects remained. The overall reduction of the part of industrial areas did not actually change the proportion of territories that were under the negative ecological influence.

Such tendencies were also reflected in the new Master plan of Kyiv city. The document provided for the reduction of the area of industrial territories from 6,912 hectares to 5,382 hectares. That, in its turn, reduced the area of spreading of negative ecological influence on surrounding urban areas in the amount of 1780 hectares (including the area of sanitary protecting zones), what is about 4.1% of the built-up area of Kyiv city.

In addition to the provided for in the Master plan, a stable tendency of changing the functional type of industrial, communal and warehouse territories for housing and public building was formed in Kyiv during the past decade. The object of such a transformation is big industrial units. The Galakton plant (7.2 hectares), the Radikal plant (93.2 hectares), the Kvazar plant (22.8 hectares), the Poznyaki industrial zone (57, 7 hectares), the part of the Podil-Kurenivka industrial zone

(146 hectares) can be mentioned as an example. From an ecological point of view - it is a positive change, but this process leads to a misbalance of the city territory as a whole.

Another major factor in changing the functional type of industrial, communal and warehouse areas and in improving the ecological state of the urban environment was the global trend towards post-industrial type of development with the use of modern innovative technologies at city-forming and city-serving objects. As a result, industrial objects are characterized by significantly less negative influence on the ecology of the urban environment, a great reduction or a complete absence of sanitary protecting zones. That allows them to be located in close proximity to housing and public buildings.

As a positive example of such an approach a change of the functional type of territory of the former motorcycle factory can be considered. This enterprise was founded in 1945 and had 2,200 workers. Its area was 25.0 hectares. The sanitary protecting zone of the plant ranged from 100 m to 300 m, and the area of the surrounding territories, which were negatively affected by the production activity of this enterprise, amounted to about 43.0 hectares. The project promotes for the creation of a modern innovative township. The center of the township is a university, where about 1,000 students already study (and where up to 3,000 students will study). In addition, the township provides for the placement of innovative business facilities and support for start-ups, objects for high technology studies and research, conferences, recreation, sports activities, cultural entertainment and accommodation. The total number of places of employment will reach 14,500.

Implementation of such an object allows not only to save, but also to greatly increase the number of places of employment, to develop a network of service facilities and to significantly improve the ecological state of the city central zone.

V.A. Burkovskaya
V.D. Burkovsky

THE WAYS TO IMPROVE THE ENVIRONMENTAL COMPETENCE OF STUDENTS IN THE IMPLEMENTATION OF EDUCATIONAL AND RESEARCH PROCESSES

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A modern higher school graduate is to acquire a number of general cultural and general professional competencies in the process of learning. Among them are environmental competencies, which are not less important and comprise the phenomenon of environmental competence based not only on the system of knowledge, skills and habits, but also on the formation of ecologically oriented consciousness and worldview, since the professional activities themselves and their results are currently evaluated with relation to the influence on the environment. Social responsibility as an integral component began to involve such concepts as environmental friendliness, rational use of resources, objective assessment of the impact on the biosphere, etc.

It should be admitted that the formation and especially the improvement of environmental competence of the student is quite a long and multifaceted process. The level of elementary environmental literacy can be considered the first, or the initial level of environmental competence. The second, or the middle level suggests the existence of a developed system of environmental values and readiness for their practical implementation, mastering the basic skills of experimental activities, the development of a creative approach to solving professional problems. The third, or the high level of environmental competence should be characterized by the trinity of the principles related to intellect, values and meanings and activity, which corresponds to the traditional scheme of the cognitive and those of value, activity and practice criteria to be used for assessing the level of environmental competence.

The first and the second levels can be regarded as generally necessary, achieved in the course of the implementation of the system-based method of cognition in the process of education.

The achievement of the third, or the high level should imply the involvement of PR-technologies, the use of scientific and research work on a large scale, the organization of environmental monitoring activities, participation in the implementation of regional and national environmental programs and projects,

volunteer and voluntary environmental movements. A high level of environmental competence is impossible without a positive motivation in the practical application of one's knowledge, skills and habits, which is reflected in the need and motivation criterion for assessing the environmental competence. In addition, a high degree of environmental competence implies not just value orientations, but a comprehensive system of values, embracing knowledge, personality, nature, social responsibility and socially significant activities, law, culture, society, health, creation, morals.

Modern society treats a high level of environmental competence as an imperative, an obligatory norm of the development of the civilization.

Iryna Dreval

OPEN SPACES OF KHARKOV HISTORICAL CENTER AND THE PROBLEMS OF THEIR ARCHITECTURAL AND URBAN PLANNING TRANSFORMATION IN MODERN CONDITIONS

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Architectural and landscape organization features of the historical city center characterize the cultural level of the urban community and its value orientation. The historical part of the city is remarkable because it stores information about the original sources of its formation. The fabric of historical buildings keeps the memory of the architectural and town planning development peculiarities of this territory, while the open spaces of the city center retain the primary landscape conditions of the city formation. For Kharkov city (Ukraine), their basis is relief, which has a kind of plastic, and rivers. The central plateau is the visually-spatial focus of the historical center. Amphitheaters go down from it in three directions. Occupying vast areas between the central plateau and the surrounding hills, they provide opportunities for observing the central city core from long distances.

Kharkov urban fabric of the XVII –XIX centuries is organically fit into nature, and it strengthened its aesthetic qualities. All elements of the natural landscape, such as green areas of the forest, hills, amphitheaters, rivers, have merged with the buildings of Kharkov historical core into a single expressive ensemble. It is the structure of open spaces, due to natural factors and combined with the buildings, formed the unique individuality of the appearance of the historical city core. On the other hand, the presence of open spaces (gardens, squares, slopes) created the prerequisites for the best perception of the city landscape and provided the variety of panoramic disclosures. Thus, the natural landscape of the city center and its historical layout determined the construction of a visual series that forms the "image of the city". The architectural dominants (the Pokrovsky and Assumption Cathedrals) are located here, their spatial and scale correlation between themselves and with the forms of the natural landscape are an example of the creative use of the situation for the spatial unification of the urban environment.

Developed during the XVII–XIX centuries, the system of landscape organization of Kharkov city center had the following features:

- at the level of the natural framework - the vast green wedges approaching

the center, the Lopan and Kharkov rivers with green slopes, the central high plateau with visual expansions into three amphitheaters;

- at the level of urban fabric - private and public gardens, which separate the building arrays, squares and green cour d'honneurs, which break the spatial monotony of the streets, greenery of the quarters and manor buildings, which form the background for buildings and structures;
- at the level of landscape details design - the stylistic unity of the architectural and planning decisions of the sites with the surrounding architecture and their large-scale harmony.

Today, in the conditions of market economy development in Ukraine, the housing of the historical center with new buildings, the reduction of the landscape territories, the deterioration of the ecological situation are taking place. To solve a problem effectively, it is necessary to make a concept of the landscape organization development of the entire city and its historical part. It should be based on the priority of ecological, historical and cultural values. From these positions, open spaces of the city should be considered as an integral system with the following properties: hierarchy of building elements; uniformity and continuity of their distribution throughout the city, as well as coherence with external open green spaces. Landscape protection measures should be aimed at preserving historically valuable relief, water bodies, restoring the historical landscape and relations with the surrounding nature, eliminating buildings and structures that distort the landscape, preserving and restoring vegetation, protecting territories from landslides, erosion, and strengthen slopes. The formation of the landscape-ecological framework of the city is an effective means of increasing the aesthetic potential of the historical part of the city while maintaining its natural basis.

Galina N. Falkova
Maria O. Osipova

ACTUAL PROBLEMS OF WATER QUALITY IN NATURAL BODIES OF WATER IN KEMEROVO OBLAST

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In present time the problem of water quality of natural bodies of water has gained its actuality and it is directly connected with the problem of removing wastewaters pollutants from wastewater.

The actuality of the problem of contamination of water bodies in the oblast is dealt with the aging of sewage treatment plants, whereas the composition of wastewater is getting more complex, water consumption for domestic use is increasing and therefore outdated sewage treatment plants are unable to process the wastewaters and thus, contaminated waters flow into natural water bodies.

Treatment of water resources in Region Kemerovo can be compared with an "iceberg",

where on the surface there is only a quite insignificant noticed part, accounting for 15-20% from the whole volume of treatment and the "underwater" part of the iceberg are made of the rest percentage of wastewater, which is not declared by dishonest operators of natural bodies of water.

