

Translation of the academic publications^{1, 2} after preliminary discussed presentations^{3, 4, 5}

CIRCULATORY DEVELOPMENT FEASIBILITY FOR TERRITORIAL-SECTORIAL PROGRESS PROVIDING AND FOR TRANSCONTINENTAL COLLABORATION

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4 Generations come and generations go, but the earth remains forever.

5 The sun rises and the sun sets, and hurries back to where it rises.

6 The wind blows to the south and turns to the north;
round and round it goes, ever returning on its course.

7 All streams flow into the sea, yet the sea is never full.

To the place the streams come from, there they return again.

8 All things are wearisome, more than one can say.

The eye never has enough of seeing, nor the ear its fill of hearing.

9 What has been will be again, what has been done will be done again;
there is nothing new under the sun.

10 Is there anything of which one can say, “Look! This is something
new”? It was here already, long ago; it was here before our time.

11 No one remembers the former generations, & even those yet to come
will not be remembered by those who follow them.

ECCLESIASTES 1

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Anthropocentric approach (focused on human interests) cannot provide sustainability for socio-economic territorial-sectorial and spatial development. The main principle for such development has been formulated by Brundtland Commission⁷, and was summarized by Claude Fussler⁸: “... we need to learn to live off the dividends of our natural system and our unlimited creativity” rather than off the capital of our planet. But this environmental-social-economic problem cannot be resolved now owing to the gap between Mankind’s demands and its ability for synergic development in Natural –Anthropogenic Environment.

As it has been mentioned before⁹ - for Natural-Anthropogenic “coexistence” - a paraphrase of Anthropogenicity means Technologies - any purposeful actions of people that change the Environment, its components and anthropogenic objects, including ourselves and relevant information.

¹ <https://www.academia.edu/69429780> P.374-381

² <http://cppk.cv.ua/i/1530388.pdf> P. 204-219

³ http://prismua.org/wp-content/uploads/2021/09/UA-MD-EU_Circulatory_Development.pdf

⁴ http://ukros.ru/wp-content/uploads/2021/10/Circulatory_development_Pan-EurAsia.pdf

⁵ https://environmentalrisks.danube-region.eu/mdocs-posts/ua_proposals_for_eusdr_pa5sg_17062021/

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⁷ https://sswm.info/sites/default/files/reference_attachments/UN%20WCED%201987%20Brundtland%20Report.pdf

⁸ https://www.iucn.org/sites/dev/files/import/downloads/celebrating_en.pdf P. 9

⁹ <http://www.carpathianconvention.org/eventdetailwg-124/events/third-meeting-of-the-carpathian-convention-working-group-on-adaptation-to-climate-change.html>

However, we perceive Environmental Management not as opportunity to synchronize Anthropogenic processes with those of Nature, but through profitability of Natural Resources (Human, Material, Energy, Biological ... and Information) utilization, blocking the way to "Homeostatic Macrometabolism".

Therefore, instead of a single, continuous and all-encompassing process of Natural-Anthropogenic Coexistence (Natural-Manufacturing Metabolism), we practise separate "Nature usage" and, only then try to overcome negative Natural and Manmade consequences for humans and other environmental components. This approach is contained in the new EU Climate Change Adaptation Strategy dated February 24, 2021. It assumes "a sequence of proactive measures that reduce the level of links between series of proactive measures to deal with the nexus of hazard (e.g. drought, sea level rise)... and vulnerability... from tipping points (i.e. thresholds in the rate of climate change) like permafrost melting, sea-ice loss, or massive forest dieback" – which means responding.

At the same time, the main efforts, including Waste Treatment, are aimed not at minimizing the causes, but at combating the consequences of Natural-Anthropogenic Imbalance after free (but stochastic) movement of people, goods, services, capitals, information, use of military technologies, etc.

World Leaders Climate Summits in April and November 2021, which followed European Green Deal & Earth Forums held since 1972, as well as the message of the European Commission of 14.07.2021 "Fit for 55%", speaking of innovations, but mainly continue to focus on the further modification and expansion of the use of "generally accepted" methods. Today it looks like chasing a shadow. From many points of view, reduction of greenhouse emissions and decarbonization are certainly necessary. But they are not a self-sufficient panacea for the causes, processes and consequences of Climate Change that generate global risks. Therefore, it is not surprising that in 2021 the leaders of the G20 countries at the meetings in Naples and Rome agreed on neither a critical superheat value of 1.5⁰C, nor on the stop/dramatic reduction of coal combustion from 2025, which is EU responsibility. And, according to the Systems Change Lab report of the World Resources Institute and the Earth Foundation, none of the 40 studied anthropogenic spheres so far has any signs of adaptation to Climate Change, as stipulated by Paris Treaty of 2015.

