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## FORMATION OF A BRAND OF SUSTAINABLE INDUSTRIAL DEVELOPMENT IN THE POSTWAR PERIOD

**Purpose.** To develop the main directions of industrial recovery as a necessary stage for the formation of a sustainable economy in the postwar period. To develop tools and approaches to rebuild war-torn industries.

**Methodology.** Methods used are: abstraction and critical analysis – in forming the theme and purpose of the work; content analysis – for analytical review of the literature; ascent from the abstract to the concrete – to form an algorithm for developing a strategy for reconstruction; analysis and synthesis – to analyze the amount of losses; idealization and formalization – to formulate directions of industrial recovery; system analysis – to form a project approach to reconstruction; comparative analysis – to stratify the losses of industries.

**Findings.** The amount of losses of the mining and metallurgical industry is analyzed and it is pointed out that the reason was not only physical destruction, but also the forced closure of enterprises. Assessment of the amount of assistance by its types is performed, which allowed estimating the approximate amount and direction of assistance for recovery in the postwar period. It is noted that the main task in the process of recovery of industries is their deep modernization and introduction of the latest technologies into the production cycle, which will create the preconditions for a sustainable economy.

**Originality.** It is stated that a single strategic development program is needed to restore the work of industrial infrastructure. The solution of tactical tasks should be consistent with the strategic program. To implement the program and the tasks of a sustainable economy, an Algorithm for developing a strategy for economic reconstruction has been developed. To increase the efficiency of reconstruction industries, use of the project approach is proposed. Projects must be implemented in accordance with the single strategic development program.

**Practical value.** The main directions of industrial recovery with the emphasis on its reform are formulated and recommendations on tools and approaches of implementing the strategic program of industrial reconstruction are given.

**Keywords:** *sustainable development, brand approach, post-war period, industrial recovery, strategy of economic reconstruction, project approach*

**Introduction.** A sound economic basis, steady dynamics of development of its components and formation of the economic basis for the prosperity of social and environmental components of society are required to form the preconditions for sustainable development of Ukraine and its regions. Each of these positions has suffered significant losses during the Russian aggression against Ukraine.

Recovery of economic, environmental, social losses should not be limited to the reconstruction of the lost. Knowing the problems in these areas in the pre-war period, it is advisable to carry out recovery in such a way as to avoid the consequences of past problems in subsequent periods. There is also a need to analyze ways to solve problems that have arisen due to the destruction of all spheres of life of the state and society as a result of hostilities. And choosing the path of reconstruction, we should take into account not only the challenges of today but also the needs of future periods.

This should be facilitated by the active civil position of society, which unites the country during the war, harnessing the potential of the volunteer movement and implementing tools to correct managerial influence in planning to rebuild active local communities, forming mechanisms for coordinating regional programs to restore economic, environmental and social losses.

Thus, the achievement of strategic development priorities for the implementation of tactical tasks determines the sustainable development of the state, the effective formation of the appropriate level of dynamics of socio-economic develop-

ment of the state and forms imperative principles in shaping sectoral policies, programs or projects.

**Literature review.** Natcher Naomi, et al. [1] studied scenario planning tools to mitigate the industrial impact on the economy of agricultural regions. Riedy [2] proposed “discursive entrepreneurship” to form the structure of the discursive environment of the modern sustainable economy. Tabara, et al. [3] developed a relational methodology aimed at creating the preconditions for the emergence of positive “socio-environmental turning points”, which can lead to the transformation of sustainable development. Havrysh, et al. [4] studied the evolution of the concept of sustainable development: from its formation to solving modern problems. Zhang [5] proposed a conceptual approach to the evolution of the theory of sustainable development. Zeldina [6] transformed the concept of investment and innovation model to the conditions of sustainable development of Ukraine’s economy. Vyniatynska, et al. [7] analyzed the composition and intensity of the dynamics of the cost of production of Ukrainian enterprises in the formation of a sustainable economy. Al-Dmour, et al. [8] proposed mathematical tools for predicting business efficiency in the formation of a sustainable economy. Bazaluk, et al. [9] studied the experience of EU countries in shaping the economy of sustainable development in terms of prospects for the implementation of sustainable development approaches in Ukraine. Mikhno, et al. [10] proposed polycentric management to model resource systems on the path to a sustainable economy (which is of interest to the mining industry). Bengtsson, et al. [11] studied the transformation of consumption and production systems to achieve the goals of

