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## ENSURING ECONOMIC SECURITY OF THERMAL POWER PLANTS WITH ACCELERATED DECARBONIZATION OF THE ENERGY INDUSTRY

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The article highlights the results of a detailed study of the Report of the Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine “Economically justified approach to the introduction of the National Emission Reduction Plan in Ukraine based on the experience of reducing emissions of harmful pollutants into the air by large combustion plants in Europe” and considers the European experience of state support thermal power plants/ thermal power plants. It was emphasized that among the mechanisms that were used and continue to be used to support coal generation, the most significant in terms of funding are the transitional payment mechanism, which is currently used in Poland, Germany, Portugal, the Czech Republic, Greece, Italy, and contracts for difference, which are still used in Austria, Denmark, the Netherlands, Great Britain, etc. countries It is justified that for Ukraine it is more expedient to finance reconstruction/modernization/technical re-equipment projects using the transitional payment mechanism, for which the transitional payment before payment will be calculated: for household consumers – as the product of the corresponding rate of transitional payment for final household consumers (UAH/month) and the number of household consumers connected to the network of this distribution system operator; for non-household consumers – as the product of the corresponding transitional payment rate (UAH/kWh) and the amount of electricity consumed by final non-household consumers. The inclusion in this way of a transitional payment to electricity supply tariffs (which include the cost of purchasing electricity on the market, the cost of services for its distribution and transmission, as well as the cost of the services of the electricity supplier) will not have a significant impact on their growth for both domestic and non-domestic consumers, instead, it will allow to have additional revenues, which the thermal power station/thermal power plant will be able to direct to finance projects for their reconstruction/modernization/technical re-equipment. The introduction of transitional payment can definitely serve as only one of the alternative options for financing the implementation of projects for the modernization of thermal power plants/thermal power plants and, accordingly, ensuring their economic security, but it does not finally resolve the issue of financial support for the implementation of projects for the reconstruction/modernization/re-equipment of thermal power plants, which are provided for by the National Reduction Plan emissions from large combustion plants.

**Keywords:** decarbonization of energy, economic security of thermal power plants, transitional payment mechanism.

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**Ensuring economic security of thermal power plants with accelerated decarbonization of the energy industry**

### ***Introduction and statement of the problem***

Difficulties related to the deterioration of the environment and climate change have rapidly risen to the surface in recent years, causing serious concern among the international community and politicians striving for sustainable development. So, at the last UN summit – COP27 (Conference of the Parties) on issues of environmental regulation and climate change, the countries that ratified the UNFCCC decided to achieve a net zero level of carbon dioxide emissions, and first of all, thanks to the reduction of power plants that work on fossil fuels fuel

Ukraine was not left behind. Therefore, the government approved the National Plan for Reducing Emissions from Large Combustion Plants (hereinafter referred to as LCP) – thermal power plants and power plants (hereinafter referred to as TPP/PP) (hereinafter referred to as NPPE) [1], the Second Nationally Determined Contribution of Ukraine to the Paris Agreement was determined [2], the National Energy and Climate Change Plan for the period until 2030 was adopted [3], the Strategy for Environmental Security and Adaptation to Climate Change for the period until 2030 was approved [4] and the Operational Plan for its implementation was developed for the period of 2022–2024 [5].

However, the implementation of solutions to reduce emissions of pollutants into the atmosphere requires the implementation of large-scale and capital-intensive projects for the modernization of TPP/PP equipment and the construction of installations for cleaning flue gases from emissions of sulfur dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), etc. Mechanisms for financing measures for environmental modernization of TPP/PP, unfortunately, have not been determined by the NPPE. The same financing mechanisms for projects of reconstruction/modernization of generating equipment, which operated before the introduction of the new electricity market, have lost their relevance, and new ones have not been developed or implemented into national legislation. Therefore, it is obvious that in the post-war years TPPs/PPs will have a shortage of their own resources necessary to finance the modernization of their equipment [6, p. 8].

The experience of foreign countries in the post-war restoration and modernization of generating equipment of TPP/PP suggests that the main source of financing should be foreign financial assistance. However, against the background of a large number of statements and declarations of Western partners regarding financial support for the modernization of the generating equipment of TPP/PP of Ukraine in

the post-war years, the institutional mechanism and financial tools for the recovery of the energy sector have not yet been defined. In particular, in May 2022, the European Commission announced the creation of a special financial mechanism “RebuildUkraine” intended to provide financial support to Ukraine in the form of grants and loans, but so far such a mechanism has not started its operation.

