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Energy Independence and Financial Stability of Economic Entities in the Conditions of War

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► **Abstract.** Russia's invasion of Ukraine has caused many social, economic, environmental and energy problems. Most business entities faced problems at the national level that affected their financial and economic activities. The mass departure of workers abroad, rising natural gas prices, internal relocation, and constant shelling force business entities to search for new approaches to the management and development of their enterprises. The purpose of the study – substantiate and test the scientific and methodological approach to achieving energy independence of economic entities as a way to avoid their insolvency in times of war. In the course of the study, a critical analysis of the thematic literature was performed, and a set of general scientific and special research methods was used: expert assessments, observation, analogy, grouping, obtaining a consensus, deductive, inductive reasoning, systematisation, system-functional, measurement, analysis, comparison, logical generalisation, systematisation, hypothesis, a repeated combination of independent scenarios, extrapolation, elasticity estimation and graphical. The study identified the consequences of the military invasion of Ukraine and developed an algorithm for actions during the war. Four scenarios have been identified, under which the investigated business entity can solve the urgent problems. It is substantiated that the best scenario is the one in which it is required to increase its production capacity by setting up a "full cycle" production using a continuous pyrolysis system for the recycling of worn-out tires. The rationality of its use is proved. The scientific and methodological tools for interaction between business entities and the state during the war have been improved based on a systematic approach, which, unlike the existing ones, deepens the significance of shifting the centre of gravity from the macro to the micro level and is based on the proposed algorithm of actions (identifying the problem, developing possible scenarios for its immediate solution, compliance of the chosen scenario with the national interests of the state, finding a source of funding for the implementation of one of the scenarios), which determines the most optimistic scenario of the balance of interests between the state and business entities. The practical value of the proposed lies in the identification of economic, social, environmental and energy efficiency of the developed algorithm of actions in practice, on the example of financial and economic activities of the entity. Such an approach, on the one hand, allows for achieving energy independence soon and is a way to avoid the insolvency of economic entities in the conditions of war. On the other hand, it should become a reliable base for the national economy in the period of post-war reconstruction

► **Keywords:** insolvency, financial condition, environmental disposal, financial and economic activity, production capacity, alternative energy sources, natural gas

► Introduction

The activities of business entities are crucial for the economic development of the country. They provide jobs, fill budgets of different levels with funds, and stimulate the development of innovations, thereby accelerating structural changes in the domestic economy. The activity of business entities is a catalyst for economic growth in the country.

However, in recent years, business entities in Ukraine have encountered many challenges and

threats that have adversely affected their activities. The outbreak of the COVID-19 pandemic and its spread has resulted in a decrease in staff employment, production cuts and the closure of some of them. Another major shock was the full-scale Russian invasion of Ukraine, which caused both a humanitarian crisis and significant economic consequences. Due to the destruction or overloading of supply chains that supported the business sector,

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the domestic economy is in a chaotic state. During the first months of the military invasion, more than 40% of business entities in the business sector of the economy ceased their activities, and thousands of people were left without a source of income. In general, Ukraine lost from 5 to 7 million jobs due to the invasion. In the first quarter of 2022, the industry reduced production by 34%, construction – by 47%, and mining and metallurgical complex – by 53% [1].

To support business entities in a difficult situation, the Government implements state support for them to restart the economy in wartime. However, not every business entity has the opportunity to use it or resume its activities in full in other regions of Ukraine. The rise in the cost of energy (natural gas – January 2021 – UAH 7.9 per cubic meter; January 2022 – UAH 43.6 per cubic meter) [2], the forced emigration of the population (from February 24 to June 3, 2022 – more than 5.2 million people) [3], mobilization (08.07.2022 – more than 1000000 people) [4], constant rocket attacks force business entities to look at their financial and economic activities in a new way. The old approach to the functioning of economic entities in modern conditions does not work and does not contribute to the avoidance of phenomena that adversely affect their financial solvency.

In the production sector of the Ukrainian economy, natural gas is the most significant energy resource [5] for economic entities. Ukraine has the most powerful network of underground gas storage facilities in Europe (30 billion cubic meters), the capacity of which is equal to a quarter of the EU storage facilities [6]. Therewith, for about two decades, Ukraine has been importing most of its gas from Russia, while retaining its promising fields. Such national policy mainly enriched individual politicians and oligarchs of both countries but did not contribute to the socio-economic development of economic entities and the country in general. Currently, in the conditions of war, when the issue of natural gas supply as the main cost-scarce source of energy in the production sphere has become of global importance, business entities have become key figures in achieving energy independence, and hence Ukraine's ability to efficiently resist the aggressor.