Last decades developments of such concepts as "Environmental Engineering", "Industrial Metabolism", "Life Cycle Assessment", "Strategic Environmental Assessment", post-COVID recovery etc, convincingly focus on search for Innovative Technological solutions, "symbiotic" to natural prerequisites. Ultimately, it is the aggregates of such technologies (their ratio and amount) that determine both the general direction and main characteristics of any territorial-sectorial development and cooperation. But even attempts to revise radically the existing approach and its economic vision, for example, by introducing the concept of "technocircles"¹, continue to separate technological development from its natural-anthropogenic foundations. In particular, in the initiative of Russian Federation Ministry of Natural

¹ <https://cyberleninka.ru/article/n/smena-tehnologicheskogo-uklada-ekonomiki-kak-obektivnaya-neobhodimost-resheniya-glavnoy-problemy-sovremennoy-tsivilizatsii>

Resources of 12.08.2021 on the development of the Law "On the Circular Economy", there is no mentioned the necessity to go beyond Waste Treatment into the sphere of their genesis Technologies¹.

Meanwhile, both Technologies as well as any Natural-Anthropogenic processes in the Environment are much less dependent on human desires than on Regularities in Nature. One of the fundamental factors that determines the nature of all entities touched upon in this article is their Circulating Nature. First of all, this is the circulatory character of the overwhelming majority of anthropogenic-natural interactions (the frequency of natural phenomena, changes in the involved material, energy and information flows, as well as renewable human, biological and other resources). This principle is observed in the full range of the World available to our understanding - from Quantum Phenomena to the circulation of Galaxies, from the helicity of DNA and blood circulation to our life activities processes planning.

Trying to oppose this understanding versus movement "forward" in a straight line, one should not forget that, firstly, such movement is impossible without cyclic steps and injections into the engines of ships, aircraft, missiles, as well as rotations of turbines and wheels of cars and trains. Secondly, such motion in any case goes either into orbital cycles, or periodically returns to a position, close to the initial one.

Similar phenomena are typical of information and communication technologies (ICT)². In general, Technologies evolutionary perfection and summation objectively has to include heuristic "leaps", both for individual Technologies & their Aggregates.

The Cyclical Nature of Human Reproduction (with its "fathers and children" problems) and other components of the social sphere, especially in context of today's cardinal changes in Information Exchange, both within an active Society and between Generations, deserve special consideration from this perspective.

It is not difficult to see the Cyclical Nature of Medicine (from biorhythms to pandemic-immune reproducibility). Education begins with the phrase "repetition is the mother of learning" and combines different teaching cycles, for example, for professional Environmental Specializations³ focused on Natural Material Resources and Energy Circulation⁴. In the Trade, Financial and Economic spheres, the Cyclical Nature of Technologies is determined by the basic roots of Commodity-Money and Credit-Fiscal-Contractual relations⁵. But the most essential is the Circulation of Information - from Fakes in mass-media up to its Reflexion in our brains, and from administrative services to exchange of Geospatial Data, first of all for Risks Assessment and Survivability Ensuring. Therefore, the Circulating Information Exchange, including the interaction between Distributed Databases, is one of the Technological Foundations of Security and Sustainability in general⁶.

All the above mentioned requires an awareness of the Circular Nature of Development as such, and the need for the consistent application of the Circulatory

¹ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Environmental_Management_Standardization.pdf

² <https://www.osp.ru/cw/1997/46/25739>

³ <http://ecoresource.ddns.net/DocLib/ECOSPEC.rtf>

⁴ <http://ecoresource.ddns.net/DocLib/ECORES1992.doc>

⁵ http://ecoresource.ddns.net/DocLib/Transition_solutions_system.pdf

⁶ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Sustainable_development_and_spatial_planning_TM_2003.pdf

approach to Technologies and their Aggregations as the origin of Sustainable upgrowth. Therefore, the purpose of this article is to consider opportunities for expanding the application of Circulatory Development approach - from individual Technologies, Territories and Sectors in Socio-Economic Sphere up to the Global level, demonstrating its advantages with the examples of improving Sustainability and modern aspects of Security in these fields¹.

The basis of Natural-Anthropogenic changes on the Planet and in surrounding Space is the circulation of elements and substances, primarily, the changing circulation of Carbon, Nitrogen, Phosphorus, Water.., which radically affecting biocenoses, their development/suppression, trophic links & other key aspects of Life on the Earth.