sustainable development on the verge of efficiency. Avelino [12] studied the impact of institutional structures on transitional processes in the sphere of sustainable development. Clark, et al. [13] made an analytical review of the work of sustainable economic approaches as to the balance of interests of environmental protection and resource development (including mining). Bobrovska, et al. [14] examines in detail the aspects of sustainable development of individual Ukrainian territories, which is interesting in terms of forecasting their development given the varying degrees of war damage. Zhironkin, et al. [15] studied the principles of sustainable development as a form of structural transformation of Ukrainian industries. Nitsenko, et al. [16] studied the methodological foundations of structural modernization of the region's economy. Shaw [17] pointed out the need to transform science and practice in the formation of a sustainable economy as a prerequisite for change in society. Markard, et al. [18] studied the problems of accelerating the transition to sustainability. Sachs, et al. [19] stratified six transformations to achieve the goals of sustainable development.

**Unsolved aspects of the problem.** A significant body of research on various aspects of the formation of a sustainable economy does not address the problems associated with the formation of approaches to a sustainable economy with significant economic, social, environmental losses during hostilities.

**Purpose.** To develop the main directions of industrial recovery as a necessary step for the formation of a sustainable economy in the postwar period. To develop tools and approaches to rebuild the war-torn industry.

**Methods.** General and special methods of cognition were used to conduct the research, the results of which are given in the presented article.

The method of abstraction and the method of critical analysis were used in forming the topic of the article and the purpose of the study.

The method of content analysis was used for analytical review of the scientific literature on the chosen research topic

The method of ascent from the abstract to the concrete is used to form an algorithm for developing a strategy for economic reconstruction of industry.

The method of analysis and synthesis was used to analyze the amount of infrastructural losses due to military actions, and, above all, the industrial capacity of the mining and metallurgical industries.

The method of idealization and formalization is used to formulate the main directions of industrial recovery with an emphasis on its reform.

The introduction of the method of system analysis allowed proposing the use of a project approach for the effective implementation of the strategy of economic reconstruction of industry.

The use of the method of induction and deduction allowed us to establish that the main task in the process of recovery of industries is their deep modernization and introduction of state-of-the-art technologies into the production cycle, which will also contribute to effective strategies of sustainable economy including environmental and social aspects.

Using the method of comparative analysis, we found out that industry suffered the largest losses due to the war and relatively less damage was sustained by housing and transport infrastructure.

**Results.** As a result of hostilities, Ukraine has largely lost its mining capacity and metallurgical industry. The enterprises of these branches were located mainly in the east of Ukraine in the zone of hostilities of considerable intensity.

According to The Vienna Institute for International Economic Studies, enterprises that provided 29 % of the country's industrial output were in the zone of active hostilities. The actual confirmation of these data is that according to our analysis electricity consumption (as a tangible indicator of

the volume of industrial activity) decreased by 1/3 compared to 2021.

This is also confirmed by a survey conducted by the Central Bank of Ukraine. According to this survey, 30 % of industrial companies in Ukraine have stopped production, and an additional 45 % of companies have reduced production. That is why the World Bank's forecast which predicts that Ukraine's GDP in 2022 will be reduced by 45 % compared to 2021 looks quite optimistic.

The country's export opportunities are significantly weakened by the aggressor's blockade of seaports. Thus, the analysis found out that up to 60 % of total exports passed through seaports in the period before the active phase of hostilities.

This is confirmed by the data of the State Statistics Service, according to which, for example, in 2021, ferrous metals were exported for 13.95 billion US dollars, which is by 81.4 % more than in 2020. But with the start of the active phase of full-scale hostilities, exports of, for example, flat-rolled products decreased by 9.3 times in March alone, from 437,000 tons in February to 47,000 tons in March.

The cessation of production as a result of the war on a number of positions in the metallurgy and mining industries led to the cessation of exports of these positions. But such a decline in export performance in industry is due not only to the war, but also to the neglect of the introduction of risk management tools by enterprise management and failure to develop new options for transportation routes other than the use of maritime transport. The use of these tools would minimize the risks regardless of their type and size.

Of course, maritime transport was much cheaper than other modes of transport before the start of full-scale hostilities, but the risks of military action for it were also obvious.

The significance of the impossibility of exporting the products of the metallurgical industry is due to the fact that the products of this industry accounted for 25–30 % of Ukraine's exports. Sea transportation accounted for 75 % of steel exports and 50 % of ore exports.

