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"GREEN ECONOMY" AS A NON- WASTE PRODUCTION IN THE SERVICE OF NATURE AND SOCIETY

Abstract. Analysis of the production development and dynamics of raw materials consumption, energy and waste generation led to the inevitable conclusion that the further production development (and society as a whole) can not be carried out on the basis of traditional extensive technological processes without taking into account environmental and social constraints, and requires a fundamentally new approach. This approach was called " low-and non-waste technology "and later "clean" and "green" technologies.

Key words: technologies, non-waste, clean, green.

As is known, the growth of human well-being depends on the pace of socio-economic development and economic development depends crucially on the scale, intensity and nature of the use of natural resources.

Analysis of the development of production, consumption of raw materials and energy, as well as the formation of waste and the state of the environment led to the inevitable conclusion that the further development of production (and society as a whole) can not be carried out on the basis of historically established traditional extensive technological processes without taking into account environmental and social constraints and requires a fundamentally new approach. This approach is called "low-and waste-free technology".

For the first time the discussion of low - waste and non-waste production was held in 1976 at the international Symposium of the CMEA member countries on theoretical, technical and economic issues of low-waste and non-waste technologies (Dresden, GDR) with the participation of the ECE Secretariat and UNEP. A fairly complete picture of "waste-free technology" was formulated at the pan-European meeting on cooperation in the field of environmental protection (Geneva, 1979). The meeting adopted a special "Declaration on low-waste and non-waste technology and use of waste", which states: "Waste-free technology is the practical application of knowledge, methods and means in order to ensure the most rational use of natural resources and energy within the framework of human needs and to protect the environment" [1,2].

The idea of multiple, cyclical use of material resources has long been widely discussed around the world. Currently, it is technically possible (there are developed technological processes and appropriate equipment) to reuse 2/3 of the generated waste, and in the future the industry will be mainly based on renewable and secondary material resources, and only expanded production will require primary, non-renewable raw materials. This idea was called "waste-free technology". This approach is prompted by nature itself. In natural ecosystems, the formation of living matter and its decomposition are balanced, the waste of some organisms serve as a habitat for others and thus a virtually closed cycle of substances is carried out.

The transition to small and waste-free production requires a fundamentally new approach to all stages of the process and equipment. For example, in the development of technological processes, the main attention should be paid to the development of fundamentally new processes, the introduction of which significantly reduces or virtually eliminates the formation of waste and negative impact on the environment, the integrated use of all components of raw materials and the maximum possible use of energy potential, the possibility of replacing primary raw materials and energy resources with secondary, the creation of energy technological processes, the introduction of continuous processes, etc.

In the organization of small and waste-free production should provide opportunities: the creation of closed water and gas cycles; combination of production based on the integrated use of raw materials and energy resources; industry cooperation of production based on the processing and recycling of secondary re-

sources; development of standards that limit the impact on the environment, including justification of methods and designs of plants and facilities for disposal and disposal of waste; organization of continuous (independent) control of the environment in the area of the enterprise, etc.

In the development and selection of new hardware design should be guided by the following provisions: preference is given to fundamentally new devices (for example, allowing to carry out several technological processes in one device), it is necessary to optimize the size and performance, sealing devices, in their manufacture it is advisable to use new more durable structural materials, etc.

Special requirements are imposed on raw materials and energy resources: it is necessary to carefully justify their quality (for example, to consider the possibility of using technical water, not drinking water, but lower quality); to conduct preliminary preparation of raw materials and fuel (extracting toxic components from it, for example, sulfur from fuel); to provide for the possibility of replacing raw materials and energy resources with non-traditional, local, simultaneously extracted, etc.

Finished products in the production of milk and waste-free after physical and moral wear should be able to return to the production cycle (the possibility of recycling).

The results of the development and implementation of low - and non-waste production in different countries were summed up at the seminar of the UN economic Commission for Europe on low-waste technology (Tashkent, 1984). At this seminar, a new definition of waste – free technology was adopted: "Waste-free technology is a method of production (process, enterprise, territorial – industrial complex), in which the most rational and integrated use of raw materials and energy in the cycle of raw materials – production – consumption-secondary raw materials, so that any impact on the environment does not violate its normal functioning." The recommendations of the Tashkent seminar were considered and approved at a meeting of Senior government advisers and sent to all participating countries on behalf of this international organization [3].