For instance, our rough ("on fingers") estimation of the influence of Water Circulation changes on Technogenic & Environmental Safety², was confirmed by leading scientific centers in a much more "harder" way³. This can also be seen from Stormwater & Droughts Cyclicity model which was developed by Planetary Climate & Atmospheric Evolution Research Group in the Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS). One of the manifestations of such influence is the increase in thunderstorm activity⁴ in the Carpathian zone of maximum overheating, which've mentioned earlier⁵ and will be discussed further.

The lack of awareness of the Circulating and changing at each cycle Development is determined by fixed notion paradigms both of scientific and socio-economic origin. First of all, it is the inertia of forecasting, which is often based on SWOT analysis (originally designed to improve activity of firms and companies, rather than for territorial-sectorial strategies), and planning "from the achieved" for the whole sphere of Technologies. However, the Circulating nature of Development requires not only the extrapolation of the available knowledge to newly taken into consideration cyclical manifestations and processes, but also their heuristic assessment in response to identified trends of changes (similar to thermodynamic analysis of multi-component heterogeneous systems²). In other words, differential deviations in Circulating Natural-Anthropogenic Systems and Processes should be considered not only (and not even so much) through linearized models of the evolving influence of a small parameter, but also as factors changing the stability of these systems and processes, with their turbulent transition into new stable states⁶

Unfortunately, the necessary approaches and solutions, even a century later, have not yet reached the level of N.Bohr's vision: "the question is whether theory is crazy enough to have a chance of being correct". In practice, this can be easily illustrated by the example of any budget project, when the tender procedure for its selection practically excludes possibility of heuristic approach. At further stages of the project cycle, when new opportunities are objectively identified at the intermediate stages of its implementation, it is much more difficult to make changes to the budget and

¹ <http://ecoresource.ddns.net/DocLib/Safety%201996.pdf>

² http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Territorial-Sectorial_Transfrontier_Cooperation_under_Green_Deal_for_Circulating_Economy.pdf

³ <https://www.dw.com/en/scientists-predict-more-extreme-weather-events-in-future/a-58300642>

⁴ <https://fs-lps.com/ru/karta-grozovoyi-aktyvnosti/>

⁵ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Green_Safety_for_Economy_overheating_the_Planet.pdf

⁶ <http://www.mathnet.ru/links/225fc68c42f4a1274144c932c3bbcf62/mm2804.pdf>

reporting than to start from scratch. The same takes place in the research and dissertation process, an example of which is, in general, the tautological term of "Scientific Novelty". In an effort to comply with it as much as possible, many researchers (sometimes, subconsciously) distort the background of their scientific and practical results, while missing the opportunity to fully implement their achievements at the current stage of development, guided by the well-known expression "everything is new - it is well forgotten old". Thus, the publication¹ of interesting and important technical solutions for Certification and the choice of Waste Treatment Technologies ignores the systematization of previous developments² (including those mentioned by the author²), which is incorporated in the existing Standards System³ harmonized with the EU Acquis Communautaire³, incl. *inter alia* Circular Economy tasks, This, ab ovo, reduces the performance of new investigation results.

Therefore, compromises are desired between identifying the necessary changes in a new Technological-Natural Cycles /Development Rounds and already established system of Geo-Economic, Political, Social and Financial-Fiscal relations, from which Circulation Approach needs an adequate response. Such compromises are objectively inevitable, e.g., for transition from ICEs to electric vehicles in accordance with the Glasgow COP26 Declaration on Automobiles. But a lot depends on at what stage of the crisis associated with Climate Change, and how exactly these compromises will be reached (taking into account Germany's special opinion on this Declaration). Thus, the climatic situation already forces us to reconsider the fundamental approaches to Energy, starting with the ideas of N. Tesla, in particular, about changing the relationships between Transformations, Transportation, Accumulation and Utilization of Energy in hydrocarbon and electrical forms. An example of such a campaign, precisely from a Global Circulation position, is the adoption in Glasgow on 02.11.2021 of 90 countries Declaration "One Sun, one World, a Single Energy System"⁴.

And, for instance, for the industrial sector of the Black Sea countries, the Environment has long been proposing to modernize their Energy and Industrial cycles by using hydrogen sulfide from the subsurface layers of the sea⁵.

It is easy to see the fundamental importance of cyclicity for territorial and sectoral development by comparing the modern and ancient industries (Aggregations of Technologies) such as Energy and Agriculture.