Not only Ukraine's economy but also the world economy has suffered significant losses. Thus, Ukrainian iron ore accounted for 16 % of total EU imports. In the volume of all world imports of pig iron, Ukrainian cast iron accounted for 30 %. That is, the economies of countries on all continents have suffered.

This factor stimulated the processes of replacing Ukrainian products with products of other countries. Ukraine has rapidly lost its markets. In particular, Indonesia increased its exports of metallurgical products by ~ 40 %. As a result, Turkey and the European Union have increased exports of metallurgical products to the United States. But the most unpleasant fact is that Ukraine can be replaced by Russia at the market of metallurgical products. Despite the imposed sanctions, Russia can export industrial products through other countries, including Turkey and China.

Until the period of the active phase of the full-scale war, raw materials predominated in the structure of metal exports. Thus, in 2021 Ukraine 25 times increased its exports of scrap metal compared to 2020. This has also led to significant problems for Ukrainian metallurgy, as it has deprived Ukrainian enterprises of the raw materials needed for the industrial cycle, which in turn has reduced the revenue side of the budget. This, for example, is evidenced by the fact that in 2021 the revenue from the export duty on the export of one ton of scrap metal amounted to UAH 1,900, and in the case of processing the specified amount of scrap metal into steel the revenue is UAH 10.7 thousand.

An option to remedy this situation with exports is, after the resumption of enterprises, to develop new multimodal routes to ports of other countries using alternatives to Ukrainian sea transport, rail transport in particular. But JSC "Ukrzaliznytsia" is currently unable to perform such an additional volume of traffic. This will require significant work to restore the

tracks, replace the narrow-gauge sections with broad-gauge ones and upgrade the infrastructure, which in turn requires significant capital investment. Also, the implementation of such an export option will require the ability of neighboring countries to provide a significant increase in the capacity of maritime terminals.

The blockade of a significant part of Ukraine's border with Russia and Belarus on land complicates this task, which in turn significantly complicates logistics and increases transportation costs. According to the preliminary analysis, transportation costs may increase by more than 30 % (optimistic estimate) or more than twice according to the pessimistic estimate.

The intensification of the work of diplomatic services aimed at reducing quotas and customs duties on Ukrainian products in importing countries may help to solve this problem. A possible option is also the establishment of a special fund to compensate for the rising cost of transportation of Ukrainian products by the European Bank for the reconstruction and development. This could help not to lose both export capacity and Ukraine's position at the markets of other countries as well.

Combining significant private and public investment in industrial recovery to achieve sustainable development goals can be one of the most pressing challenges. Institutional factors to improve the investment climate could contribute to the formation of the necessary resources for economic reconstruction.

Ukraine's refusal, at one time, of its agreed commitments to the IMF, which led to insufficient development of the energy sector because this refusal hinders investment, is an example of the insufficient level of institutional factors.

At present, funding for the industrial reconstruction program may require the cooperation of donor governments, the Ukrainian government and international financial organizations.

If Ukraine manages to mobilize domestic financial resources through institutional restructuring and suppression of corruption, this will significantly increase the confidence of private investors and funds, which will lead to the formation of a resource sufficient for sustainable development of the country.

With the right investment conditions guaranteed by the reforms, and with the current level of international support, Ukraine is able to rebuild the destroyed industries and ensure that most of the damage caused by the war is eliminated and join the circle of fast-growing countries.

To increase the efficiency of reconstruction of destroyed industries, we have proposed the use of a project approach. Projects must be implemented in accordance with a single strategic development program. This is confirmed by the conclusions of the audit of the Iraqi reconstruction program conducted by the relevant US structures. This audit found out that the main reason for not implementing many reconstruction projects was the lack of a strategic planning program and close coordination in the process of their implementation.

Urgent tactical tasks of industrial reconstruction should be implemented on the basis of the existing single strategic program of development in the postwar period. The Algorithm for developing a strategy for economic reconstruction of industry is proposed (Fig. 1) to implement the strategic program. This Algorithm was formed by us as the main tool for rebuilding the war-torn industry.

The basic block for the effective implementation of this algorithm is "Determination and comparison of indicators of the destruction of the industry by region". In our opinion, in order to implement it, it is necessary to create a database in which the scale of losses, their locations and expert assessments of measures to restore the destroyed facilities and the amount of resources needed for this will be determined in detail.