Therefore, understanding the complexity of this issue, the government of Ukraine has already taken the first steps to solve it. In particular, in May 2022, the creation of the Recovery Fund was announced, which should be filled from the following sources:

- assistance from partner states and international financial organizations;
- the help of large international corporations;
- frozen assets confiscated in Russia;
- contributions of private individuals;
- assistance of international humanitarian organizations and charitable foundations.

But, as evidenced by the results of the analysis of the normative legal field on the regulation of issues related to the recovery of Ukraine, the procedures for attracting and using funds from the Recovery Fund have not yet been regulated [7, p. 96]. And, therefore, stopping and/or decommissioning part of generating power units of TPPs/PPs, due to non-fulfillment of the provisions of the NPPE, may lead to a shortage of capacities and increase threats to the economic security of energy enterprises [6, p. 11].

### ***Analysis of recent research and publications***

The analysis of the latest researches and publications proves that the question of ensuring the economic and safe future of the enterprises of the energy sector has not left indifferent both practitioners and scientists for a long time. In particular, in the works of such domestic scientists as Boboshko O., Veklych O., Vervega T., Novytska N., Olehova O., Pashkova M., Sidenko V., Markevicha K., Stetsyuk P., Honchara M., Stukalenko I. Popova S., Khlebnikova I. Chekunova S. and others this problem is comprehensively considered.

They are not inferior to research on this topic and the work of foreign scientists. In particular, the results of research by Tomiwa Sunday Adebayo and Mehmet Aga testify to a unidirectional causal relationship between financial support for energy development and CO<sub>2</sub> emissions in each of the MINT countries (Mexico, Indonesia, Nigeria and Turkey) – potential economic giants [8].

Flavio R. Arroyo M. and Luis J. Miguel emphasize that changes to the national energy balance due to the financing of energy development

are the factors that will most contribute to the achievement of carbon emission reductions under different energy-growth-environment nexus scenarios, and therefore and sustainable development of the industry [9].

Mara Madaleno and Manuel Carlos Nogueira emphasize that since energy is an important source of economic growth in the world economy, sustainable economic growth can only be achieved by first creating the conditions necessary for expanding the production and consumption of clean energy sources. Only in a sustainable way, it is possible to ensure the necessary reduction of CO<sub>2</sub> emissions [10, p. 33], Hongyi Zhang, Hsing Hung Chen, Kunseng Lao and Zhengyu Ren [11], Zhuohang Li, Tao Shen, Yifen Yin and Hsing Hung Chen [12].

And, therefore, the partial decommissioning of TPP/PP, the closure of mines and the conversion of coal regions in accordance with international obligations, as well as the urgent need to create favorable conditions for attracting investments in the electric power sector, require the search for an effective toolkit to ensure the economic security of thermal power plants [6, p. 18]. Ignoring or inappropriately treating this issue in the near future can lead to the destruction of the country's energy security and the impoverishment of energy industry enterprises.

#### ***The purpose of the article***

The purpose of the article is to find an effective toolkit for ensuring the economic security of TPPs/PPs during the accelerated decarbonization of the energy sector.

#### ***Presenting main material***

To date, it is considered an extremely difficult task to implement all environmental projects in accordance with the requirements of the NPRE in the planned terms, taking into account the required amount of investments (more than 4 billion euros) in the absence of defined sources of financing, even if the issue of extending the terms of its implementation is agreed upon.

According to the results of the calculations, the total amount of capital investments for the implementation of the requirements of the NPRE may reach 4.130 billion euros for the entire period of validity of the NPRE until 2034. The largest amounts of expenses are expected in 2024-2025: 544 and 636 million euros, respectively. In general, EUR 3.4 billion of capital investments (82% of the total amount) should be made during 2021-2027 [6, p. 11].

As shown in Table 1, the NPRE implementation schedule requires the implementation of a significant number of projects

Table 1  
**Volumes of capital expenditures for the reconstruction/modernization/technical re-equipment of power plants, taking into account the changes ensuring the implementation of the NPRE**

Years	Desulfurization	Denitrification	Dust removal	Amount
2020	97	42	15	154
2021	396	18	87	501
2022	193	18	135	346
2023	171	18	56	245
2024	135	185	75	395
2025	158	307	57	522
2026	138	102	51	291
2027	153	88	36	277
2028	203	78	31	312
2029	170	46	–	216
2030	156	69	–	225
2031	170	108	–	278
2032	143	114	–	257
2033	26	86	–	112
Total	2311	1 276	543	4130