The Technological Development of both anthropogenic systems is fundamentally dependent on natural global (for example, annual) cycles, as well as on daily, in particular, hydro-meteorological specifics. However, with a common for both industries significant dependence on global environment, the agricultural sphere is much more significantly affected by the local territorial-basin characteristics of specific areas and their surroundings⁶. At the same time, both the agricultural technologies themselves and the corresponding infrastructure (for growing crops and

¹ https://news.solidwaste.ru/wp-content/uploads/2021/09/183_Fayustov.pdf

² http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Waste_Treatment_Standardization_1999.pdf

³ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Wastes_Treatment_and_BAT_revealing.pdf

⁴ <https://ukcop26.org/one-sun-declaration-green-grids-initiative-one-sun-one-world-one-grid/>

⁵ <https://www.tandfonline.com/doi/abs/10.1080/15567030802463844>

⁶ https://dcsf.danubestrategy.eu/sites/default/files/Media/Zinovy%20S.BROYDE%20-%20Basins_%26%20Territorial%20Strategies.pdf

animals, storing and processing agricultural products, handling rural waste, etc.)¹ and the nature of consumption supply of agricultural products are circulating. Already today, global warming has led to a large-scale redistribution of agricultural production in multi-zone countries, such as Russia or China.

Further development of the energy sector in accordance with aforementioned “One Sun...” Declaration¹, will need pilot elaboration of Energy Flows flexible maneuvering with proper responding changes of their circularity. This requires applying both strategic assessment² and localized “embedded” forecasting approach³ for monitoring and planning of Energy Cycles on various levels. Elaborations in previous projects⁴, hint, that presence of Europe's largest hydropower storage complex together with Burshtyn energy island on Dniester/Nistru river in the aforementioned overheated zone around Carpathians, as well as developed transfrontier network for Energy transportation both in hydrocarbon and electricity forms, will allow to test optimized capabilities for predicting and responding, maneuvering and redistributing Energy Flows. This allows further to find new approaches of optimizing the full cycles of energy carriers extraction, generation, accumulation, distribution /redistribution, transportation, as well as to combine Natural (fossil resources, hydro...), Anthropogenic (nuclear, in future, thermonuclear) and recyclable Secondary Energy Resources.

At the same time, the circulatory approach suggests, *inter alia*, that Hydrogen technologies perspective isn't so much in transportation of this energyware (with complicated reconstruction of gas pipelines). Initiated, in particular by the Kyjv Institute of Industrial Ecology, localized "hydrogen supplementation" of actual energy transformation cycles in existing thermal power systems will allow flexible accumulation and use of energy by electrolysis of water and return of hydrogen and oxygen to process, including utilization of CO, CO₂ emissions and methane reproduction, for example, by further improving the Fischer-Tropsch catalytic synthesis, which is already being tested in Germany⁵.

After all, in fact, the greenhouse heating, which is so harmful for Mankind today, is only a small segment-superposition of a number of Circulation processes on the Earth and in surrounding space, where individual elements and their isotopes change their phase states and chemical compounds (from geological rocks to plasma). Therefore, the main task of applying the Circulatory Development approach is to identify technological solutions that lead not only to a decrease in the formation of certain unfavorable components of natural and anthropogenic processes, but to the targeted closure of sequences of transformations and/or to changing certain segments of natural and anthropogenic cycles for "synergization" coexistence of our Civilization with them.

Continuation of the enumeration of the technological "facets of feasible", indicated earlier, is beyond the scope of this article. It seems more constructive to consider the

¹ <http://ru.calameo.com/read/001133349178f58a43e46> P. 193-200

² http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/On_Environmenally_advisable_approach.pdf

³ <http://ecoresource.ddns.net/DocLib/Systemic%20Energy%20territorial%20cycles-1993.pdf>

⁴ <http://ecoresource.ddns.net/DocLib/Brochure%20Energoplan%20CEP.pdf>

⁵ <https://www.dw.com/en/sustainable-aviation-fuel-power-to-liquid/a-59398405>

ways to further develop the possibilities of territorial and sectorial Circulatory Development, including scientific, methodological and practical aspects.

For their pilot testing, attention should be paid to the features of the most overheated zone (between all dense population areas on the Earth), already affected above, around Geographical Centre of the European continent, located in the Carpathians¹. These features have been studied for a long time, incl. former Republican Engineering Center "Ukrecolgy" and one of the first Chair of Environmental Engineering and Resource Conservation at University of Chernivtsi (since 1994 – Centre "EcoResource").