The block "Formation of ways to solve tactical tasks and methods of their coordination of strategic goals" should include the stage of formation of the recovery priority plan for

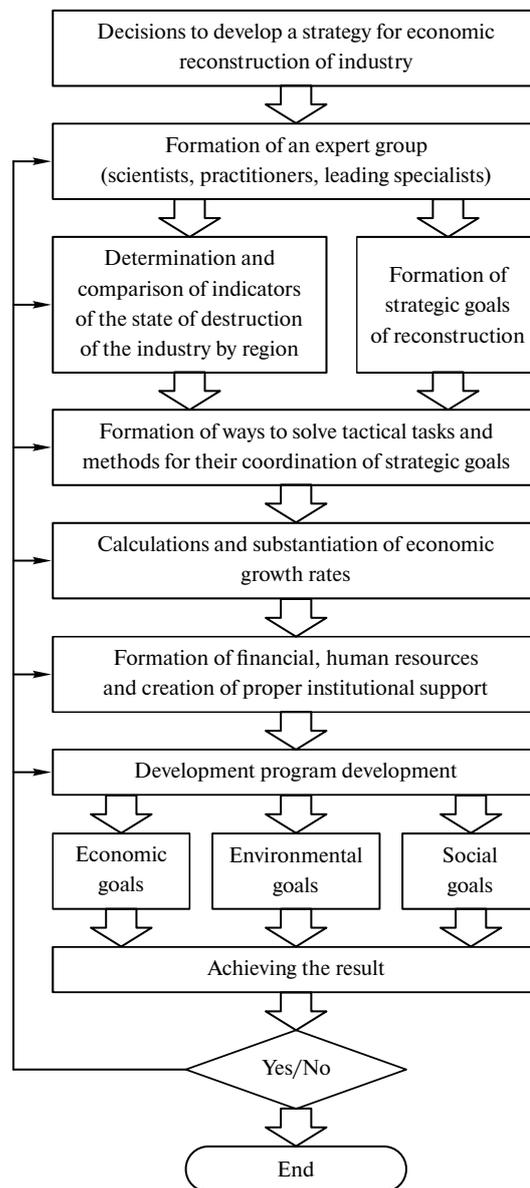


Fig. 1. Algorithm for developing a strategy for economic reconstruction of industry

sectors of the economy, detailed for each of the affected regions and for each destroyed facility in the complex – including all related infrastructure which is necessary for its normal operation.

Ukraine will not have enough of its own resources to implement the strategy of economic reconstruction of industry in the postwar period in the presence of war-torn industry.

Nowadays it is difficult to estimate the amount of resources needed to implement the Marshall Plan 2, as hostilities are still ongoing, but preliminary estimates put the amount of aid at hundreds of billions of US dollars. The results of the analysis as of 12.04.2022 are shown in Fig. 3.

The very use of such a working name of the recovery plan is significant, because this plan was aimed primarily at restoring the industry. Prior to the implementation of the Marshall Plan for the period 1945–1947, European countries received 14 billion dollars primarily for the restoration of infrastructure. This will help in assessing the possible amount of assistance to Ukraine and the pace of its provision. The countries that received 2/3 of the aid, namely the United Kingdom, France, Italy, West Germany and the Netherlands were able to lead the list of most developed countries after a period of economic recovery thanks to the

Marshall Plan. Therefore, the strategic goal of economic reconstruction of Ukraine is not only to achieve sustainable development but also to take a worthy place among developed countries.

In general, the strategy of economic reconstruction of industry should use the approach of mass introduction of primarily state-of-the-art technologies into production. This strategy should also be adjusted to the directions and goals – physical reconstruction of destroyed facilities, environmental rehabilitation of regions, economic reconstruction, social and institutional recovery.

Therefore, a study on the amount of financial, humanitarian aid and supply of military equipment, machinery, weapons for the period of active hostilities based on data [20] was conducted to assess the amount of possible assistance in the post-war period for the recovery according to the above-mentioned directions and goals of the economy, social sphere and environment, which are components of sustainable development in the future.

European countries also have their own interest in helping Ukraine within the framework of the Marshall Plan 2, for the social sphere and the environment. The good state of the social sphere will help reduce the number of migrants from Ukraine to the EU.

And, since the state of the environment is important for neighboring countries (because the impact of negative factors on the environment is not limited to state borders), to help Ukraine in this area would be a rational approach.