Considering the national interests of Ukraine during the war, business entities face a question that requires an immediate solution: "What measures to take to reduce energy dependence without reducing production and with the possibility of establishing new jobs?". Based on the above, economic entities must search for alternative energy sources that would enable them to achieve energy independence as the foundation of their solvency in times of war.

After reviewing and analysing the literature, it can be stated that currently there are many publications devoted to energy resources, which disclose their essence and types (fuel, renewable resources, nuclear resources) [7-9]. Many works are addressed to renewable energy sources, where approaches to their content are given [10-12], the main forms [13] and economic conditions of use [14] are determined, and

scenarios of renewable energy until 2040 are demonstrated [15]. There is a study devoted to the search for alternatives to renewable energy sources from an environmental standpoint. Thus, J. Pilusa, E. Muzenda cite statistical data (the temperature in the Arctic is 30 degrees higher than the historical level, and in Antarctica – by 40 degrees) and quote the opinion of the UN Secretary-General Antonio Guterres ("dependence on fossil fuels is a mutual guaranteed destruction") propose to use only environmentally friendly renewable energy sources (biogas, biodiesel), which can be obtained as a result of waste conversion [16]. Another group of researchers, against the backdrop of the military invasion of Ukraine, provide ways to achieve energy independence at the national level. Thus, M. Flanagan, A. Kammer, A. Pescatori, M. Stuermer consider that energy dependence can be overcome in two ways: 1) by finding alternative energy sources; 2) by encouraging energy saving by economic entities while protecting the most vulnerable. In their opinion, Italy should be included in the countries that already encourage enterprises to save energy [17]. In turn, C. Halser, F. Paraschiv, to reduce energy dependence, propose an accelerated deployment of renewable energy capacities, which is of the greatest national interest to provide the economic power necessary for the energy transition [18]. And according to J. Bowman, it is essential to stop buying and move away from fuel that depends on the aggressor state. The worst thing that can be done now is to make future generations decades more dependent on this dangerous fuel – and those who would use it as a weapon. In his work, the author proposes to use clean energy sources that will not cause endless cycles of chaos, suffering and war. It is the way to establish true energy independence, strengthen the Ukrainian economy and improve the security of Ukraine [19]. A similar opinion is expressed by J. Bowman, President of the European Commission Ursula von der Leyen, who stated the necessity of an immediate transition to renewable energy sources [20]. K. Bekhrad, A. Aslani, T. Mazzuca-Sobczuk in their research demonstrate the importance of the transition to alternative energy sources for achieving energy independence of the country and identify the problems of its achievement (growth of energy consumption, high volatility of fuel prices, interruptions in energy imports and exports, climate change and environmental pollution) [21]. Another group of researchers, A. Juaidi, F. Montoya, I. Ibrik, F. Manzano-Agugliaro, and J. Gázquez [22; 23], prove the importance of the transition to alternative energy sources and bioenergy for both the economic and environmental sectors, and the social sector. In turn, A. Antonenko, R. Nitsovych, O. Pavlenko, K. Takac substantiate the role of alternative energy sources in the coming years from the standpoint of compliance with EU directives [24].

The purpose of the study is to determine the specific features of the functioning of economic entities during the war and to develop based on these theoretical provisions and practical recommendations

for achieving energy independence by economic entities as a way to avoid their insolvency. By the defined purpose, the following tasks were solved: to propose an algorithm of energy independence as a way to avoid insolvency of economic entities in times of war; to identify possible scenarios for the implementation of the proposed algorithm; to perform an economic justification of the most optimistic scenario on the example of LLC "Megatex Industrial".

► Materials and Methods

The study was performed in several stages. In the first stage, a problem of a general and individual nature was identified, which affects the further successful financial and economic activities of business entities and the performance of the state's powers during the war. In the second stage, it is proposed to shift the centre of gravity from the macro to the micro level, which is based on the economic life of the country. Accordingly, an algorithm for achieving a balance of interests between business entities and the state in war as a single system was proposed and developed. In the third stage, the economic justification of the proposed algorithm of actions was performed. The fourth stage involved finding a possible source of funding for the implementation of one of the proposed scenarios and justifying the rationality of its practical use.