The municipal infrastructure contributes significantly to the volume of water pollution, which represents about 26% of the total volume of wastewater. In terms of the concentration of pollutants the most hazardous industry is the energy industry (45%), followed by mining industry, chemical industry (9%), metallurgy (6%) and coke-chemical industry.

The high concentration of pollutants in the volume of wastewater from above mentioned industries has recently led to unfavorable ecological conditions in Kemerovo Oblast.

On the territory of Oblast Kemerovo there are 32109 rivers of the total distance of 245152 km.

Among the water storage reservoirs enlisted in the oblast the biggest are: Cara Chumysh (62,46 km^3), Belovsky (59,0 km^3), Dudetsky (41,0 km^3), Zhuravlevsky (31, 59 km^3), which are used as drinking water supply and as a source of technical water, fish farming and recreation.

On the territory of Oblast Kemerovo there are water production systems

for industrial, agricultural and municipal water supply and sewerage including storages of liquid wastes

(hydraulic fills, sludge silos, float solids storages, retention basins, ash and slag storages), and also ponds that regulate streamflow of rivers and temporary watercourses, which serve as strategic supply of water resources in case of fires and droughts.

The total length of the coastline of the water objects in the borders of settlements on the territory of the Region Kemerovo is 7000 km. Monitoring of hydrological and hydrochemical state of the local water on the territory of the Region is carried out on 18 bodies of water, in 27 sites, 39 folds.

Characteristic substances, which contaminate the local water are petroleum byproducts, phenols, compound of nitrogen iron, zinc, manganese, copper and suspensions, COD, BOD (The Report on State and Environment Protection in Region Kemerovo in 2015).

During last 5 years the exceedance of threshold limit value on zinc, copper, petroleum byproducts and nitrite nitrogen in river Tom has been constantly reported. Most pollutant part of river Tom is the part located downstream of the city Novokuznetsk (village Slavino).

In 2013 the volume of wastewater disposal into superficial bodies of water was estimated as 1717,86 mln.m^3, where 188,87 mln.m^3 were disposed without the treatment and 409,03 mln.m^3 was not treated properly.

In order to ensure citizens' rights to favorable environment, improvement of quality of life the program «Ecology and natural resources of Kuzbass" has been conducted throughout 2014-2018. The program was adopted by the resolution of the Collegium of Administration of Oblast Kemerovo from 25.10.2013 N.460.

In the frame of this program there are 9 subprograms, among them such as "Application of Water Resources", "Development of the Complex of Water Economy". These subprograms put forward the goals of high priority for the oblast:

- Sustainable use of water to preserve aquatic ecosystems and to provide protection of the population, the economic infrastructure and social spheres from exposure to wastewater;

- ensuring preservation and reproduction of biological resources.

Subprogram "Development of the Complex of Water Economy" envisages the funancing following works: «Capital renovation of hydraulic structures, which are property of subjects of the Russian Federation, municipal property; capital renovation and liquidation of unregistered hydraulic structures. Works on capital

renovation of hydraulic structures of the Region without property ownership are going on to date.

To solve the problems and to reduce the exposure of bodies of water can be achieved due to introduction of best available technologies on the enterprises of Oblast Kemerovo.

Therefore, solving the problem of quality of natural bodies of water of water in Oblast Kemerovo can be carried out in joint and complex efforts between the bodies of the executive power, engaged in realization of ecological policy in Kuzbass and the operators of bodies of water, whose activities should be aimed at modernization and improvement of sewage treatment plants and technologies of sewage treatment of disposed wastewaters based on the principals of best available technologies (BAT).

A.A. Garashchenko

INFORMATICS METHODS APPLICATION IN ECOLOGY

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The use of information technologies can significantly facilitate the process of research in any scientific field, including ecological science. Basically, their application consists in forming data arrays on the required topics and modeling natural and technogenic processes.

In ecology, Geological Information Systems (GIS) are widespread. Depending on the purpose of use, the GIS are able to provide, in addition to a certain territory schematic plan, information on the territory protection status (is it a conservation district or not) and land ownership. In some cases, with the help of GIS, it is possible to model various technogenic situations with the prediction of their distribution. GIS also allow to fairly quickly create informative plans of the territories with the required information. Thus, monitoring and research are greatly simplified.

The next example of the computer science methods application is simulation modeling. Simulation modeling allows to recreate the behavior of a certain system by means of computers. Such modeling can be very useful in cases when real, physical modeling is very expensive and difficult. In ecology it allows to simulate changes in a certain biological structures under the influence of various processes required for studying (for example, the effect of industrial emissions on the state of a river's territory, rates and trends in the population of biological species). Perhaps, one of the first such models is the Predator-Sacrifice simulation.

The most common and easily implemented information technologies are databases and data banks. It can be said that they were among the first to find application in ecology in contrast to the above mentioned technologies.They are successfully used to store information about wastes, waste management technologies, natural resources and regulatory documents. Over time, new databases appear, old databases are supplemented or restructured. Currently, there is no tendency for stopping using them, unless a more convenient structure for storing data appears.

The above methods are not the only ones. In the future, the emergence of new ways of applying information technologies in ecology is possible.

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OPTIMIZATION OF MARBLE WASTE PROCESSING TECHNOLOGY

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The extraction of minerals is the basis for obtaining of natural raw materials for all branches of industrial activity. On the other hand, mining companies have a significant negative impact on the environment, which is expressed in the alienation of land, pollution of soil, air, nearby bodies of water and groundwater. Resource-based economy causes a constant increase of volume of extracted resources and generated wastes.

There are a lot of occurrences in the Irkutsk region, that are being now developed. One of that is on interest - the factory of marble extraction and processing, located in the immediate vicinity of Lake Baikal. The proximity of the quarry to the largest and cleanest fresh water reservoir in the world necessitates the development of directions for recycling of marble waste.

The authors developed a technology for the utilization of dispersed waste from the extraction and processing of marble in the production of composite building materials with improved consumer characteristics. The degree of filling of these materials reaches 60% by weight. The technology is an extrusion processing of dispersed marble waste and PVC resin. As a part of this work executed optimization of technological modes for the production of materials with different composition. Optimized extrusion regimes for various contents of dispersed marble in the composition:

- Temperature of extruder zones, °C:
--- zone 1 (40 % - 169 °C, 50 % – 175 °C, 60 % - 183 °C);
--- zone 2 (40 % - 171 °C, 50 % – 177 °C, 60 % - 185 °C);
--- zone 3 (40 % - 174 °C, 50 % – 182 °C, 60 % - 191 °C);
--- zone 5 (40 % - 178 °C, 50 % – 187 °C, 60 % - 193 °C);
- Adapter temperature, °C:
40 % - 167 °C, 50 % – 176 °C, 60 % - 183 °C;
- Die hole temperature, °C:
40 % - 168 °C, 50 % – 171 °C, 60 % - 180 °C;
- Melt pressure, MPa:
40 % - 6,9 MPa, 50 % – 8,3 MPa, 60 % - 11,6 MPa;

- Screw rotation speed, R.M.P.:

40 % - 7,7 r.m.p., 50 % – 9,5 r.m.p., 60 % - 12,1 r.m.p.;

- Dosing device speed, R.M.P.:

40 % - 6,9 r.m.p., 50 % – 8,7 r.m.p., 60 % - 8,0 r.m.p.

The resulted technological parameters of extrusion allow to receive materials of the improved quality and minimize defects of a surface and profile geometry. At the same time, the resulting materials are durable, fireproof and environmentally friendly.

The work was carried out with the financial support of the Ministry of Education and Science of the Russian Federation: project within the framework of the state task: No. 5.11496.2018 / 11.12

S.A. Kolodyazhny
L.V. Shulgina
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TECHNICAL AND ECONOMIC ASPECTS OF DIGITALIZATION OF ECONOMY

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Critical researchers consider the process of digitalization as an information revolution, see the difference in the rates of socio-economic and information-digital development of the country, express fear for the likely growth of social contradictions. Those directly responsible for the implementation of the reform (Deputy Minister of Economic Development of the Russian Federation S. Shipov, head of the Pension Fund of Russia A. Drozdov, General Director of the Digital Economy Autonomous Non-Profit Organization E. Kovnir and others) see the problem in shaping technical tools and new data processing technologies, creating institutions the introduction of robotics. General Director of ASIS Soft O. Zakharchuk believes that the most important technical task is to change the paradigm of project management in the field of artificial intelligence.