In the USSR, the introduction of waste-free technological processes and production was carried out in the legislative order. So in 20 article of the law of the USSR " About the state enterprise (Association)", 1987 it is written: "The company is obliged to organize production on the basis of non-waste technologies as the main direction of preservation of the natural environment."

In this connection special importance is the quantitative evaluation of the effectiveness of the preservation of the natural environment and rational use of natural resources in modern factories.

The criteria that limit the harmful effects of industrial production on the environment are based on the existing sanitary standards-maximum permissible concentrations (MPC) of pollutants in various components of the environment. On their basis, scientific and technical indicators limiting the impact of production on the environment are calculated. These indicators include standards of maximum permissible emissions (MPE) into the atmosphere and maximum permissible discharges (MPD) into the hydrosphere. These values are measured in impurity mass units over time for each source of organized release or discharge. At the same time, the receipt of harmful substances from this source and from all sources in the region, taking into account the further development of infrastructure and dispersion of harmful substances in the atmosphere or hydrosphere, should not create concentrations exceeding the maximum permissible.

To date, there is no universal criterion for quantifying the degree of non-waste production. There are various relevant indicators in different branches of industrial production. Thus, in non-ferrous metallurgy, the coefficient of complexity is widely used-the proportion of components extracted from processed raw materials in relation to its entire amount. In some industries, this value is the degree of use in technological processes of raw materials.

A number of chemical industries have introduced a waste-to-waste ratio; a special method for its determination and classification of the corresponding process to the category of waste-to-waste, low-waste and traditional has been developed.

The coefficient of non-waste characterizes the completeness of use in the production of material and energy resources, as well as the intensity of the impact of this production on the environment:

$$C_{nw}=f \cdot C_{nw} \cdot C_m \cdot C_{en} \cdot C_{ec}$$

where f – coefficient of proportionality determined empirically;
C_{nw} – non-waste coefficient (dimensionless quantity $0 \leq C \leq 1$);
C_m – coefficient of completeness of use of material resources;
C_{en} – coefficient of completeness of use of energy resources;
C_{ec} – coefficient of compliance with ecological requirements [2].

The development of the concepts of "waste-free production" and "waste-free technology" took place at a meeting of the UNEP/IEO working group in 1989.at this meeting, a new name and definition of such processes and production was given. The international community has spread the definition of cleaner production "Is the production, which is characterized by a continuous and complete application to processes and products environmental strategies to prevent pollution of the environment thus, to lower the risk for mankind and the environment." With regard to the processes - a rational use of raw materials and energy, excluding the use of toxic raw materials, reducing the amount and degree of toxicity of all emissions and waste generated in the production process.

In terms of products, clean production means reducing its environmental impact over the life cycle (product) from extraction of raw materials to disposal (or disposal) after use. The transition to clean production is achieved by improving technology, applying know-how and / or by changing production management and organization" [4].

It should be noted that all the requirements for the organization of waste-free production remain unchanged in the transition to "clean" production. Additional requirements for the organization of such production are imposed on the toxicity of raw materials and products and the need to take into account the entire life cycle of products, as well as to reduce the environmental risks of production.

Recently, the principles of green chemistry have gained leading positions in the development of the chemical industry[5, 6], which have become widespread in the world thanks to the active support of IUPAC, the Organization for economic cooperation and development (OECD), the Institute of green chemistry (USA) and other organizations.

By the definition adopted by IUPAC, "Green chemistry" is "the invention, development and application of chemical products and processes that reduce or eliminate the use and formation of hazardous substances and products"

Green chemistry should be considered as a further development of waste - free and clean technology in the chemical industry [6]. Therefore, one cannot but agree that green chemistry should be considered "as one of the main methods of prevention of environmental pollution", however, it is regrettable that, for unknown reasons, the vast experience gained by UNECE, CMEA and Russia in the development of approaches to the creation of waste-free and clean technologies is often simply ignored. For example, in the detailed review "Green chemistry: 30 - year history" [7], as in the work [8] there is not even a mention of it.