In the course of the study, a critical analysis of the thematic literature was performed, and a set of general scientific and special research methods was used. When identifying problems of general and individual nature, the following methods were used: expert assessments, observation, and analogies. The method of grouping and the method of obtaining an agreed opinion allowed a large number of observations on achieving energy independence and finding a possible alternative energy source to be reduced to a fairly small number, in which observations are grouped by more striking features. Deductive, inductive reasoning, systematisation and system-functional methods were used in the development of an algorithm for achieving a balance of interests between business entities and the state during the war as a single system. When considering the current state of financial and economic activities of the entity, calculation and analytical methods of research, measurement, analysis and comparison were applied. Heuristic methods and logical generalisation are used to find an alternative energy source to natural gas. Using the methods of systematisation, hypothesis, and repeated combination of independent scenarios allowed the development of possible scenarios that reflect the probability of making decisions that will affect the further financial and economic activities of the entity with the probability of

receiving benefits or expected losses. The application of extrapolation methods, a clear sequence of actions and elasticity estimation allowed for exploring the selected fourth scenario from a practical standpoint. Graphical and visualisation methods were used mainly not as independent methods but as methods that accompany, illustrate, and explain the conclusions from other methods.

The research has a theoretical and applied nature and contains an analytical part. The practical principles of achieving energy independence as a way to avoid insolvency are demonstrated in the example of LLC "Megatex Industrial". The financial statements of LLC "Megatex Industrial" for 2017-2021 are used as the initial data.

► Results and Discussion

Since Russia's invasion of Ukraine, the issue of the danger of warming the country and the search for alternative energy sources has gradually faded into the background. Ukraine is actively trying to reduce its dependence by reducing gas demand, increasing domestic gas production and expanding reverse import capacity from more competitive European markets. According to forecasts, natural gas production in 2025 will range from 27 to 30 billion cubic meters [25]. The rapid growth of energy prices has already pushed to increase the volume of fuel production, which contributes to global warming [26]. According to the authors, this approach is ineffective in the conditions of war, as the lack of energy independence and environmental problems are interconnected and one of the main ones. The same opinion is expressed by Professor of Globalisation and Development at Oxford University Goldin Ian, who notes that high energy prices can result in governments narrowing the list of priorities for renewable and sustainable energy sources, which is highly adverse [27]. A similar reasoning is held by P. Cohen, who notes that "concerns about the climate are receding into the background as fuel prices soar, and the crisis in Russia deepens. Energy security has gained relevance, while the conflict in Ukraine raises concerns about possible disruption of natural gas supplies" [28].

Energy is at the heart of the economic welfare of every business entity [29]. Energy independence can be reached only with stable and permanent access to diverse energy sources. In war, these components are completely offset. Thus, the centre of gravity should be shifted from the macro to the micro level, which is the foundation of the country's economic life. By clearly identifying the problems of business entities faced during the war and taking appropriate measures, it allows for achieving a balance between the interests of business entities and the state as a single system in the short and long term (Fig. 1).