For nowadays Pan-Eurasian problems and the upcoming West-East negotiations on further cooperation in the Climate and Resource-Environmental issues, the most significant factors in the proposed pilot zone are:

1. One and half centuries of joint spatial-sectorial and poly-ethnic-cultural socio-economic development in 8 today's countries of Carpathian macro-region based on the Alpine experience. The consequent Natural Resources mastering, and construction of the foundations of today's communications & energy networks, as well as other sectors in socio-economic sphere was carried out here in the transboundary basins of the main water sources and forest "lungs" of Baltic and Danube-Black Sea macroregions from the 18th to the 20th at the junction of common interests and contradictions of the Austrian, British, German, Ottoman and Russian empires.

2. The high potential of Natural and Anthrozopogenic Threats to the sustainability of development, in particular, risks of periodic natural phenomena (floods, earthquakes etc), and of man-made emergencies (Stebnik disaster on the Dniester in 1983, Chernobyl consequences, mass alopecia of children in 1987 ...) with their more and more frequent overlaps, as well as the lessons of two World Wars.

Therefore, in 1990th Transfrontier Cooperation was initiated, focused from the very beginning on Sustainable Socio-Economic & Spatial Development in accordance with nowadays priorities of the European Green Deal. The first attempts were aimed to develop appropriate program for the Carpathian Region and to establish an international Environmental Center for Administration & Technology (ECAT)² to connect the currently proposed pilot Carpathian zone to a network of EGTC centers in coastal cities and regions - from St. Petersburg to Tirana. The discussion of these developments in April 1994 in Shplinurov Mlyne on the Czech-Polish border during a meeting of representatives of the relevant structures of the EU, Central Europe and the CIS took place with the active participation of the last Head of the USSR State High School Committee Hennady Yagodin.

After the discussion at the 19th Special Session of the UN General Assembly on Sustainable Development on June 24, 1997³, Presidents of Ukraine, Romania and Moldova in July 1997 agreed to create the Carpathian-Black Sea Eco-Euroregion⁴ for implementation of the indicated opportunities in the transboundary basins of the main

¹ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Green_Safety_for_Economy_overheating_the_Planet.pdf

² <http://ecoresource.ddns.net/DocLib/UA-AT%20Protocol041295.pdf>

³ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/President_UA_XIX_Spec_Session_Gen_Ass_UN%20.pdf

⁴ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/EcoEuroRegion_1997_1999.pdf

Danube tributaries: Prut, Tisza, Siret, and also the Dniester. In the course of further interaction with the Association of European Border Regions (AEBR)¹, the relevant institutions of the EU, Council of Europe², US EPA (1999), and after the presentation at the Central European Initiative (CEI) Summit in Budapest (2000), 11.04.2001 main tasks and the perspectives for such cooperation were agreed upon by Working Group of CEI countries representatives in Warsaw³. And already on April 30, 2001, the key provisions were reflected in the Declaration of the Bucharest Summit "Environment and Sustainable Development of the Carpathian-Danube Region"⁴, which laid the foundations for the following Carpathian Convention (2003) and further - EU Strategy for the Danube Region (EUSDR - 2011).

The subsequent elaboration to increase the development sustainability in the course of the formation of these macro-regional structures, has been carried out in cooperation with AEBR, CEI and was further discussed at the forums of the Pan-European⁵ and Eurasian⁶ paradigms and special CEI-Bukovina events⁷. As a result, by the mid-2000th, the experience of the main EU development zones along the former axes of confrontation in Europe ("Blue Banana" along the Siegfried and Maginot lines and "Red Banana" along the former Cold War border) was summarized on the basis of the approaches of the Eco-Euroregion for "Green Banana" along the axis of former Warsaw Treaty^{8,9}. Starting with the initial support in the aforementioned Bucharest Summit Declaration of 30.04.2001, WBRD¹⁰, as well as following discussions in EU at the Regional Policy Forum¹¹ and in Committee of Regions¹², these initiatives were reflected in the EU Council Conclusions dated 13.04.2011 on the need for synergy of the goals and priorities of the Baltic and Danube macro-regional strategies¹³. The same tasks, along with the indicated strategies and new paradigms of the EU "Next Generation" and "Just Transition", can be resolved within the framework of 3 Seas Initiative.

Thus and so, further pilot testing of Circular Development approaches in the overheated "Green Banana" zone meets both European and Eurasian interests¹⁴. The universality of such approaches for all types of Natural-Anthropogenic interactions will contribute to the consistent convergence of the priorities of the Green Deal and the above-mentioned EU Strategies with the agreed positions of the Shanghai Cooperation Organization, BRICS...