These different challenges mean that the interface between an economic (or rather, socio-economic) and a technical approach to digital development takes time. And, although the terms of implementation of the Program are indicated - until the end of 2024-the formation of such a switching is necessary.

Russia is currently ranked 39th among 85 countries in terms of digitalization of population activities. This means insufficient economic and technical support for the digital sphere. There is an active process of developing programs and ways to translate into figures any amount of information, adapting to each other data at different levels, the use of domestic and available foreign technologies in this area.

The traditional economic approach is to compare the income and expenses of economic agents and identify the effectiveness of activities as a result of digitalization.

The technical approach to the digitalization of the economy has in mind the formation of digital platforms based on “end-to-end” technologies using domestic developments and international achievements in this field, as well as the creation of methods for the formation of infrastructure and digital institutions for this.

The objectives of a socio-economic nature in the traditional economy require appropriate traditional management of the relations of economic agents, and

digitalization requires digital management. That is, digital management is needed, based on digital monitoring, analysis, evaluation, rating (data for stimulation) and control over controls for making a decision. Digital management concerns, first of all, the main element of any activity - a person. The risks generated by digital management itself lead to the digitalization of the individual, unauthorized openness of personal data for any management institutes, including domestic and foreign systems of power management, criminal structures. There is a need for the preventive development of legal regulations to minimize or eliminate risks.

In the field of digital training, engineers and IT professionals are not enough, as reflected in the Program. Based on the objectives of the Program, there is a need to train digital managers. There is also a need for digital lawyers who will be able to resolve disputes between economic agents that will arise in the process of digitalization. Without digital economists will not do any enterprise. Teachers with specific humanitarian training and methods of work are needed to teach the population digital technologies. Moreover, the principles and ethics of such training may differ significantly from those generally accepted in traditional higher education.

It should be borne in mind that monitoring, analyzing and evaluating the digitized life activity of people will sooner or later lead to rating evaluations of everyone, and such a rating allows us to develop a corresponding digital stratification of the population that affects the distribution of wealth in society. There may be risks of social caste-making of society, which from a socio-economic point of view means a return to the feudal past, although technically digital systems will correspond to modernity. After all, the digital economy covers, above all, the phases of distribution and exchange in society. The digital management can be enhanced by the uneven income and distribution of benefits for different segments of the population, which can not but influence the demographic, labor and gerontological processes in society. In this regard, changes in traditional legal institutions and codes are inevitable. And, although the Roadmap to the Program considers these processes for 6 years, but it is more expedient to make changes at the same time, assuming the experience of foreign countries in risk management and legislation transformation. The onset of the digital economy as part of the traditional or as a new supratraditional sphere is objectively inevitable. No criticism can cancel the use and development of Internet technologies. What could be the way out? The first is to close the country's activities from the global trends of the digital economy. This output, of course, is impossible. The second is to catch up and conform to the countries developed digitally not

only technically but also socially, to use their positive and negative experience of digitalization.

However, the intensification of digital technologies, indicated directly in the Program, may not coincide in time with the intensification of the development of socio-economic institutions.

The conjunction of the socio-economic and technical aspects of digitalization should be carried out taking into account the moral beginnings and preservation of the social priorities of modern Russia. Moral laws and traditions are developed in Russia by the whole course of its historical development, and attention to them contributes to the growth of public confidence and its participation in the digitalization process. Indeed, the basis of economic morality is always the idea of social justice, which supports the spirit and spirituality of the nation.

Otherwise, the economic and political achievements of the state of Russia can be leveled and made dependent on the more developed digital systems of the United States and European countries, and possibly the new industrialized Asian states.

Olena Kotsar

EXTRACTION OF BIOCOMPOSTING SUBSTRATES AND IRRIGATION WATER FROM WASTE WATERS FOR PREVENTION OF SOIL DEGRADATION AND DESERTIFICATION IN UKRAINE

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Ukraine is among the top ten countries in the world that have about 32.5 million hectares of arable land. However, soil degradation is progressing. Soil formation properties deteriorate due to unsustainable economic activity and natural processes caused by global warming, which is accompanied by loss of soil's productive and environmental functions. Soil degradation and desertification causes loss of not only biological species but also water reserves, namely small rivers, eutrophication of waters, pollution of ground waters, increase in concentration of greenhouse gas in the atmosphere etc. Due to soil degradation, losses caused by shortfall of agricultural products, are estimated at the level of EUR 600 million/year.

Major factors of soil degradations, observed in recent years in Ukraine, are erosion (44%) and dehumidification (23%).

Among the main factors of soil degradation processes in recent years, erosion (44%) and dehumidification (23%) dominate on the lands of Ukraine. The reduction of humus content in eroded lands can reduce crop yields from 16.7% for weakly-eroded soils and up to 52.9% for highly-eroded soils, while raising in its level by 3-5% contributes to the increase in yields, in particular, winter wheat - 5 hwt / ha, sugar beet - 75-98 hwt / ha. Speaking about dehumidification of soils, which leads to desertification due to loss of humus, it should be noted that on average 80-90% of organic residues of vegetable and animal origin in soils are mineralized by microorganisms, worms and mushrooms to final mineral products consumed by plants, and only 10 -20% are used for the formation of humus in the biochemical processes of humification. In Ukraine, the annual deficit of humus is about 110 kg/ha, and -3.57 million tons / year for entire arable lands. Therefore, the enrichment of arable land by humus is one of the priority tasks in counteracting the processes of their degradation. In spite of conventional methods of soil enrichment with organic substrates (compost, humus, peat, etc.), which are turned by biocoenosis of soil organisms into

humus, there is another method based on placing of biohumus obtained through biotechnologies in artificially created conditions into the soil.

The main methods for production of biohumus is processing of the organic substrate by rainbow worms (using the vermiculture method) and the use of biocenoses of microorganisms that, in anaerobic conditions, under optimal temperature and hydraulic regime in anaerobic bioreactors, form bio-substrates containing biohumus. This process results in release of biogas in the process of humification of the organic substrate. This gas is an alternative source of thermal and electric energy.

Ukrainian Scientific and Engineering Center POTENTIAL-4 has tested developed and certified anaerobic biohumus reactors on different substrates, in particular, poultry litter of poultry farms, sewage of livestock complexes, sediments of biological treatment plants of household and sewage systems. Bio-substrate, used in tested land plots in the amount of 50 kg/ha, has increased Micscanthus yield by 45-52% in comparison with control. Considering the results of performed research, wastewater air conditioning station 7,000 m3 / day was developed for use in irrigation of Micscanthus by return water of normative quality and extraction of biohumus and biogas from biomass and sediment formed in the process of biochemical purification of sewage, in anaerobic bioreactors. The construction of such station requires the area of 4 ha, considering land plot for year-round irrigation of Micscanthus with area of 3.8 ha and construction of buildings for air conditioning of return waters and anaerobic bioreactor for extraction of biosubstrate and biogas with the area of 0.2 ha. Sanitary protection zone of the station is located 150 m away from residential area. The station will produce biosubstrate of 75% humidity with humus content of approximately 60% in the amount of about 1700 tons per year, which is sufficient for compensation of lack of humus in degraded soils within the area of 3800 ha of arable lands provided that it is applied in the amount of 0.4 t/ha.

Svitlana Kysil

ECOLOGICAL PRINCIPLES OF ARCHITECTURAL AND PLANNING ORGANIZATION OF MULTI-STORY PARKING GARAGES EXEMPLIFIED BY THE LARGEST CITIES

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The practice of protecting the environment identifies the main aspects of the deterioration of its sanitary and ecological status in the process of vehicle movement, such as noise of the territory and pollution of the air. The multistory parking garage facilities are a basic part of the modem community's transportation system. At the same time, storing cars at the multi-story parking garages is also become direct sources of air pollution and generate penetrating noise in the environment as a whole.

The problem of storing personal vehicles cannot be solved with technology and space planning means alone. Ecological component is just as important, which points to multifaceted nature of interaction between a man and his surroundings. Not enough attention at the present stage of design is pay to art, esthetic, environmental and psychological problems of organization of the architectural environment of multi-story parking garages. Ecological problems of organizing architectural environment for multi-story parking garages currently do not receive as much attention as they deserve.