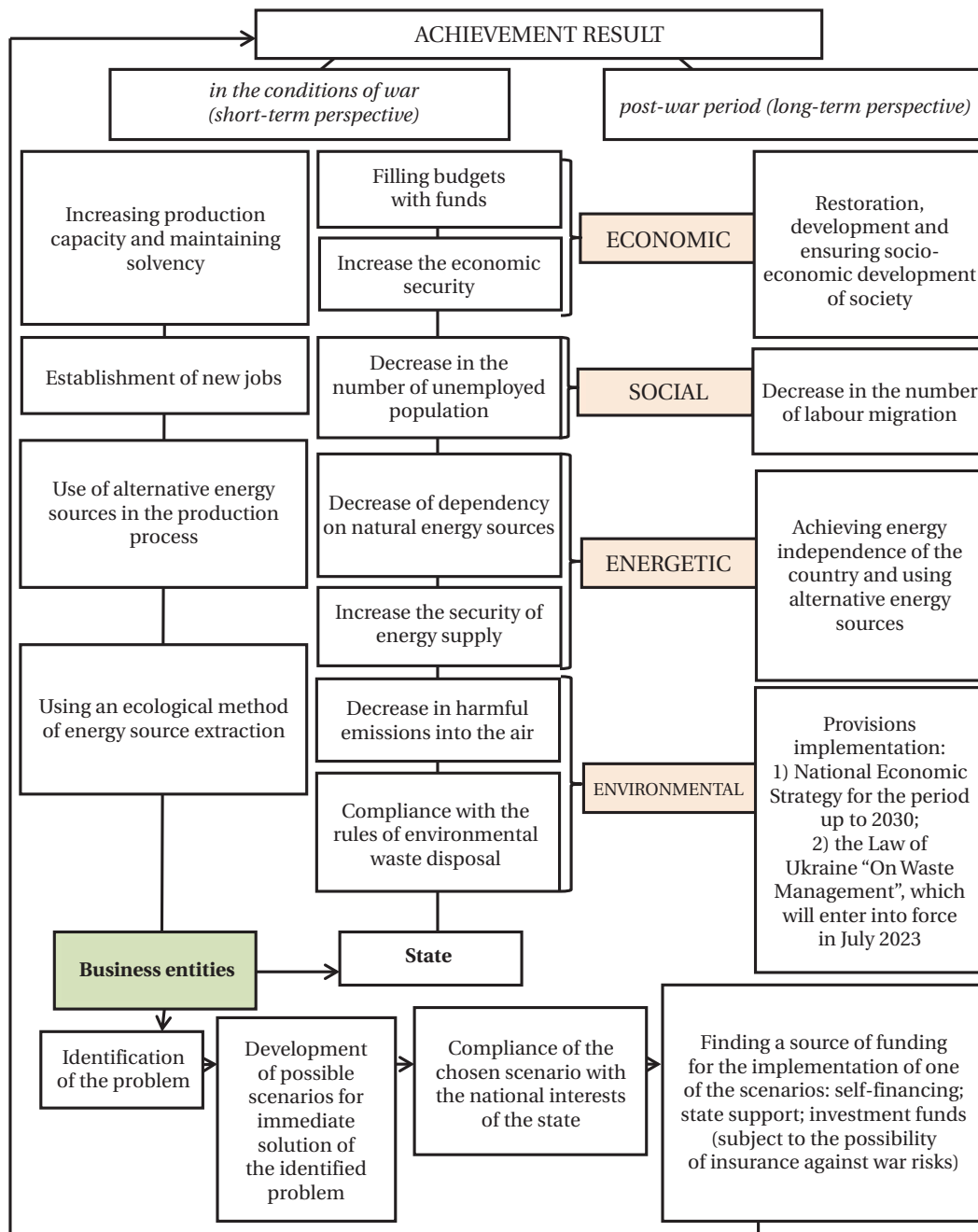


Figure 1. Block diagram of the algorithm for achieving a balance of interests between business entities and the state in war as a single system

Source: proposed and developed by the authors

In the short term, the most critical tasks are achieved, the implementation of which is vital for the further functioning of business entities and the performance of the state's powers and duties. In the long term, fundamental changes can be applied that will contribute to the recovery of Ukraine in the post-war period.

Energy independence covers four areas: economic, social, energy and environmental. By developing measures to solve a particular problem, business entities simultaneously promote the interaction of all four spheres. It allows not abandoning the development priorities of each of them but

applying the practice of mutual solution and development. Considering the above, the proposed scientific and methodological approach to achieving a balance of interests between business entities and the state during the war as a single system in the short and long term is extremely relevant in modern conditions. It provides an opportunity to simultaneously solve vital problems for business entities and the state in the field of implementation of its national interests, namely the achievement of energy independence shortly. Following the proposed algorithm, it is suggested to apply it to the example of LLC "Megatex Industrial".

Currently, during the war, LLC “Megatex Industrial” has faced an extremely serious problem that threatens its successful financial and economic activities. Having close relations with LLC “Megatex” (Kostiantynivka, Donetsk region), the company performed the production of products using

state-of-the-art technology on the principle of “full cycle” (Fig. 2), that is, from the simplest raw materials (lead, plastic, acid) to fully finished, charged starter lead-acid batteries [30]. LLC “Megatex” was a key supplier company.