¹ http://ecoresource.ddns.net/SiteAssets/SitePages/TFC/AEBR_Annual_Conference_Kursk_22-24_September_2011.pdf

² <https://rm.coe.int/168048955c> - P.119-126

³ http://ecoresource.ddns.net/SiteAssets/SitePages/TFC/CEI%20TFC%20WG_Warsaw%2011%2004%202001.doc

⁴ [http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Declaration_of_the_%20Bucharest_Summit_on_Danube_%20\(8th_November_2010\).pdf](http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Declaration_of_the_%20Bucharest_Summit_on_Danube_%20(8th_November_2010).pdf)

⁵ https://www.mittleeuropa.it/wp-content/uploads/2020/06/2009_3-1.pdf P 14-15

⁶ https://eabr.org/upload/iblock/c6d/broyde_transgranichnoe-sotrudnichestvo-v-evrazii.pdf

⁷ <http://ecoresource.ddns.net/DocLib/Brochure%20CEI-Bukovina%202006.pdf>

<http://ecoresource.ddns.net/DocLib/Brochure%20III%20CEI-Bucovina%202008.pdf>

http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/IV_CEI-Bukovina_Recomendations_2010.pdf

⁸ http://ecoresource.ddns.net/SiteAssets/SitePages/TFC/Eastern_direction_Europe_of_Regions_2005.doc

⁹ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Logistic_challenges_in_Green_Banana_it.pdf

http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Logistic_challenges_in_Green_Banana_en.pdf

¹⁰ http://ecoresource.ddns.net/SiteAssets/SitePages/TFC/Letter_WBRD.pdf

¹¹ http://www.eurosfair.pr.fr/7pc/doc/1303887075_proceedings_opendays_2010.pdf P. 65

¹² <http://www.carpathianconvention.org/eventdetailwg-spatial-planning/events/workshop-towards-a-eu-strategy-for-the-carpathian-region-148.html>

¹³ https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/EN/genaff/121511.pdf item 18

¹⁴ http://innclub.info/wp-content/uploads/2021/10/Circulatory_development_Pan-EurAsia.pdf

Generalized and supported by the EUSDR Forums, the system of interconnected strategic and local initiatives with already partially implemented projects¹ for further elaboration of the mechanisms of Circulatory Development in the proposed pilot zone should, in our opinion, include, among a number of others, the following areas based on previous designing².

The issues of ensuring Mobility (freight and passenger transportation), , which today, along with the Energy and Agro-Food spheres touched upon above, are among the most relevant topics for further West-East dialogue, seem important. Mobility in the proposed pilot zone of the Green Banana is determined by the shortest historical Transcontinental connections of the main branches of the “Silk Way” and “from Varangians to Greeks”. bypassing and through Carpathians³ between the main EU Transport (TEN-T) and Freight Rail (RFC) corridors. The conformity of these initiatives also to UNECE Combined Communications (AGTC) was reaffirmed by UNECE TEM/TER projects⁴. The passage of the main routes of communication⁵ along the above-mentioned key river basins and in main directions of the EU Energy Net (TEN-E) improves the conditions for the "splicing" of modern domestic and border-crossing multimodal Transport Technologies: Container, Piggyback..., as well as combined passenger transportation with the corresponding development of the "Green Infrastructure" of mobility, foreseen for this zone by the Transport Protocol of Carpathian Convention⁶.

The described opportunities create fundamentally new prerequisites for territories development, depending on their relationship with the vertices and edges of Transport and Energy networks graphs, e.g. for creation of appropriate production and service logistics cluster structures⁷. At the same time, the Circulating nature of Transport Industry, combined with the Eurasian “spatiality”, has in this space a decisive influence on the nature of the territorial development. Thus, the imbalance between the cargo flows of raw materials and manufactured commercial products from a number of regions leads to the "fixing" of their role as resource-extracting. Due to the transportation cyclicity (forth & back), the increase in the export of primary raw materials (ores, energy carriers, timber, agricultural products etc) leads to a drop in domestic production of goods and services with high added value, since an objective “preference” is created for the import of cheap goods from outside (so as not to drive rolling stock empty). This feature of the circulating nature of transportation can also create advantages for the development of "transit" regions, such as Bukovina⁸.