Source: [6, p. 11]

within a fairly short period of time – seven years (2021–2027). This approach means a high concentration of investments, which is quite difficult to ensure in the post-war years. This can be prevented not only by shifting the deadlines for the implementation of flue gas desulphurization measures, but also by an even annual distribution of such projects during the duration of the NPRE and the recapitalization of energy enterprises affected by the war by directing funds from the Recovery Fund to:

- compensation for the sums of direct losses on an irreversible basis in cash or in the form of specially issued government bonds (for large enterprises) with compensation in the future at the expense of reparations from the aggressor country;

- partial coverage of indirect losses as a result of reduction (or curtailment) of business activity in temporarily occupied territories and territories where active hostilities were conducted;

- providing guarantees for bank loans for the implementation of investment projects (purchase of equipment, technologies, management know-how), which would ensure the integration of the Ukrainian energy business into value chains in European markets in the post-war period [7, p. 96].

No less significant is the review of the list of inefficient thermal generation power units that should

be decommissioned, and efficient power units that will be in demand in the long term, because the corresponding lists of installations established in the NPRE have lost their relevance. Such a step will make it possible to reduce the volume of necessary investments several times and ensure their effectiveness [6, p. 150].

The correct solution would be to revise the marginal prices, which would allow coal generating companies to transfer their costs to the price of electricity, would not increase the weighted average prices for the day-ahead market. Since coal-fired power plants work according to a different principle than other power plants: at night they are unloaded to the technical minimum – 40–50%, and during the day they work with the maximum load – 100%, the correct distribution of marginal prices is extremely important. The existence of such marginal prices does not encourage coal-fired power plants to operate at full installed capacity during peak load hours, because they do not transfer the costs of electricity production into the price of electricity. Thermal power plants ensure the stability of the United Energy System of Ukraine, therefore the establishment of economically unjustified price restrictions poses a threat to the stability of energy supply in Ukraine

[6, p. 79].

Therefore, it is obvious that under such conditions, environmental investments and measures to increase the maneuverability of the power plant, which are a necessary condition for the normal operation of TPP/PP in the conditions of the new market, cannot be financed from the price of electricity, but only with the help of other mechanisms, not related to the fluctuating low price of electricity in the wholesale market. Possible, but diametrically opposed, solutions in this case should be either the stopping and decommissioning of thermal power plants, or the introduction of new mechanisms and models of their state support [6, p.81].

Among the models of state support for coal generation used in European practice, the price system and the quota system became the most significant in terms of financing.

In particular, the pricing model (price system) provides (Fig.1).

The model of electricity production quota (quota system) outlines the implementation of the following measures (Fig. 2).

However, after the liberalization of electricity markets in the EU in 1996, most of the above-

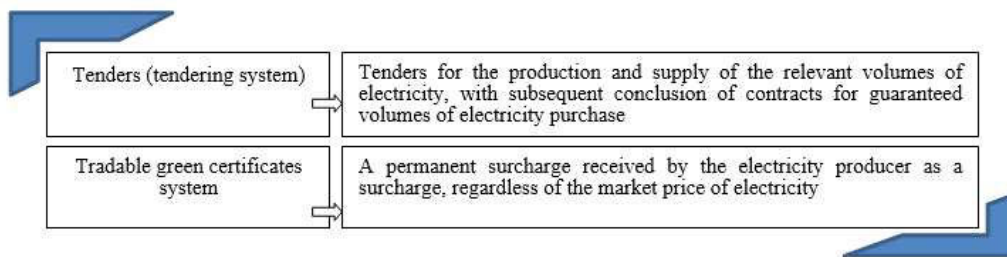


Fig. 1. Support system for electricity production in EU member states based on the pricing model (price system)