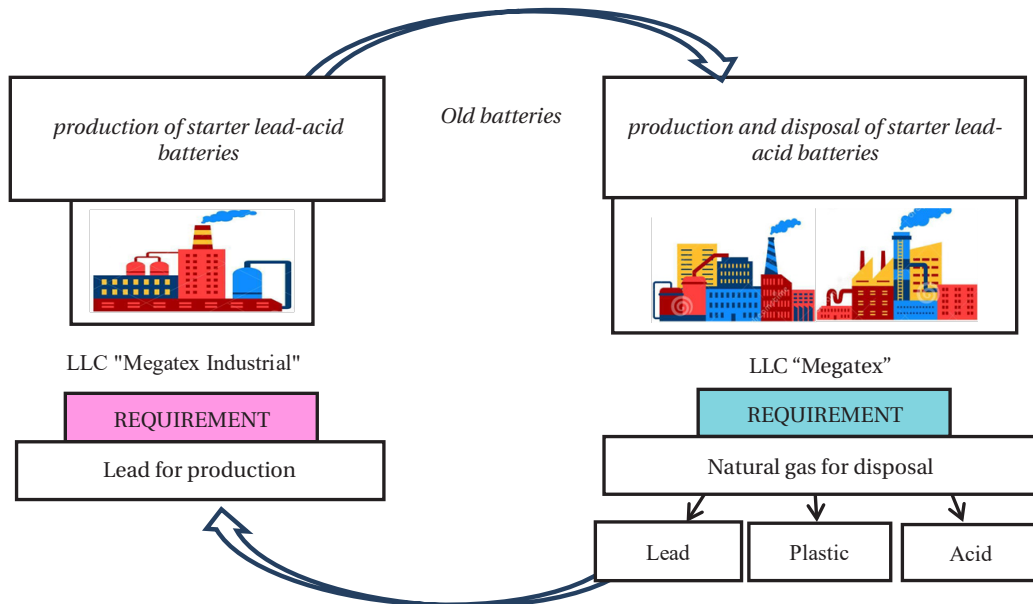


Figure 2. Graphical visualisation of the full production cycle of starter lead-acid batteries before the war

Source: developed by the authors

It allowed not collecting and not throwing of old starter lead-acid batteries to the landfill, but to reuse them and get a pure lead, which is the main source of energy for the production of new ones. The main supplier of lead was LLC “Megatex”. Due to the intensified shelling of the eastern regions of Ukraine, the supplier company participated in the “Program for the temporary relocation of enterprises from the war-affected regions”, and was able to perform only partial relocation of its production facilities to Starokonstantynov (Khmelnysky region). Thus, the supplier company is currently unable to fully restore its production capacity.

Thus, in the first stage of “Identification of the problem,” it was established that LLC “Megatex Industrial” was left without a supplier, which provided it with the main source of production. It threatens the LLC “Megatex Industrial”, in particular: loss of leading positions in the market and its insolvency shortly; 154 people may lose their jobs. For LLC “Megatex”, it is: the risk of inability to restore its production capacity; more than 500 people may be left without work.

In the second stage “Development of possible scenarios for immediate solution of the identified problem” several scenarios were distinguished:

1) LLC “Megatex Industrial” is increasing its production capacity by purchasing equipment for the recycling of starter lead-acid batteries. However, this scenario has both positive and adverse sides. Positive – establishment of new jobs for unemployed workers

and expansion of their production capacities. Adverse – an increase in the price of natural gas may result in significant financial costs, which will cause a corresponding increase in the price of manufactured products for customers;

2) LLC “Megatex Industrial” finds another supplier of lead. But this scenario has both positive and adverse sides. Positive: rapid recovery of its production capacities, which will reduce the risk of insolvency. Adverse: the prices of other suppliers for lead are much higher than those offered by LLC “Megatex”, which is not profitable for the company; the increase in the price of natural gas can lead to significant financial costs, which will cause corresponding increase in the price of manufactured products for customers;

3) LLC “Megatex Industrial” is increasing its production capacity by purchasing equipment for the recycling of starter lead-acid batteries and finds a supplier of an alternative energy source. The positive aspects of such a scenario are: the establishment of new jobs for unemployed workers; the expansion of their production capacities; participation in an environmentally friendly way of extracting energy sources. Adverse: overpriced prices from suppliers for alternative energy sources;

4) LLC “Megatex Industrial” is increasing its production capacity by launching a “full cycle” production using alternative energy sources. In such a scenario, the positive aspects are: the establishment of new jobs for unemployed workers; expansion

of production capacities; application of an environmentally friendly method of energy source extraction; reduction of harmful emissions into the air; compliance with the rules of ecological waste disposal; reduction of dependence on natural energy sources. The adverse side of such a scenario is significant financial costs and time constraints.