All of above mentioned about Circulatory Development of Energy, Transport, Agro-Industrial sectors and other anthropogenic areas and technologies is a part of Natural-Technogenic Interaction in such main components of the Environment as Water, Air,

¹ <http://www.gsbs.org.ua/wp-content/uploads/UA-for-EUSDR-opportunities-strategic-initiatives-conditions-1.pdf>

² <http://comeuroint.rada.gov.ua/uploads/documents/29550.pdf>

³ http://www.carpathianconvention.org/11_files/carpathiancon/Downloads/03%20Meetings%20and%20Events/Working%20Groups/Sustainable%20Industr.%20Energy,%20Transport%20and%20Infrastructure/prcs/Brochure_ConnectingDanube_Balticmacroregions%20V.pdf

⁴ https://www.unece.org/fileadmin/DAM/trans/main/ter/terdocs/TER-SC-31st_Report.pdf item 21

http://www.unece.org/fileadmin/DAM/trans/main/tem/temdocs/TEMSTAT_2012_report.pdf item 12

⁵ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/TEN-T_and_contrailler_links_bypass_and_across_Carpathians.ppsx

⁶ <http://www.carpathianconvention.org/eventdetailcop/events/cop4-fourth-meeting-of-the-conference-of-the-parties-to-the-carpathian-convention-copy.html>

⁷ <http://comeuroint.rada.gov.ua/uploads/documents/29422.pdf>

⁸ <http://ecoresource.ddns.net/DocLib/Bukovinian%20cluster.pdf>

Soil, Subsoil, Biodiversity of Flora and Fauna ... and, correspondingly, Water and Land Use , Waste Treatment... which is difficult to envelop in a single paper. Therefore, we will turn our initial attention to two sectors, that are especially relevant to common Pan-Eurasian issues, to be initiated for the proposed pilot testing of new technologies in the central part of the European Continent, namely, the circulatory use and renewal of Water and Forest Resources.

The problems here are common, since the climate-induced changes in Water Cycle, already considered by us earlier, link both of these aspects of Circulatory Development into a coherent whole. With increasing reduction in snow and glacier Water Reserves, Forests remain the only strategic accumulator of surface waters and a damping regulator of abrupt changes in their circulation, leading to Stormwater and/or Desertification. Therefore, the studies that have been carried out and international projects for these areas in the Carpathian region¹ and their specialized discussion^{2, 3} allow us to propose the following:

In the proposed pilot zone: should be foreseen the implementation of the synchronized approach to planning and integrated management of, *inter alia*, water resources and emergency risks, in particular, in relation to multi-annual water cycles and seasonal events.

On the common Geo-Information (GIS) Platform indicated below, such planning and management are proposed to be integrated with the system of forecasting, warning, in situ actions and liquidation of the consequences of emergencies in the basins of the Danube, Tisza, Prut, Siret, Vistula, as well as the adjacent Dniester and Neman. In accordance with the Declaration of the leaders of 137 countries on forests and land use of 10.11.2021⁴ it is supposed to synchronize with its implementation the above-proposed integrated successive reforestation of the Carpathians and the basins of these rivers. Such a solution will allow, not be limited only by purely ascertaining and demonstration activity. It'll make able further synchronized planning of all the main types of socio-economic activities in certain areas, coordinating cyclical nature of Water, Forest and Land Use in accordance with the approach of "Engineer Pronchatov"⁵. Such a development will probably affect both crop rotation cycles and selection and combinations of agricultural and forest technologies.

Concluding a brief overview of the possibilities to use the Circular Development approach for solving key Natural and Anthropogenic problems and to establish strategic Pan-Eurasian cooperation, let us briefly dwell on the existing scientific, methodological, information and communication support, which makes it feasible to implement the initial stages and further promotion of technological innovations.

One of the most universal indicators of imperfection and identification of "weak points" of almost all anthropogenic activities, as well as an initial stage for the search/development for new optimal technological solutions, can be the processes of Waste Generation (liquid, solid, gaseous, energy and information).

¹ <http://ecoresource.ddns.net/SiteAssets/SitePages/TFC/TFC%20GIS%20regions.pdf>

² <https://riob-info.org/ru/node/1080>

³ <http://www.carpathianconvention.org/eventdetail/wg-forests/events/fourth-meeting-of-the-wg-on-sustainable-forest-management.html>

⁴ <https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/>

⁵ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Territorial-Sectorial_Transfrontier_Cooperation_under_Green_Deal_for_Circulating_Economy.pdf P.4

The basis of the initial analysis and subsequent actions for Waste Treatment provided by the Current Standards (including the mentioned search and development of the best available technologies – BAT) is an assessment of the material and energy balance of any acts of anthropogenic activities – technological processes and their individual operations (unit process), in which waste is generated. Methodologically, such assessment is similar to financial accounting technologies, e.g. applied in the mentioned article¹ And such appropriate standard software tools can be further used for this approach implementation. The results of this primary analysis serve the initial data sources for both the Strategic Environmental Assessment (SEA) of programs (and planning documents) at the territorial, national and international level, and of Environmental Impact Assessment (EIA) of specific projects.