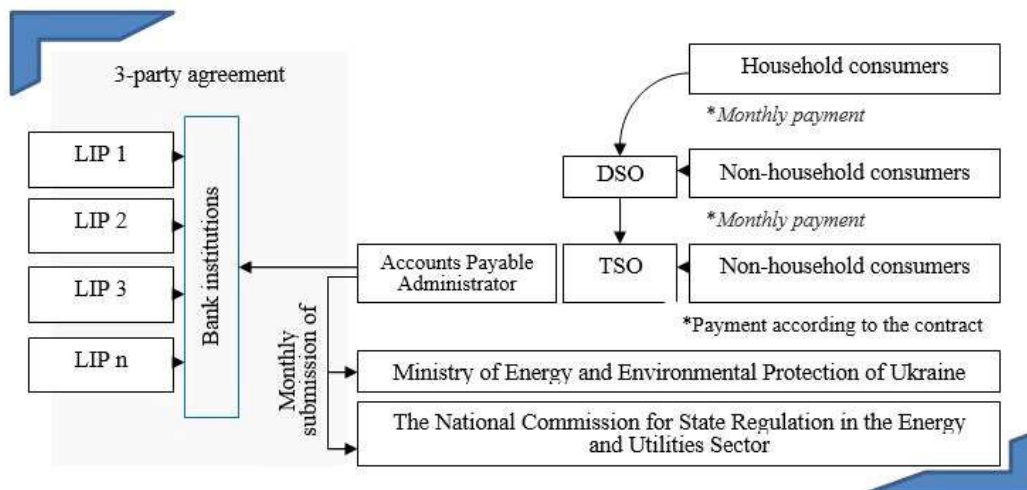


Fig. 2. The system of supporting electricity production in EU member states based on the electricity production quota model (quota system)

mentioned instruments were canceled or their application was limited to supporting renewable energy sources and nuclear energy. This is related to the general political course of the European Union to create a low-carbon economy and, in particular, decarbonization of the energy sector [6, p. 88].

Among the mechanisms that have been used and continue to be used for coal generation, the most significant in terms of financing are the transitional payment mechanism, which is currently used in Poland, Germany, Portugal, the Czech Republic, Greece, Italy, and contracts for difference, which are still used in Austria, Denmark, the Netherlands, Great Britain, etc. countries [6, p. 88].

However, for financial institutions, the transitional payment mechanism is more convenient for guaranteeing loan payments, since contracts for difference do not allow predicting the income of plant operators, and transitional payment establishes a clear schedule of fixed income for generating companies throughout the period of crediting by banking institutions for the reconstruction project/

modernization/re-equipment. Therefore, it is the transitional payment mechanism that is recommended to be used in Ukraine as a financing mechanism for the ecological modernization of TPP/PP [6, p. 89], because it is the most rational tool, provided that the investment component in the electricity tariff is abolished and prices on the wholesale market are constantly reduced financing of reconstruction and technical re-equipment of thermal power plants [6, p. 150],

Transitional payment should be one of the components of the electricity transmission tariff (Fig. 3).

At the same time, the transitional payment due will be calculated:

– for household consumers – as the product of the corresponding rate of transitional payment for final household consumers (UAH/month) and the number of household consumers connected to the network of the given Distribution System Operator;