In the third stage “Compliance of the selected scenario with the national interests of the state”, it was established that the fourth scenario corresponds to the national interests of the state, namely strategic purpose 4 “Improving the energy efficiency of the economy and ensuring the environmental friendliness of the energy sector” of the National Economic Strategy for the period up to 2030 [31]. In addition, this scenario will allow implementation of the provisions of the Law of Ukraine “On Waste Management” from July 2023 [32].

The fourth stage “Finding a source of financing for the implementation of one of the scenarios” is designed to determine at the expense of which LLC “Megatex Industrial” can finance the fourth scenario. There are three forms of financing: self-financing, state support, and investment funds. It is not profitable for LLC “Megatex Industrial” to use only self-financing, as it already has significant financial costs. It is practically impossible to find an investor who would agree to invest in the scenario during the war. Moreover, since February 24, 2022, no insurance company in the world can insure property in Ukraine against war risks. As for state support, attention should be paid to the state program “eRobota”, which includes six grant programmes designed to stimulate entrepreneurship. The main purpose of the state program is to intensify entrepreneurship and increase employment among the population of Ukraine by establishing new jobs.

The problem of developing economic and financial solutions for obtaining fuel that will become an alternative to natural gas remains. Disposal of non-biodegradable solid waste is a necessary alternative for LLC “Megatex Industrial” during the war. The process of waste-to-energy is a very simple concept, which involves obtaining maximum energy from waste with minimal damage to the environment through various thermal processes, such as pyrolysis technology [33; 34]. Pyrolysis is the decomposition of organic compounds at high temperatures (from 200 to 600 degrees) without oxygen, and the emitted gases condense into pyrolysis fuel [35]. According to the International Energy Agency, it is planned to produce 27% of fuel in the automotive industry from waste by 2050 [36].

Worn-out car tires can become the secondary raw material that can be processed to produce pyrolysis fuel. This approach allows both finding an alternative to natural gas and reducing emissions of toxic gases into the air. As an example, due to: 1) storage – if a worn-out car tire is not disposed of, then under the influence of atmospheric precipitation and groundwater, toxic substances are removed from car tires, which cause great harm to

the environment [37]; 2) disposal of worn-out car tires by burning in the open – according to the State Statistics Service [38], 150 thousand tons are subject to disposal annually. Nothing has been growing on the site of burning worn-out car tires for ten years. Out of 1000 kg of burnt tires, 450 kg of various toxic gases, and 250-270 kg of soot [39]. It results in a high mortality rate from diseases caused by air pollution (cardiovascular and lung diseases), where according to WHO Ukraine ranks fifth. Therefore, it can be agreed that the automotive industry is a “black pollution” [40] that threatens the environment and human life.

Having analysed and performed the relevant calculations, the following advantages of using a continuous pyrolysis system for the disposal of worn-out tires for LLC “Megatex Industrial” were identified:

- availability of a market – the received fuel can be used by the entity in its production, sold to LLC “Megatex” or other customers in different regions of Ukraine;
- availability of technology – different types of such equipment is known today. LLC “Megatex Industrial” in its activities should use a continuous pyrolysis system. As an example, can be used equipment model UPP-10, offered by LLC “Research and Production Enterprise “Electric Welding Technologies of Paton” (cost – 2770397 UAH (the price includes: development of working documentation considering the basic model, considering the terms of reference; development of technological modes by the technical task; training of maintenance personnel; a package of operational documentation; warranty service – 1 year; delivery, installation and commissioning – 90-120 days); productivity – 10 tons. The equipment is modular and completely energy independent from external networks;
- ease of use – a powerful continuous pyrolysis system ensures uniform heating of the material with the subsequent production of three products: carbon black, purified metal cord, and pyrolysis fuel. The main characteristics of such equipment are automatic feeding and removal of slag, automation of production processes, high productivity, high safety, the presence of a screw conveyor, which allows mixing materials in the reactor at different temperatures;
- availability of raw materials – pyrolysis technology allows using raw materials of any degree of deterioration. The main channels for obtaining it can be: a collection of tires from landfills and in cities (after the war), removal of worn-out tires from the territory of economic entities, purchase of tires in service centres and car repair shops, organisation of points of collection of worn-out tires for the population. It will allow LLC “Megatex” to both provide itself with raw materials and draw the attention of the population to the current environmental situation;
- environmental friendliness – the continuous pyrolysis system implements an environmentally friendly waste disposal technology and is completely safe for the environment;
- state support – the state supports business entities in their activities by providing benefits for doing