The increasing complexity and multi-factorial nature of the search and development of appropriate technological solutions prove the need for their following "crosslinking" into above mentioned territorial-sectorial aggregates. Therefore further research and development of these technological elements should include relevant methods for their detailed analysis and control. Platforms of territorial and sectorial GIS with exchange of Geospatial Information between Distributed Databases can serve as a common information and communication basis for this².

Thermodynamic calculation of equilibrium (quasi-equilibrium) states of multi-component heterogeneous systems (see³) can be applied here as a fairly universal method of multivariate analysis of complex chemical-technological processes and operations. The advantages of thermodynamic analysis stem directly from its genesis as the original tool for studying namely circulating phenomena and processes (e.g. Carnot cycle, Hysteresis etc.).

Due to the necessity to bring together, on the one hand, the interaction of different substances and materials in various natural and anthropogenic transformations, and, on the other hand, to summarize individual technologies into territorial-sectorial aggregates, it is advisable to develop methods similar to R. Feynman diagrams that allow to demonstrate the components of the technology and their splicing to a wide range of non-specialists.

The Circulation essence of Natural and Anthropogenic Development processes requires to apply Harmonic Analysis methods (e.g, Fourier transformation) to them. This makes it possible to identify both the main characteristics (eigen frequencies) of repetitive Circulatory phenomena, and Temporal, Spatial, Structural features of those differential changes, that dictate the need to search /develop appropriate innovative technological solutions⁴, expanding ability on their management (forecasting, analysis, monitoring, etc.).

In turn, identified in this way and experimentally refined spectral features of technologies (natural and anthropogenic phenomena) make it possible to single out their individual characteristic indicators. They can serve as easily measured (compared to complex episodic surveys of broadband spectra) indicators for

¹ https://news.solidwaste.ru/wp-content/uploads/2021/09/183_Fayustov.pdf

² <http://dcsf.danubestrategy.eu/sites/default/files/Media/Zinoviy%20Broyde%20EUSDR%20multilevel%20facility.pdf>

³ http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Territorial-Sectorial_Transfrontier_Cooperation_under_Green_Deal_for_Circulating_Economy.pdf P.2

⁴ http://ecoresource.ddns.net/DocLib/Gradient_Functional_Materials.pdf P. 153.

continuous (or following with the required frequency) observations, both for technological express control and external (in particular, Environmental) monitoring (so-called relative measurements¹).

The ratio between the development of such Technological Metrology and Monitoring of the Environment, Biota and Human Health, focused on their further symbiosis, was discussed for a long time with specialists from the St.-Petersburg Centre of Environmental Safety Issues and with a number of other specialized institutions, mainly in context of Waste Treatment at different stages of Production, Consumption, provision of Services and Recycling of Secondary Resources. The first step towards the implementation of such an approach was made by Interstate Standard GOST 17.9.0.2-99, in particular, by introducing Annex G “Requirements for the composition of Waste Parameters”.

At the same time, such solutions also create prerequisites for the evaluation/control of cost-price indicators (cost-effectiveness ratio) at different stages of the Life Cycle of new technological solutions, from their development, through further use, up to recycling/disposal, including reuse of worn/obsolete products and waste. It is advisable, in particular, to extend the assessment of the possibilities of applying the best available technologies (BAT) by “poor and rich countries”² from the sphere of Waste Treatment (Minimization) into many other technological aspects in Natural-Anthropogenic Environment. In other words, the necessary prerequisites are being created for permanently bringing the identified and newly developed technologies in line with urgent and future needs, as well as for linking them into more effective Territorial and Sectorial aggregates.

Thus, the Circulatory nature of the Development of most Natural and Anthropogenic processes creates preconditions for Systemic technological solutions of strategic problems and further coexistence (Synergization) both in the context of Global Climate Change and growing confrontations in Pan-Eurasian space. The shown opportunities for pilot testing of approaches and mechanisms for implementing Circulatory Development in an overheated zone of compact population around the Geographical Centre of the European Continent at the junction of Transport, Energy, Technogenic Security and Regional Interests and Contradictions will contribute to the adoption of informed mutually beneficial decisions.

¹ http://ecoresource.ddns.net/DocLib/Gradient_Functional_Materials.pdf P. 2

² http://ecoresource.ddns.net/SiteAssets/SitePages/EUSDR/Territorial-Sectorial_Transfrontier_Cooperation_under_Green_Deal_for_Circulating_Economy.pdf P.5