The analysis, the results of which are shown in Fig. 2 allows us to estimate not so much the amount of aid as its pace,

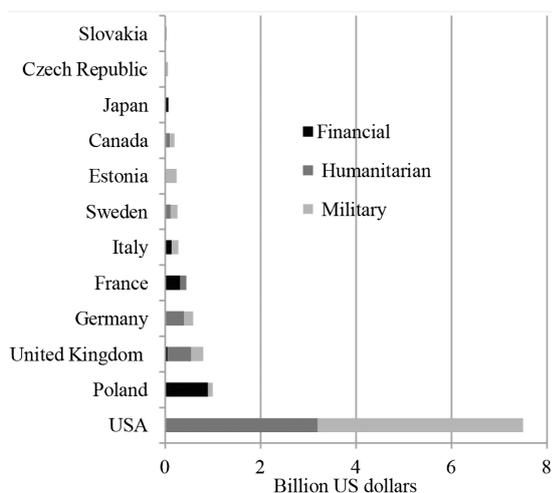


Fig. 2. Financial, humanitarian aid and supply of military equipment, machinery, weapons, \$ billion

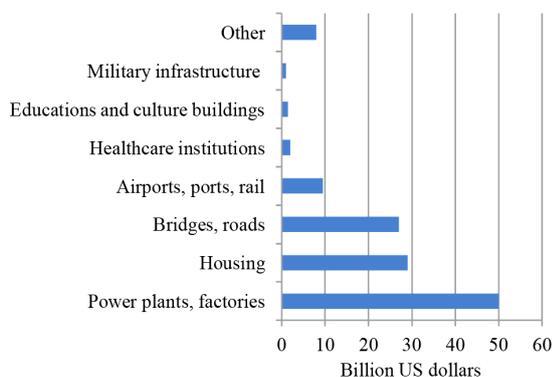


Fig. 3. Volumes of destroyed infrastructure as of April 12, 2022, \$ billion

because the data relate to 1.5 months of the active phase of hostilities.

The need for assistance can be estimated in Fig. 3 made according to The Vienna Institute for International Economic Studies and the Kyiv School of Economics.

Comparative analysis shows that industry suffered the biggest losses while housing and transport infrastructure sustained relatively smaller ones.

A comparison with the amount of losses of military infrastructure indicates that civilian, industrial and logistics facilities were the main target of the aggressor (Fig. 3).

To use the expert method of analogies, we will cite the recently adjusted loss estimate prepared by the relevant UN agencies, which is \$442 billion. The direct damage from the destruction of infrastructure and industrial facilities is estimated at \$117.7 billion.

At the same time, our analysis shows that the biggest damage apart from the destroyed industrial facilities is the cessation of production processes at industrial enterprises.

Failure to provide the required maintenance, lack of timely investment to support the production cycle has led to the fact that even the surviving industrial facilities will need technological upgrades.

This confirms the amount of investment in the depreciation of industrial facilities in the unoccupied territories of Donetsk and Luhansk regions for the period 2014–2021 which is ~60 % of total losses.

The analysis also shows that despite significant estimated volumes of aid from friendly countries, they will also be insufficient to restore a sustainable economy. Therefore, Ukraine should encourage private investors, primarily domestic private investors, to implement strategic industrial recovery projects. This necessitates certain institutional steps to restore investor confidence and ensure a favorable regime for investment.

Ways to restore the industry with an emphasis on its reform are outlined by representatives of the executive branch and the Verkhovna Rada of Ukraine.

They can be combined in the following areas:

1. Growing share of the country's exports of manufacturing products, not raw materials.
2. Increasing funding for military-industrial complex products.
3. Institutional guarantees for the free development of small and medium enterprises in the industrial sphere.
4. Ukraine's membership in the European Union. The EU is far from being just about the economy, but it will have a decisive influence.
5. Institutional guarantees of global business focused on the development of industrial production, job creation and the use of modern technologies.
6. Introduction of industrial parks as forward projects in industrial recovery.

**Conclusions.** An analysis of the volume of infrastructure losses, in particular, the mining and metallurgical industries. Military action continues, the amount of losses continues to grow, so only an estimate of the amount of losses was made. It is stated that the mentioned losses are borne by the industrial infrastructure not only as a result of the physical destruction of enterprises and the export of equipment to Russia. The losses are also caused by the forced shutdown of enterprises, which is irreversibly catastrophic for the metallurgical industry, as failure to provide the necessary maintenance, lack of timely investment to support the production cycle means that even surviving industrial facilities will need technological upgrades. The main directions of industrial recovery in the postwar period with an emphasis on its reform are formulated.