business in the form of subsidies, low-interest loans, and grants for the establishment or development of the enterprise. To implement the proposed fourth scenario, LLC “Megatex Industrial” can use one of the grant programs offered by the government. As an example, the Resolution of the Cabinet of Ministers of Ukraine dated 06/24/2022 No. 739 “Some Issues of Granting Grants for Processing Enterprises”, which

approved the Procedure for granting grants for the establishment or development of processing enterprises [41];

– profitability – having estimated the costs in the amount of 8197069 UAH (Table 1), having identified the sources of funding (70% state funds – 5737948 UAH, 30% own funds – 2459121 UAH. The profitability is calculated considering the prices for the products received.

Table 1. Brief estimate of monthly expenses of LLC “Megatex Industrial” according to 4 scenarios

Indicators	Amount of financing, UAH	Amounts of financing, %
Expenses of equipment, software, materials and inventory	5540794	67.6
Labour expenses of employees of the technical department (4 persons)	150000	1.8
Expenses associated with the purchase of raw materials (based on the 50:50 principle)	15460	0.2
Expenses associated with the new jobs establishment	167430	2.0
Expenses related to training of new employees	1273385	15.5
Expenses of remuneration of new employees (40 persons)	1000000	12.2
Other expenses	50000	0.6
Total expenses	8197069	100.0

According to the data presented in Table 1. It can be estimated the profitability of the implementation of the 4th scenario, given that pyrolysis fuel is sold for 24 UAH per litre. Based on the technical characteristics of the continuous pyrolysis system of the UPP-10 model, the calculation of profitability can be performed only conditionally, since the output depends on the internal characteristics of solid waste. But, if considering the lowest figures, from 1 ton of worn tires you can get: technical carbon – 0.275 tons, pyrolysis fuel – 0.3 tons, and purified metal cord – 0.425 tons. After the calculation, it was determined that LLC “Megatex Industrial” will receive pyrolysis fuel for 2160000 UAH, purified metal cord – 1290000 UAH (provided that its cost is 10 UAH per kg). Thus, the company can receive UAH 3450000 already in the first month of operation, using a continuous pyrolysis system. The authors did not estimate the cost of carbon black, as the company can use it for its use – heating the reactor, drying the charge, and autonomous power supply.

Thus, the pyrolysis of worn-out tires is a suitable solution for LLC “Megatex Industrial” as a cheap way to obtain alternative liquid fuel in an environmentally friendly way. For the state, it is a driving force, the growing interest which can ensure the energy security of the country [42] and contribute to the achievement of energy independence in an environment free from threats and risks [43]. Pyrolysis of used car tyres will allow the safe reuse of used car tyres, and contribute to economic, social, energy and environmental welfare by converting waste tyres into fuel [44].

► Conclusions

The war in Ukraine has had adverse long-term consequences for business entities and caused serious damage to the environment. Gas is the main energy-consuming source for the production activities of economic entities, which requires reformatting the market by national interests – to eliminate dependence on russian energy carriers. In conditions of shortage of own energy resources, using alternative energy sources is especially important for business entities. For this purpose, products obtained during the disposal of worn-out car tires can be used. Pyrolysis technology offers a practical solution for converting car tires into liquid fuel. It can be considered a renewable product that has a high marketing value and establishes economic, social, environmental and energy benefits at the same time.