Today, with the deterioration of the environment in urban areas, there is a question of establishing the ecological multi-story parking garages for saving vehicles. Ecological principle involves consideration of all environmental factors (noise protection, vibrations, radiation and electromagnetic radiation, fumes, water pollution and soil), sanitary norms regulations and rules when designing the multi-story parking garages for harmonious functioning of an architectural environment. Creating gardening, both outside the building and inside it ceases indispensable criterion in the design of the multi-story parking garages.

Therefore, the multistory parking garage has often been reduced to the construction of the minimal stand-alone structure or parking lot without human, aesthetic or integrative considerations. This has given the multistory parking garage a poor public perception and has frequently disrupted existing urban fabric.

Landscaping can add to the multistory parking garage facility attractiveness

and is good public relations. Disadvantages are initial cost and maintenance of appearance. Landscaping in the context of the multistory parking garage facilities is generally restricted to trees, shrubs, and grasses. The latter two are minimize in actual use because of their relatively high maintenance requirements.

Finally, landscaping territory of the multistory parking garage facility and within parking areas can be use to soften the appearance of the multistory parking garage facility from the street. More specifically, expanses of the multistory parking garage should be broken up with landscaped islands and planted strips, which include shade trees and shrubs. Such landscaping provides a canopy cover and reduces the urban heat island effect in the summer.

Some developers of the multistory parking garages are beginning to incorporate green roofs on parking structures to retain and naturally filter stormwater runoff, thereby improving water quality. Underground parking structures often have lawns and parks planted on top. Above ground, parking structures could also incorporate roof systems of vegetation, soil, drainage, and waterproof membranes to alleviate environmental problems including storm water runoff and the urban heat island effect. Additional benefits of greenroofs include improved livability of the urban environment by buffering noise, reducing glare, and offering an aesthetic alternative to asphalt roofing. Green roofs are more costly than traditional roof systems; however, the associated costs could be offset by the reduced need for stormwater facilities.

Based on ecological principle, it is advisable to form rational methods of architectural design environment, forms of expression, aesthetic the multi-story parking garages, avoiding the negative effects on the environment and human health. Therefore, using ecological principle will help to create a modern architecture of the multi-story parking garages, taking into account climatic conditions and particularly socio-cultural needs, and will be crucial to improve their planning schemes.

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O.S. Anisimova

ECOLOGIC ASPECTS OF COPPER-SMELTING ENTERPRISES ACTIVITIES IN THE MIDDLE URALS

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Non-ferrous metallurgy enterprises have a significant impact on the formation of unfavorable environmental conditions in industrial areas of the Middle Urals. The most disadvantageous plants are those ones producing crude copper. The three main copper smelters emit more than 250 thousand tons of toxic substances, which is about 5% for the industry in Russia and more than 13% for the region. The same enterprises are among the top largest stationary sources of lead emissions in the country.

In fact, geochemical anomalies have formed around large copper smelters due to severe contamination of soil and water bodies with heavy metals. Soils in the surrounding mono-cities contain copper and zinc that hundreds times more, and in the immediate area from the plant - thousands times exceed the permissible levels. The content of toxic substances in the air of the city exceeds the established standards: for technogenic dust it is 1.6-4 times higher, for lead – it is 3-7 times higher, for copper – it is 2.4 times higher, for zinc it is 6 times higher, for sulfurous anhydride it is more than 2.5 times higher. The degree of harmful substances trapping does not exceed 30%.

In addition to soil and air, the activity of copper smelters affects the state of water bodies. For example, the average annual concentrations in the basin of the Ural rivers are: copper 116 MPC, zinc 15 MPC (maximum permissible concentrations).

As a result of long term activities at copper smelters, toxic wastes accumulate in “temporary” dumps, sludge and tailings storages, which causes additional pollution of land and water bodies due to washing-out of heavy metals with surface and ground waters.

The formation and implementation of a comprehensive program for the introduction of modern environmentally friendly, resource-saving technologies and waste-free production for the processing of copper-containing raw materials and industrial wastes is highly relevant for copper-smelting enterprises of the Middle Urals. They will enable to process both current wastes and old dumps.

An important goal is to create a mechanism of environmental and economic assessment and to stimulate economic decisions for implementation of expensive technologies in order to relieve the environmental tensions of copper smelting production by reducing emissions and increasing the complexity of raw materials.

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VISCOSE PRODUCTION WASTES AS ALTERNATIVE SOURCE OF ZINC-CONTAINING RAW MATERIALS

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Wastewater from enterprises producing artificial viscose fibers contain significant concentrations of zinc sulphate. After pre-neutralization of the solutions with lime milk, zinc almost completely deposits, and then is discharged into settling basins. Significant amount of zinc have been accumulated in limestone-gypseous slimes for several decades of work. For example, there are 2,700 thousand tons of slimes in sludge collectors at the Balakovo Khimvolokno enterprise, 160 thousand tons of slimes - at "Ryazan Himvolokno", and 80 thousand tons at "Sibvolokno" enterprise. The content of zinc in slime is from 12 to 36%. The moisture content of slimes, depending on the depth, reaches 70-80%. For the construction of new sludge collectors, large areas are required, but artificial fiber plants do not have them. Weathering and surface washing out of zinc-containing compounds causes irreparable damage to the environment.

The processing of slimes from enterprises producing viscose fibers, in addition to reducing environmental tensions, could replenish zinc plants with raw materials.

The laboratory studies were conducted before, that concerned finding the technology for processing lime slimes of Balakovo "Khimvolokno" using the pyrometallurgical method of processing. The results of these studies and economic calculations proved the perspective of zinc recovery method by Waelz process. At the same time, zinc recovery into sublimates reaches 94% with zinc content of 60-65%. Such sublimates are suitable for processing in zinc production. However, the use of this method causes difficulties in the maintenance of waelz furnaces and dust collection systems, pollutes the total mass of waelz-sublimates with organic substances, and deep drying of slimes is required before Waelz process.

The following scheme can be the most rational - it includes low-temperature slimes roasting with the use of existing facilities of the Waelz workshop, sulfuric acid leaching and filtration that results in sulfuric acid solution sent to the basic zinc production and gypsum cake suitable (after washing) for the production of building materials.

The researches were carried out with representative sample of slimes from "Sibvolokno" viscose production.

Leaching of the most representative fraction was carried out in a stirred reactor at room temperature after re-pulping with water by batch addition of concentrated sulfuric acid. After the end of the experiment, the pulp was filtered in a vacuum filter, the gypsum cake was washed) and dried at 105 ° C, and the solution and industrial wastewater were analyzed for zinc content.

Zinc recovery into the solution was 82.7%. The precipitation of zinc hydroxide was carried out from leaching solutions with the addition of 10% NaOH solution to pH of 6.5 at room temperature, it was cured for 1.5 hours to form a precipitate. No zinc was detected in the solutions after filtration; a white residue was obtained, after drying at 110 ° C, corresponding to the stoichiometric composition of zinc hydroxide (94% of the basic substance).

A technological scheme for viscose slimes processing has been suggested based on the obtained results. According to preliminary data from exploratory experiments, the material balance of the technological scheme was compiled, taking into account operating materials. They were used as the base for calculation of the main indicators of the technology and for estimation of current costs in order to implement the technology with a capacity of 30 tons of wet slimes per hour.

Sufficiently satisfactory results have been achieved that can be the basis for further balance studies and for the formation of initial data for designing a mini-plant for processing slimes on the site, or for transferring it to zinc-producing plants as an alternative source of zinc-containing raw materials.

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INTEGRATION IN THE CONTEXT OF GLOBALIZATION AND THE MAIN CHARACTERISTICS OF ENTERPRISES

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Global processes actively influence all economic interrelations and generate new forms of economic interrelations. This also applies to the integration of economic entities. We distinguish two directions of integration, bearing in mind the criterion of the geography of integration processes: national and international. Both processes are not news of recent years. The integration of entrepreneurial resources in the national and international sense took place in the Middle Ages as a combination of capital of participants from different countries - this was how limited partnership worked. At the end of the 19th and the beginning of the 20th century, the same directions of integration in the form of joint-stock companies, concessions, and various forms of monopolies were actively forming. However, due to changes and complications in economic relations and forms of cooperation, the forms of integration also change.

Globalization is an objective factor of world development, it cannot be suspended or eliminated by political or economic means. From our point of view, globalization acts as a form of realization of the essence of transnational enterprises and the dominant monopoly in the personality of contract participants, both entrepreneurs and employees of enterprises. Let us explain what we introduce as an economic category, speaking about the dominant monopoly in the individual.