As has been repeatedly noted, the main thing in modern production is not waste processing, but the organization of technological processes for processing raw materials in such a way that waste is not formed in the production itself. After all, production waste is a part, for one reason or another, of unused or underutilized raw materials, defective products, sludge and sludge treatment facilities that are not utilized for a given period of time and entering the environment. However, in most cases, waste is a raw material for other industries and industries. As in the last century was noted by D. I. Mendeleyev:"There is no waste in chemistry, but unused raw materials". The ultimate goal of modern production is the maximum possible satisfaction of people's needs (food, clothing, housing, transport, etc.) without deterioration (and sometimes with improvement) of the human environment, that is - sustainable development.

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«Жасыл экономика» табиғат пен қоғам қызметінде қалдықсыз өндіріс ретінде

Түйіндеме. Өндірістің дамуы, шикізатты және энергияны тұтыну динамикасы, қалдықтардың пайда болуын талдау және экологиялық, әлеуметтік шектеулерді назарға ала отырып өндірістің (және тұтастай алғанда қоғамның) одан әрі дамуы, дәстүрлі экстенсивті технологиялық процестер негізінде жүзеге асырыла алмайтыны туралы сөзсіз қорытындыға әкелді және қазіргі уақытта принципті түрде жаңа тәсілді талап етеді. Бұл тәсіл "аз қалдықсыз және қалдықсыз технология" деп енгізілді, ал кейінірек - " таза "және" жасыл " технологиялар деген атқа ие болды.

Түйінді сөздер: технология, қалдықсыз, таза, жасыл.

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«Зеленая экономика» как безотходное производство на службе природы и общества

Резюме. Анализ развития производства и динамики потребления сырья, энергии и образования отходов привел к неизбежному выводу о том, что дальнейшее развитие производства (и общества в целом) не может осуществляться на основе традиционных экстенсивных технологических процессов без принимания во внимание экологические и социальные ограничения, и требует принципиально нового подхода. Этот подход получил название «малоотходная и безотходная технология», а позднее - «чистые» и «зеленые» технологии.

Ключевые слова: технологии, безотходный, очистить, зеленый.

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EFFICIENCY AND CONVENIENCE OF A CORONA DISCHARGE OZONATION IN WATER TREATMENT IN KAZAKHSTAN

Abstract. The article presents an overview and technical specifications of the world experience of water ozonation is one of the main modern technologies to provide the population with clean potableg water. In addition, the best proven practices are proposed to be effectively used in Kazakhstan, including ozonators based on coronary discharge and improve them in accordance with the weather conditions of the country.

Key words: ozonation, corona ozonator, high voltage power supply, dielectric, solar energy.

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ҚАЗАҚСТАНДА СУДЫ ТАЗАЛАУДА ОЗОНДАУДЫҢ ТӘЖДІК РАЗРЯД ТҮРІНІҢ ТИІМДІЛІГІ МЕН ЫҢҒАЙЛЫЛЫҒЫ

Түйіндеме. Мақалада халықты таза ауыз сумен қамтамасыз етудің қазіргі заманғы басты технологияларының бірі – суды озондаудың әлемдік тәжірибелеріне шолу жасалған және техникалық сипаттамалары берілген. Сонымен қатар дәлелденген озық тәжірибелерді, оның қатарында тәждік разряд негізіндегі озонаторларды Қазақстанда тиімді пайдалану және оларды еліміздің климатына сәйкес жетілдіру ұсынылады.

Түйінді сөздер: озондау, тәждік озонатор, жоғарғы кернеудегі қорек көзі, диэлектрик, күн энергиясы.

КІРІСПЕ

Адамзат тіршілігінде судың, оның ішінде ауыз судың алатын орны ерекше. Қазіргі заманда адамзатты ауыз сумен қамтамасыз ету әлемдік проблемлалардың бірі болып табылады. Ауыз судың жылдан-жылға жетіспеушілігі үдеп келеді. Қазіргі таңда әлем елдерінің көпшілігі өзен суларын әртүрлі әдістермен тазартып ауыз суға пайдалануда. Бірақ бұл жағдай ауыз судың тапшылығын жоя алмайды.

Қазақстандағы өзендердің бір бөлігі солтүстік өңірлерден (мысалы, Жайық өзені) бастау алады. Солтүстік өңірлерде табиғи су көздерінің құрамында минералды және органикалық заттар, сондай-ақ микроорганизмдер көбірек кездеседі. Ал кейбір өзендер өндірістік өңірлер арқылы өтеді. Атап айт-