An assessment of the amount of financial and humanitarian aid provided and the supply of military equipment, machinery, weapons for 1.5 months of active hostilities was

conducted. The analysis of this information, in turn, allowed us to assess the approximate (since the war is not over and the destruction continues) amount of aid needed to rebuild the country, and, more importantly, areas of assistance.

Using the method of comparative analysis, it was established that today the largest losses due to the full-scale war suffered by industry, relatively smaller – housing and transport infrastructure. A comparison with the amount of military infrastructure losses proved that the aggressor's main targets were industrial, logistical and civilian facilities.

It is stated that there is a personal interest for European countries in providing assistance to Ukraine for the restoration of the social sphere and the environment within the implementation of the “Marshall Plan-2”. The good state of the social sphere will help reduce the number of forced migrants from Ukraine to the EU. Restoration of the natural environment will reduce the level of negative transboundary impact for the countries of the European Union.

It is indicated that the main task in the process of restoration of industrial branches will be their deep modernization and introduction of state-of-the-art technologies into the production cycle. This should provide a basis for the effective implementation of sustainable economic strategies, including environmental and social aspects. Combining significant private and public investment to restore industry to achieve sustainable development goals can be one of the most relevant tools for post-war reconstruction. Institutional factors to improve the investment climate could form the foundation for using the necessary resources to rebuild the economy.

As the task of economic recovery in general, and in particular the rebuilding of industry will require solving the problem of destroyed transport infrastructure, development of new multimodal routes to ports of other countries with the use of alternatives to Ukrainian transport by sea, in particular, modernized railway transport.

It is stated that a single strategic development program is needed to restore the work of industrial infrastructure. The solution of tactical tasks should be in accordance with the specified strategic program. An Algorithm for developing a strategy for economic reconstruction of industry has been developed to implement the strategic program in terms of realizing the tasks of a sustainable economy.

The use of a project approach is proposed to increase the efficiency of reconstruction of destroyed industries. Projects must be implemented in accordance with a single strategic development program.

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## Формування бренду сталого розвитку промисловості в післявоєнний період

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**Мета.** Розробити основні напрями відновлення промисловості, як необхідного етапу для формування сталої економіки в повоєнний час. Розробити інстру-

менти й підходи відбудови зруйнованої війною промисловості.

**Методика.** Використані методи: абстрагування та критичного аналізу – при формуванні теми й мети роботи; контент-аналізу – для аналітичного огляду наукової літератури; сходження від абстрактного до конкретного – для формування алгоритму розробки стратегії економічної відбудови промисловості; аналізу й синтезу – для аналізу обсягів втрат; ідеалізації та формалізації – для формулювання основних напрямів відновлення промисловості; системного аналізу – для формування проектного підходу до відбудови; порівняльного аналізу – для стратифікації втрат галузей.

**Результати.** Проаналізовані обсяги втрат гірничо-добувної й металургійної галузей і вказано, що їх причиною було не тільки фізичне знищення, але й вимушене зупинення роботи підприємств. Проведено оцінювання обсягів допомоги за її видами, що дозволило оцінити орієнтовні обсяги й напрями надання необхідної допомоги для відновлення в післявоєнний час. Указано, що основною задачею у процесі відновлення промислових галузей буде їх глибока модернізація й запровадження до ви-

робничого циклу надсучасних технологій, що сприятиме стратегії сталої економіки.

**Наукова новизна.** Указано, що для відновлення роботи промислової інфраструктури потрібна єдина стратегічна програма розвитку. Вирішення тактичних задач має бути узгодженим зі стратегічною програмою. Для впровадження цієї програми й реалізації передумов сталої економіки створено Алгоритм розробки стратегії економічної відбудови промисловості. Для збільшення ефективності відбудови зруйнованих галузей запропоноване використання проектного підходу. Проекти мають реалізовуватися відповідно до єдиної стратегічної програми розвитку.

**Практична значимість.** Сформульовані основні напрями відновлення промисловості з акцентом на її реформування й надані рекомендації щодо інструментів і підходів формування й реалізації стратегічної програми відбудови промисловості.

**Ключові слова:** *сталій розвиток, бренд-підхід, післявоєнний період, відновлення промисловості, стратегія економічної відбудови, проектний підхід*

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