Foreign researchers, describing the company, actually determine the target settings of the enterprise. This does not diminish the role of man in the firm.

Talking about the factors of contracting enterprises can only find out the essence of the enterprises themselves. After all, enterprises that have the characteristics of a legal entity are essentially a fictitious institutional entity, de jure existing separately from its founders, managers and labor collective (taking into account their possible turnover), and de facto - including organizational, technical, technological and material relations. founders, partners and members of the workforce.

We consider as a monopoly the individual values and abilities of a person that have developed in his socialization process; the dominant feature of a monopoly is that which distinguishes one individual from all others. In the economic sphere, this property takes the form of a monopoly, that is, a unique activity. However,

all human values cannot constitute a monopoly - otherwise the social component of the personality will disappear. Monopoly in this sense has the highest value. If such a monopoly is involved in socialization and becomes the common property, then its value decreases, and the price of it falls. The dominant monopoly in the individual allows this individual to take controlling positions, competition means only the exchange of values that either have not ceased to be monopoly, or there is no information about it. Then transaction costs are the costs of maintaining one's own monopoly in any form: technology monopolies, property monopolies, information monopolies, etc. The organizational structures that are formed at the same time act as a unity of monopolistic and social principles. Thus, the needs and abilities of the individual are interrelated with the organizational structures of the economy.

Consequently, integration in the global world is a form of manifestation of the dominant personality of those people (entrepreneurs or employees of an enterprise) who interact in this space. Over the past 50 years, new forms of enterprise integration in the international sector have emerged. Despite the fact that Professor Belyaninov A.Yu. believes that the so-called dual integration is taking place in the modern world: global, or global, economic integration generated by the processes of transnationalization and globalization; and traditional regional integration, which has been developing in certain institutional forms since the 1950s. [6], one should pay attention to the degree of integration or the degree of interpenetration of the mechanisms of the economic actors participating in the integration. In the same way in which the integration of enterprises takes the form adequate to the manifestation of the dominant personality of entrepreneurs and their teams, international forms of integration acquire the integration characteristics of the economic entities that form them. Thus, international integration expediently appears in the case when the possibilities of integration within the country are completely exhausted, and not only the internal, but also the international infrastructure is established.

We can call integration the formation of special economic zones, the varieties of which contribute to the diversification of the economy.

The types of special economic zones include:

- Preferential zones;
- customs zones;
- free customs zones;
- free economic zones (FEZ);
- free trade zone;

- foreign trade zones;
- duty-free export-production zones;
- free export zones;
- free export-production zones;
- export production zones;
- free production areas;
- zones of economic favor;
- industrial export-oriented zones;
- free industrial zones;
- business areas;
- joint venture zones;
- zones of technical and economic development;
- zones of development of new and high technology;
- technical innovation zones; scientific and industrial parks;
- offshore zones;
- International offshore financial center;
- free banking zones;
- ecological and economic regions;
- open areas;
- tourist centers;
- ecological and economic regions.

Each form of integration includes the socialization (association) of certain functions of enterprises for their optimal cooperation.

Alla Pleshkanovska

CRITERIA OF ENVIRONMENTAL PLANNING OF CITY TERRITORIES

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The term "ecology," first introduced by biologist Ernst Heckel over 150 years ago, has confidently entered the urban science, forming a separate branch of it - urboecology. The first formal establishment of the requirements for environmental regulation of urban areas can be considered the "Athens Charter" (Le Corbusier, 1933). This document consolidated the principles of monofunctional use of urban spaces, in order to separate the residential and industrial areas, to improve the environmental conditions of residence. The next major step can be considered the formulation of the principles of sustainable development of human settlements laid down in the UN document - "Agenda for the XXI century" (1992) and enshrined in the "Aalborg Charter" (1994).

Recent decades are characterized by a significant expansion of the interpretation of the concept of urboecology. In particular, here we propose the introduction of new criterion characteristics to be taken into account when assessing the ecological and planning organization of the city plan.

The most important of these is the spatial compatibility of territories of different functional uses, which is based on minimizing conflicts between different territories. Factors that lead to conflict situations in the ecological balance of the city can be divided into three groups: 1) sanitary-hygienic; 2) socio-psychological; and 3) architectural-visual. The object of tolerance level assessment is a distinct planning element of the city - a functional area or land with a certain functional type of use.

According to the typology model, the compatibility assessment of functional areas is

The compatibility assessment according to sanitary-hygienic, socio-psychological and architectural-visual criteria of different types of functional areas, as per the proposed typology model, is made in the form of matrix tables. On the basis of the numerical assessment, tolerance indices for each functional area are determined and their rankings are compiled. The most tolerant ones are those with the highest degrees of freedom regarding their location in the city.

Mutual intolerance of functional areas in city planning is reflected in the

conflict zones that form as a result of the interaction of neighboring regions. In this work, three types of zones of conflict are distinguished, depending on the territorial spread of mutual influence, which reflects the conflict situation: contact, strip, and depth. The area of a conflict zone can be defined as a product of the length of conflicting areas fronts of a certain type of conflict and the depth of the conflict spread.

Depth and strip conflict zones are usually caused by sanitary-hygienic factors, and their size is regulated by numerous legislative and regulatory documents. Socio-psychological factors can also cause strip conflict zones. Their size is established within the boundary of a number of planning elements - districts or microdistricts (from 100 to 300 m).

The size of contact conflict zones caused, predominantly, by architectural and visual factors, can be defined as the depth of the first row of development (about 15-25 m for dense historical building areas, or 25-50 m for new buildings).

The aggregate value of the conflict coefficient for the city as a whole is defined as the total area of conflict zones of different types, moderated by various weighting factors, which are determined depending on the value share of conflict neutralizing costs. The aggregate area of conflict zone urban areas, as a share of the total area of urban development, determines in general the quality of the ecological and planning order of the organization of the city plan and should be minimized in the process of multivariate design.

Global trends in the transition to a neo-economy, the application of modern technologies to transport and municipal utilities, will likely highlight the problem of socio-psychological and architectural-visual alignment of urban areas.

Through its methodology, tailored for the framework of multivariate design, the present work will allow to determine the most appropriate solution based on a set of ecological, social, economic, historical and architectural criteria.

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THE VOLUNTEER ENVIRONMENTAL MOVEMENT IN THE LIPETSK REGION: PROBLEMS AND PROSPECTS OF DEVELOPMENT

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The year of 2018 is declared in Russia the year of volunteering. However, the traditions of volunteer movements have a long history both in the Russian Federation as a whole and in its regions. In Lipetsk for about ten years there has been a Centre for the development of volunteerism, organizing the implementation of various courses of youth volunteering, including environmental. Young citizens of the region at the ages between 14 and 30 join the ranks of the ecological volunteer movement. Among the major challenges facing the movement the essential ones are planting the areas with trees, participation in the public environmental regional monitoring procedures, environmental education of the region's population, the involvement of the students and schoolchildren of the region in environmental project activities, the promotion of healthy lifestyles, assistance to regional national parks, cleaning of water bodies, promoting the development of recreational areas, participation in national and regional environmental actions, improvement of urban areas and landscape complexes, etc.

The results of the activities of environmental volunteers are evidenced by the restoration of forest plantations after the fires of 2010, which covered large areas of the region; successful lobbying of the problem of introduction by the municipal authorities of modern technologies for the collection and disposal of household waste and construction of new treatment facilities; purification of the banks and the riverbed of the Voronezh, and of the small rivers of the region as well; inclusion of certain landscapes in the number of specially protected; revival of feedback via the Department of ecology and natural resources of the Lipetsk region in case of administrative offences in the field of the use of natural resources; carrying out mass recreational activities for the people of different ages; effective lobbying of energy saving problems and resource saving; arranging festivals of ecological orientation ("Joint actions make it brighter", "Bunin's Ozerki", "Let's do it together", "Clean Wave", "Ecobit" and others); regular work on the creation of sanitary protection zones of industrial enterprises in

Lipetsk and other cities of the region; coordination, organization and holding of environmental pickets, demonstrations, processions with the aim of attracting the attention of the public and the population to the problems of improving the microclimate of the region and the formation of the need for healthy living conditions.