The research proposes an algorithm that reflects the gradual order of actions that are necessary to be implemented to achieve a balance of interests between business entities and the state in war. It is justified that its application will contribute to the solution of immediate problems that arise in business entities as a result of the adverse impact of hostilities and the achievement by the state of its national interests related to energy independence. Such an approach allowed identifying four scenarios of achieving energy independence as a way for economic entities to avoid insolvency. The most optimistic was the fourth scenario, in which the entity increases its production capacity by launching a “full cycle” production based on pyrolysis fuel. The expenses associated with the implementation of the

selected scenario are financed in the form of co-financing: 30% – own funds of the studied business entity; 70% – funds that the enterprise can receive as financial support from the state in the form of a grant. The implementation of the proposed scenario allows short-term business entities to establish new jobs, increase their production capacity, maintain solvency at the proper level, use alternative energy sources, and apply environmentally friendly methods of energy extraction. For the state, it means providing the necessary funds to the budget; increasing economic security; reducing the number of unemployed people, reducing dependence on natural energy sources, and

harmful emissions into the air; improving the security of energy supply; compliance with the rules of environmental waste disposal. Therewith, the highlighted scenario has long-term development prospects.

The conclusions, proposals and practical recommendations can serve as a foundation for achieving energy independence by the business entity while avoiding insolvency in times of war.

Further research in this area consists of the economic substantiation of the areas of increasing the profitability of economic entities using the pyrolysis method of solid waste disposal.

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Енергетична незалежність та фінансова стійкість суб'єктів господарювання в умовах війни

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► **Анотація.** Вторгнення Росії на територію України спричинило багато проблем соціального, економічного, екологічного та енергетичного характеру. Більшість суб'єктів господарювання зіштовхнулись з проблемами національного рівня, що вплинули на їх фінансово-господарську діяльність. Масовий виїзд працівників за кордон, зростання цін на природний газ, внутрішня релокація, постійні обстріли змушують суб'єктів господарювання шукати нові підходи до управління та розвитку своїх підприємств. Мета статті – обґрунтувати та апробувати науково-методичний підхід досягнення енергетичної незалежності суб'єктів господарювання як способу уникнення їх неплатоспроможності в умовах війни. Під час дослідження здійснено критичний

аналіз тематичної літератури, використано комплекс загальнонаукових і спеціальних методів дослідження: експертних оцінок, спостереження, аналогії, групування, отримання узгодженої думки, дедуктивний, індуктивного міркування, систематизації, системно-функціональний, вимірювання, аналізу, порівняння, логічного узагальнення, систематизації, гіпотези, повторюваного об'єднання незалежних сценаріїв, екстраполяції, оцінки еластичності та графічний. В дослідженні виявлено наслідки військового вторгнення на територію України, розроблено алгоритм дій під час війни. Виокремлено чотири сценарії, за яких досліджуваний суб'єкт господарювання може розв'язати назрілі проблеми. Обґрунтовано, що найкращим сценарієм є той, за якого необхідно нарощувати свої виробничі потужності, налаштовуючи виробництво «повного циклу» з використанням безперервної системи піролізу утилізації зношених автомобільних шин. Доведено раціональність її використання. Удосконалено науково-методичний інструментарій взаємодії суб'єктів господарювання та держави під час війни на основі системного підходу, який, на відміну від наявних, поглиблює важливість зміщення центру ваги з макро- на мікрорівень та базується на запропонованому алгоритмі дій (виявлення проблеми, розробка можливих сценаріїв її негайного вирішення, відповідність обраного сценарію національним інтересам держави, знаходження джерела фінансування реалізації одного із сценаріїв), що визначає найбільш оптимістичний сценарій балансу інтересів між суб'єктами господарювання та державою в умовах, що склались. Практична цінність запропонованого полягає у виявленні економічної, соціальної, екологічної та енергетичної ефективності розробленого алгоритму дій на практиці, на прикладі фінансово-господарської діяльності суб'єкта господарювання. Такий підхід, з одного боку, дозволяє досягти енергетичної незалежності найближчим часом та є способом уникнення неплатоспроможності суб'єктів господарювання в умовах війни. А з іншого – має стати надійною базою для вітчизняної економіки в період післявоєнної відбудови

► **Ключові слова:** неплатоспроможність, фінансовий стан, екологічна утилізація, фінансово-господарська діяльність, виробнича потужність, альтернативні джерела енергії, природний газ