At the same time one cannot help mentioning the existence of topical environmental problems awaiting their solutions in Lipetsk Region, which is the largest centre of the metallurgical industry in the European part of Russia. Despite the increased number of parks and squares in different districts of the city, the strengthening of control over emissions of pollutants, Lipetsk still occupies one of the leading positions in the rating of polluted Russian cities, though the situation is being changed for the better. Thus, the need for environmental volunteering in the Lipetsk region is of great importance at present.

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RESIDENTIAL BUILDINGS IN RUSSIA: THE LIFE CYCLE AND RESOURCE EFFICIENCY

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Keywords: residential building, energy efficiency, resource-saving technologies, life cycle costs, sustainable development, assessment method of efficiency the resource saving solutions.

Abstract. The authors of the article present a new efficiency assessment method for resource saving solutions in the housing stock. This method is based on evaluation of the ecological, environmental and economic effects on realization of the resource saving solutions in residential buildings, taking into account the building's life cycle cost. It suggests that the improvement of energy and resource use in the residential houses during their life cycle will promote the transition of Russian cities on the way to sustainable future.

The depletion of natural resources, growth of energy consumption from non-renewable sources, environmental degradation are the problems requiring thorough research and proper consideration on the way to sustainable development of Russian cities.

The construction sector generally and apartment buildings in particular, not only the cause of the problem, but also the solution of these problems as they are the principal end-consumers of energy and other natural resources.

According to experts' estimates, over 19.5 thousand tons of equivalent fuel and 3530.0 thousand m^3 of water are required in general during the whole life cycle of only one 10-storey building in our country. Improvement of energy efficiency in the housing stock nationwide will provide not only the reduction of energy consumption or preservation of natural fuel, but also the reduction of the environmental load on urban areas, as well as wealth growth of Russian citizens by decreasing utilities expenses and improving the quality of living environment.

Building is a complex dynamic system, which is permanently in the process of change during the all phases of its life cycle. Russian and foreign scientists agree that modern effective resource-saving activities should not only solve the problem of saving energy and other resources, but also increase the comfort level of buildings, quality of people's life, promote preserving the environment and human health during the whole life cycle of a building. Thus, the introduction

of energy- and resource saving technologies are reasoned by the possibility of immediate reduction of resource consumption as well as environmental and social demands. This approach balances the fundamental principles of sustainable development: economic, environmental and social interests of society.

To solve this problem, we have proposed the following function of the formation of organizational and technological provision plan of resource-saving construction. This function contains a set of architectural (Arc), planning (Pl), design and engineering (E) solutions, are chosen during the life cycle of the building, which would provide both: the lowest life cycle cost of a building and at the same time a maximum degree of environmental friendliness, energy savings and comfort under the existing constraints. The proposed function is:

$$\begin{cases} F\left(\sum_{i=1}^{n} A_{rct}; \sum_{j=1}^{k} Pl; \sum_{y=1}^{z} E\right) = \dfrac{LLC}{S_{ust}} \rightarrow min \\ S_{ust} > 140 \\ \dfrac{LLC}{S_{ust}} \rightarrow min \end{cases}, \quad (1)$$

where LCC – life cycle cost of the building; S_{ust} – the integral indicator of building's sustainability.

The proposed function (1) formed the basis of new methodology for optimization the choice of organizational and technological energy saving solutions among a set of alternative ones. This methodology provides for comprehensive assessment of effectiveness the resource-saving solutions implementation, calculation of operating costs, social and environmental effects.

Application of the proposed methodology to assess the effectiveness of resource saving decisions might be necessary to choose among different alternative options the most optimal one in residential buildings. Methodology presented in the article is recommended for development the regional programs of apartment houses' capital repairs, energy saving and energy efficiency improvement strategy for housing stock. Its application in practice will provide a high level of energy saving in buildings in different climatic conditions, introduction in practice of building's design and construction modern technologies and materials, will guide the construction industry to the active introduction of sustainable development principles.

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INNOVATION SYSTEM OF REGIONAL INSTITUTIONAL BASES

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The regional innovation system is an integral part of the national innovation system, based on university-industrial relations and institutions that implement the results of university-industrial relations in the region and in the country as a whole.

The innovation system of the region is considered by us as a complex for the production, registration and implementation in practice of innovative ideas in the form of projects, products, equipment, technologies and services. Such an approach gives grounds to divide innovations by the size of the life cycle, by the stages of formation and application of innovations (production - registration - implementation), and also - by project direction into: ideas, products, equipment, technologies, services.

The typology of innovation affects the strategic policy of the state and the region in this area.

Consider the institutional framework for the innovative development of the region. Institutional support for innovation development includes:

a) stimulation of activity in the field of high technologies through the use of tax, customs, foreign economic instruments;

b) standardization and patent law;

c) the formation of new structures integrating the scientific and industrial sectors; the creation of small innovative events;

d) budget financing of scientific research (full or partial);

e) the formation of legal institutions that create attractive investment conditions for research and innovative projects for the private sector.

It is necessary to investigate the institutional factors influencing the formation and functioning of the regional innovation system (RIS). Institutions in the economic environment are called norms, customs, and traditions of behavior in society that are fixed in the form of laws and institutions. The formation of institutions regarding the innovation environment has been intensive recently, especially given the attention of the Russian government to the introduction of digital technologies.

Thus, the regional innovation system relies in its activities on development

institutions, which are based on public-private partnership. These development systems include a number of organizations whose focus is related to innovation. For example, ANO Agency for Strategic Initiatives, the Skolkovo Foundation, OJSC RosNANO, OJSC Russian Venture Company. However, such structures, which operate at the federal level. The region promotes innovative development through business incubators, venture capital funds, technology parks. Some of them are able to attract private capital in regional innovation projects and work on co-financing terms.

The objectives of the institutions in the innovation sphere of the regions are:

- support of creative initiative and innovative entrepreneurship;
- support for youth innovation initiatives: "start-ups", "social entrepreneurship", competitions and so on.
- formation of investment attractiveness for small and medium-sized businesses;
- the creation of an innovative climate to the subject;
- revision of legislation on innovative development.

Improving the innovative development of the Voronezh region is conducted by the Government of the region.

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PART-TIME EMPLOYMENT IN RUSSIA AS A FACTOR OF CYCLIC OF THE ECONOMY

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Annotation: The article provides definitions of partial employment, affecting the status of an employee with his participation in public production. The authors cite the classification of partial employment and disclose the meaning of its elements. The authors consider part-time employment and freelancing as elements of a partial.

Keywords: part-time employment, underemployment, human capital, economic cycles, employee incentives.

Introduction

Stimulation of labor is one of the functions of enterprise management. During the XIX and XX centuries. labor stimulation was also being improved in industrialized countries, including in Russia, the separation of incentives into material and moral incentives.

In the late twentieth and early twenty-first centuries, new forms of employment appear in the sphere of employment, which researchers call "partial", "flexible," "unconventional," "unstable," "flexibilized." This group includes self-employment, distance, home, secondary, part-time, freelance, coworking,

In Russia, such forms of employment appear in the conditions of the permanent crisis, the developing market economy and the growth of Internet functions in the production sector. Labor traditions and labor values of workers have changed, especially in the past 10 years. Therefore, the methods of stimulating new forms of employment are also subject to modernization.

To date, there has been insufficient research in the field of studying self-employment in the form of freelancing. In Russia, there is still no permanent statistics and methods for accounting for part-time workers, despite the fact that this dynamic will show not only part-time workers, but also the new needs of the employee in organizing his work, will show changes in the labor market and in the organization of incentives for such workers.

Methodology of research

The theory of cyclicity was developed by scientists with world names. The

British economist and statistician Joseph Kitchin saw the main reason for cyclical development in the fluctuation of world gold reserves, the Soviet and Russian economist Nikolai Kondratiev - in technical changes in production, the French physician and statistician Clement Jugljar - in changes in the volume of investments in fixed assets. That is, researchers saw the causes of cyclicality in the material factors of production and sought ways to influence them to mitigate crises. The state of employment as a factor in the cyclical nature of production in this sense has not been investigated. Undeniable was the fact that as a result of the crisis in the economic cycle, the level of employment is changing, unemployment is coming as a result of the crisis. At present, the cause and effect, as it seems to us, have been reversed. Therefore, the incentive system, applied earlier to employees, currently gives a weak return. We will try, using general scientific methods of analysis and synthesis, historical and logical, induction and deduction, to describe the current state of incentive systems, primarily applied to part-time workers. In addition, we conducted a sample survey of young families (interviewed 500 families) on the outskirts of Voronezh (a former suburb with private households) in order to find out the motives and incentives for part-time employment and preference for the home, individual sector of work for the public.

According to the popular electronic resource for finding work and hiring personnel, the most popular areas in which freelancers are constantly required are: banking, construction, information technology, sales, tourism, marketing.

Bankings sphere relatively recently began to use the work of freelancers. It is noteworthy that most of the proposals are aimed at young people who do not have enough experience to work directly in the bank. All vacancies in this sphere are aimed at selling certain banking services that do not require the presence of an employee in the office. Examples of widespread use of freelancers in this area are «Bank Tinkoff», engaged in aggressive advertising of its products.

In construction, basically, designers, estimators, design engineers are required. This creates opportunities for the organization to get a competent specialist for the project period.

In information technology, the list of required professions is constantly expanding. These are programmers, designers, web designers, web developers, web-masters, web-engineers, site optimizers, managers of Internet projects.

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MARKETING TECHNOLOGY OF THE MEDICAL SERVICES AT PRIVATE CLINICS

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In the last decade, the medical services market has become one of the fastest growing markets in Russia. Every year brings changes into the process of providing medical services, the requirements for medical institutions, the quality of treatment change. Today, a significant portion of the cost of medical services falls on insurance organizations and consumers.

The main stages of the company's marketing activities are the analysis of market opportunities, the selection of target markets and the development of a marketing mix.

The term "marketing mix" or "marketing mix", as a set of marketing tools, using which the company receives the desired response from consumers, was first proposed in 1953 by the American researcher Neil Borden. And in 1960, the marketing mix was called the "4P" concept after the first letters of the English names of the constituent elements: product (product), price (price), place and method of distribution (place), promotion (promotion).

If we transfer the "7P" concept to the sphere of activity of a private medical center, these seven elements can be characterized as follows.

A product is a licensed medical service that turns out to be a narrow specialist with a corresponding medical education (secondary or higher). The quality of the service primarily depends on the experience, knowledge of the specialist, availability of the necessary equipment. The name of the service should be meaningful, understandable to the target consumer, who may not have a medical education. For example: acupuncture instead of acupuncture, acupressure instead of acupressure. Service characteristics, variability should be described in sufficient detail on the official website of the medical institution, reference sites, official pages on social networks, as well as when the client personally contacts the administrators and professional staff of the clinic.

The cost of medical services should be clear to the client of a private medical institution, namely: how much you need to pay to get a course or several sessions, whether drugs are included in the cost of the service, whether consultation is included in the cost of the procedure. The price of services should not be hidden

from consumers, that is, prices should be indicated on the official website, with free access. This not only does not repel consumers, but also increases the position of the site in search results, as search engine robots track the availability of prices on sites;

The place and method of distribution mainly implies the geographical accessibility of the institution, the interior and exterior of the medical center, the appearance of medical specialists;

Promotion of medical center services includes a number of features, such as restrictions in advertising, perception of advertising of the target audience, competition with medical institutions and private doctors;

People in the marketing complex of a commercial medical institution are two sides: staff and customers. The staff includes both medical staff (top and middle medical staff) and support staff (administrators, managers, marketing staff, system administrators, etc.). Among patients distinguish loyal, primary, repeat, VIP-clients, opinion leaders. Service process may vary by category. For example, the primary patient must be introduced to the services offered, and the repeated patient may be reminded of additional procedures that he has not yet used. Additional services and gifts may be offered to VIP customers and opinion leaders in order to create a more loyal attitude towards the medical institution;

The process refers to the service. Service for a private medical center is one of the key factors when choosing a facility for a potential consumer. In this regard, it is compulsory for all personnel to create special scripts for communication with the client, the duties of employees, the requirements for their appearance, actions are prescribed;

The physical environment for the medical center includes the place of distribution and the process, that is, the doctor's office, the internal state of the institution, and the service. Due to this, the client is forming an attitude towards a private medical institution.

Comprehensive work with these elements allows to achieve the desired result and the effective promotion of the company's services, but the implementation of marketing activities in the operation of private clinics depends on the general specifics of the provision of medical care.

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THE MAIN ASPECTS OF COMPLIANCE WITH THE REQUIREMENTS OF THE MONTREAL PROTOCOL

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The most important and dangerous cause of ozone depletion is the widespread use of human-synthesized chemicals in industry and agriculture. The basis of these compounds – chlorinated, fluorinated or brominated hydrocarbons, which react with ozone molecules.

Ozone-depleting substances (ODS) are characterized by their high chemical resistance and poor solubility in water (they are not washed away by rain). Due to these properties, substances rise high in the atmosphere. After freons pass freely the first 10-15 km of air space (troposphere), and penetrates into the stratosphere, where 90% of atmospheric ozone is concentrated. The path to the stratosphere is indirect, since freons, like all other compounds, can enter the stratosphere from the Earth's surface only with tropical convective flows. In order to be at an altitude of 35 km, substances need 15 years. So the impact on the ozone layer may be provided only by such substances, the lifetime of which in the atmosphere exceeds a few tens of years. Such substances are called freons.

Ozone loss in the stratosphere while increasing in the troposphere can lead to climate change. Also, O3 refers to greenhouse gases and its formation in the troposphere occurs when it is contaminated with nitrogen oxides and hydrocarbons, which leads to an increase in temperature. In addition, chlorofluorocarbons, as greenhouse gases, also absorb IR radiation and thus contribute to the greenhouse effect. Thus, the redistribution of ozone between the troposphere and the stratosphere will be accompanied by climate change.

The adoption of the Vienna Convention for the protection of the ozone layer (1985) was an international response to the global problem of ozone depletion. The Vienna Convention was the first attempt to create a framework for cooperation for the protection of the ozone layer. The Montreal Protocol on substances that deplete the ozone layer was adopted in 1987 (entered into force on 1 January 1989). To date, 197 countries have made commitments under The Protocol to phase out the production and use of ODS. The Protocol provides that each Party shall establish and implement a licensing system for the import and export of

new, used, recycled or recycled substances listed in annexes a, B, C and E to the Protocol.

The fundamental objective of the Montreal Protocol is a gradual transition from ozone – depleting substance technologies to alternative technologies, avoiding competition in local markets or increasing social benefits resulting from additional ODS reduction costs and affecting consumers.

The solution of the problem requires radically new scientific developments and technologies, the product composition should not contain nitrogen, fluorine, bromine and their derivatives. Selection of new technology that allows to switch to the production of products that do not contain ODS – the way to solve the global environmental problem.

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PLANNING ASPECTS OF REINTEGRATION OF THE CHERNOBYL NUCLEAR POWER PLANT

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The growing interest of the international community in environmental security and the exceptional experience of combating the consequences of a nuclear disaster that Ukraine has acquired is becoming the basis for international cooperation, which leads to an increase in the number of visitors to the Chornobyl N.P.P. exclusion zone.

Over the past three years, the number of tourists who come to this zone for cognitive purposes has increased almost six-fold (from 8.4 to 49.8 thousand people). In this regard, the Forbes magazine included Chornobyl N.P.P. in the list of the most extravagant tourist destinations on the planet.

According to the draft Law of Ukraine "On Amendments to the State Program for Decommissioning of the Chernobyl Nuclear Power Plant and the transformation of the Shelter Object into an Environmentally Safe System", the station must be liquidated before 2065. 'It is the object of this Law to consider in a timely manner, the potential of the recently closed territory of the exclusion zone as a unique research and experimental site - the "Radiation Environmental Laboratory in the open air" and "the most innovative technological and scientific platform" of the world-level of remediation and regeneration of landscapes in order to achieve the "Global Goals of sustainable development of mankind".

In this area, the issues of reintegration of the exclusion zone and restoration of its key energy function, which today should be based on the latest technologies of the using renewable energy sources, in particular wind and solar, are actualized. The interest in the exclusion zone, its flora, fauna and "ghost town" may contribute to the conversion of individual areas of this territory into an "ecosphere museum", an "educational forest ecological focus" and "Mecca of ecological tourism".

This stipulates the need to address the issues of increasing the convenience of the conditions of stay in the exclusion zone of people who work or are here for scientific and cognitive purposes, and the feasibility of reforming and developing engineering transport, social and tourist infrastructure.

The presence in the exclusion zone of the temporarily and permanently resident population (328 people who have been resettled in 11 settlements of the zone)

necessitates the revitalization of this territory and the regeneration of its landscapes (natural and anthropogenic). Revitalization (return to life, socialization) of this space requires the disclosure of new possibilities of "old forms" (taking into account their primary and contemporary functions, ecological status, historical and cultural value) in order to develop new spatial structures of resettlement and the formation of a tourist network. This stipulates the necessity of a planning ordering of "interurban" spaces of the exclusion zone, its scientific-production, nature-protected and residential areas, taking into account the radiation safety and social protection regimes; development of the sphere of scientific-cognitive, ethno-ecological and educational tourism, which will promote the revival of respect for the "needs and interests" of future generations and ecosystems as a whole, as well as the formation of spatial preconditions for the development of the innovation cluster of the "green economy" of Ukraine and the attraction of foreign investments.

The planning ordering of the territory with a special mode of use involves the elaboration of a complex of design work: from the concept and scheme of planning the territory of the zone of alienation of the Chernobyl nuclear power plant to the master plans for individual elements of resettlement, detailed planning of their territory and development projects (territories of scientific and production complexes, objects of "green" Energy, rural areas, museum, tourism, forest-park complexes, etc.). The scheme of planning the exclusion zone concretizes the decision of the "General Scheme of the Planning of the Territory of Ukraine", and determine the principal provisions for the functional zoning of this territory (according to radiation safety regimes and preferred uses); planning organization and integrated location of the main objects of industry, social sphere, transport, engineering and tourist infrastructure; protection of settlements from dangerous processes and phenomena; the protection of the environment and cultural heritage, the formation of the national ecological network.

Iryna Ustinova
Iryna Koziatnyk

PLANNING ARRANGEMENT OF RESIDENTIAL AREAS WITH THE USE OF METHODS OF MICROCLIMATE THERMAL REGIME REGULATION

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In the recent decades, hot summer become the norm in countries with the temperate climates. Climate change is one of the threats of sustainable human development: global warming leads to droughts, floods, earthquakes, hurricanes. Summer overheated modern city deteriorates living conditions in it. In such circumstances, the actual is the search of relevant architectural-planning measures for softening the local climate within limits tangible by person.

Today, the climate formation on city territories is considered in three adjacent spatial levels: macroclimate of geographical area; mesoclimate of a certain location (southern slope of the mountain, river valley, the sea coast); microclimate at the level of the human body (of two-meter surface layer). These levels of different spatial scale have similar mechanisms of climate formation. The main anthropogenic factors that are affecting at the climate of the city are: the size of the city and types of energy is used, the nature and location of industrial enterprises, organization of transport and transport network. Character of the building is causes significant impact on citys climate the character development (small-or multistory), landscaping of dwellings territories, the extent of its landscaping, irrigation or statement, relief (natural or artificial), slope exposition. Low humidity favourites the rise in temperature compared to the suburban area. The urban environment is predominated over by the surface, which significantly accumulate heat and from which water is quickly drained. Hence the surface layer of air in the city receives three times more heat than in the natural environment. The determined causes the appearance of "heat island" in the city. This phenomenon is observed in the squares and streets, deprived of greenery, where the daytime temperature is much higher than in parks and town squares. Increased temperature and reduced pressure, compared with surroundings, cause the appearance of "urban breeze". Warm air mass moves upward and is replaced by chill masses of suburbia. The determined promotes aeration of the urban areas. Concurrent phenomenon is recorded in the zones of influence of green part of the city, where in parks, squares, gardens there are created more favourable microclimatic conditions. Constant air flow arises due

to temperature difference. In the summer midday heat flow traveling from such plants and reservoirs in the direction of the building, and in the evening and night reverse its traveling back way. Humanizing and hygienic effect of green areas and water bodies becomes apparent in the adjacent areas in the increased humidity and lower temperatures. Definite impact depends on the building.

Thus, microclimate is formed in the streets, squares, in a housing estate and city parks under the natural and city planning factors. It follows from the determined that climate conditions may be subject to regulation and architectural and planning tools. In this context, it is expedient to consider the parallel flow of processes in natural and artificial environment. This is a certain similarity of space elements and processes that shape the conditions studied: large paved area - the desert, a set of skyscrapers - the furnace ridge, planting or watered areas - forests, rivers, seas. Architecture and planning regulation can be achieved by using the free, well ventilated building, landscaping, water cut, use a sunscreen of housing due to tangential favorable regard for natural landscapes, the uniform distribution of built and open-watered landscaping areas. In this sense the system of greenery, water and free spaces is the main means of planning control temperature and humidity profile in the urban environment to create favorable climatic conditions in residential buildings in areas of pedestrian movement and places of mass rest. As an architectural means of microclimate control in crowded areas can use coloring and texture of the surface buildings and structures, covering walkways and platforms, specialized small architectural forms (screens perhaly, umbrella, mobile landscaping and water installations, fountains), which can take sun and heat function, moist air and promote aeration territory.

The study found that for balancing and softening of climate conditions for living and of effective impact on the heat, humidity and aeration regime of the modern city, it is desirable to achieve a ratio of 1:1 between its planting and artificial surfaces.

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Grygoriy Trakhtengerts

ENVIRONMENTAL DEVELOPMENT LAWS AND DIRT ACCUMULATION PROBLEM

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Only recently, the humanity has been focusing its attention on waste management issues, since the burden on the environment through their accumulation has substantially influenced the health and living conditions of people. In our time, for every inhabitant of the planet an average annual production amounts to about 20-45 tons of raw material, from which about 90-98% goes to waste. Ukraine is among the countries with the highest volumes of generation and accumulation of wastes. About 700-720 million tons are annually formed in Ukraine. Wastes are accumulating in the form of sludge depositories, waste heaps, dumps and dumping places. They occupy about 160 thousand hectares. Mining waste produced during the development of deposits (up to 75% of the total amount) and waste from enrichment of minerals (up to 14%) are dominated in Ukraine. By the definition of N.Reimers, waste means those types of raw materials and their remaining residues unsuitable for the manufacturing of a particular type of product, that cannot be consumed, as well as those substances and energy that arise during the technological processes and cannot be utilized in this production.

To solve the same problems of waste management, it is necessary not only to improve and implement the environmentally neutral technologies, but also to take into account the well-known fact - the flow of processes in the surrounding world is governed by certain laws of Nature. In this context, the most important are the environmental laws: “failure to dispose waste”, “system development at the expense of the environment”, “reduction of environmental pressure” (according to N.Reimers). According to the law of “failure to dispose waste” the waste and side effects that can not be eliminated are created in any economic cycle, and then they can only be moved in space or transformedd from one form to another. This law is closely connected with the law “system development at the expense of the environment”. Under this law, any natural system can develop only at the expense of the use of material, energy and information capabilities of the environment. This law has an important theoretical and practical significance due to its main

consequences. Firstly, an absolutely waste-free production is impossible. Secondly, each more highly organized biotic system using and modifying the living environment is a potential threat to lower-organized systems. Consequently, the notion that the biosphere works on the principle of non-wastefulness is false. In turn, the law of "reduction of environmental pressure" is a manifestation of the law "ecosystem self-regulation", according to which the environment for each species has a certain population capacity the reserve whereof - "under-population" of the territory causes growth, and its exhaustion - overpopulation of the territory launches mechanisms for reducing the number of species. The excess population of any species, including the species "homo sapiens", causes degradation of the life environment, which does not have time to recover and becomes less suitable for life. Increasing anthropogenic pressure on the environment leads to a disturbance of the ecological balance, activates (not always obvious) mechanisms of feedback of the environment, aimed at worsening the state of health and living conditions of the population in order to restore the balance in the system "population ↔ environment".

The results of a comprehensive study of the Institute of Public Health, conducted on the territory adjacent to two existing landfills in Kyiv region: landfills near the village of Kriukivshchyna in Kyiv-Sviatoshynsky district and the ash dump of Trypilsky thermal power plant in the Obukhiv district are consistent with the above mentioned theoretical provisions. The study found that degradation of the environment in the zones of influence of these waste ponds causes a significant complex negative impact on living conditions and public health, which is a manifestation of regulatory mechanisms for reducing the size of the species. This is the quality of all environmental factors that directly and indirectly affect the health of the population. In our opinion, the mitigation of these mechanisms can consist in improving technologies that would reduce the specific generation of waste and, accordingly, increase the capacity of the human ecological niche.

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