– for non-household consumers – as the

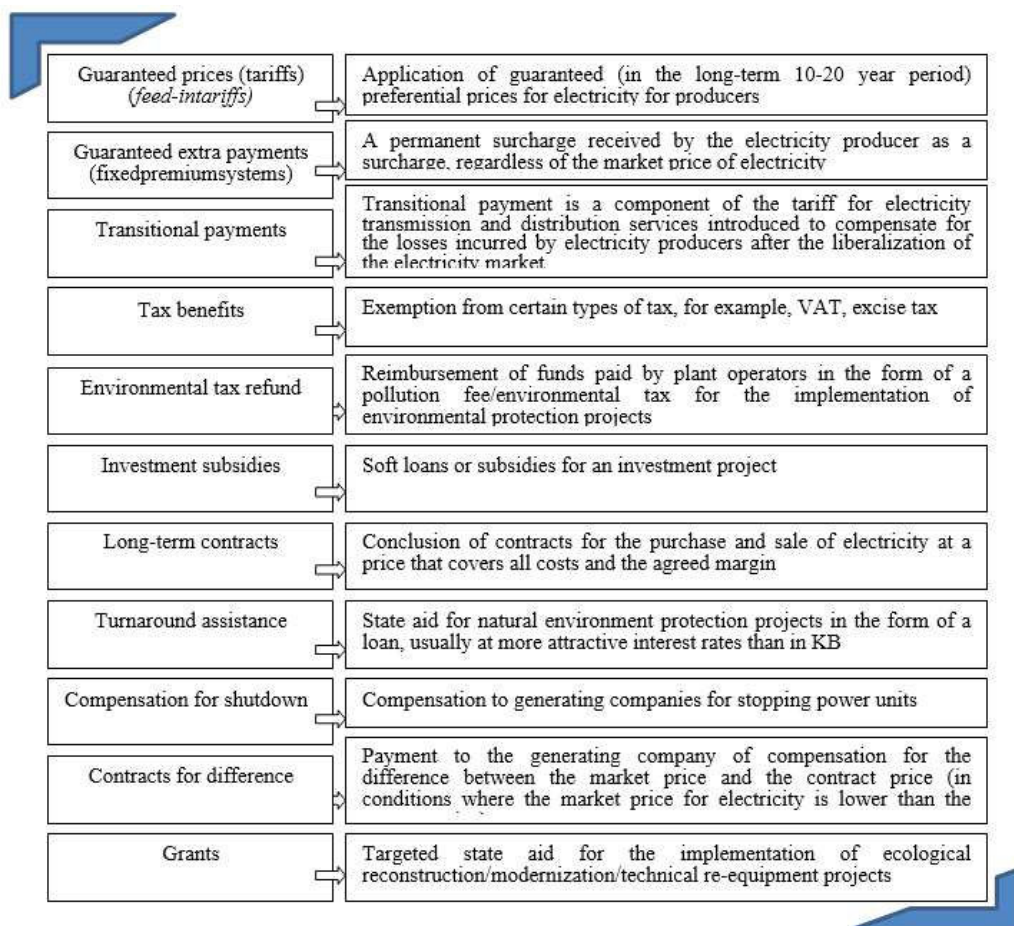


Fig. 3. Scheme of collection of transitional fee and movement of funds

Source: [6, p. 131]

product of the corresponding transitional payment rate (UAH/kWh) and the amount of electricity consumed by final non-household consumers [6, p. 132].

The Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine (hereinafter – IEP of the National Academy of Sciences of Ukraine) provides calculations of the volume of transitional payments for three options for the distribution of charges between household and non-household consumers:

– option 30/70, for which 30% of the transitional payment is charged to household consumers, 70% to non-household consumers;

– the 50/50 option, for which 50% of the transitional payment is charged to household consumers, 50% to non-household consumers;

– the 70/30 option, for which 70% of the transitional payment is collected from household

consumers, 30% – from non-household consumers [6, p. 156].

The results of calculations carried out by IEP of NASU are summarized in Table 2.

The transitional payment mechanism provides for the financing of repayment by thermal power plants of credit obligations taken for the implementation of environmental projects, and therefore the term of its operation should be set to the term of payment of loans received by plant operators for the implementation of environmental projects in accordance with the requirements of the NPPE [6, p. 150].

The mechanism of transitional payment during the years of application has definitely proven its effectiveness, but this does not mean that the countries of the European Union used only the income from the transitional payment to compensate the costs of the installations for adaptation to new,

Table 2

**Calculations of transitional payment volumes for three options for the distribution of charges between household and non-household consumers**

Years	Household consumers (permanent payment per month, hryvnias)			Non-household consumers (transitional payment rate per 1 kW, UAH.)		
	Alternative options for charging a transitional fee					
	30/70	50/50	70/30	30/70	50/50	70/30
1	0.662006	1.103343	1.544680	0.003704	0.002645	0.001587
2	2.871502	4.785837	6.700171	0.016065	0.011475	0.006885
3	4.828002	8.046671	11.265339	0.027010	0.019293	0.011576
4	6.873052	11.455086	16.037120	0.038451	0.027465	0.016479
5	9.166880	15.278133	21.389386	0.051284	0.036632	0.021979
6	11.848635	19.747725	27.646815	0.066287	0.047348	0.028409
7	13.404559	22.340931	31.277304	0.074992	0.053566	0.032139
8	14.964699	24.941166	34.917632	0.083720	0.059800	0.035880
9	15.635138	26.058564	36.481989	0.087471	0.062479	0.037488
10	15.829102	26.381836	36.934570	0.088556	0.063254	0.037953
11	15.458041	25.763402	36.068763	0.086480	0.061772	0.037063
12	13.703937	22.839895	31.975853	0.076667	0.054762	0.032857
13	12.228129	20.380214	28.532300	0.068410	0.048865	0.029319
14	10.545707	17.576178	24.606649	0.058998	0.042141	0.025285
15	8.251878	13.753131	19.254383	0.046165	0.032975	0.019785
16	5.570123	9.283539	12.996955	0.031162	0.022259	0.013355
17	4.014199	6.690332	9.366465	0.022457	0.016041	0.009625
18	2.454059	4.090098	5.726137	0.013729	0.009807	0.005884
19	1.783620	2.972700	4.161780	0.009978	0.007127	0.004276
20	1.589657	2.649428	3.709199	0.008893	0.006352	0.003811
21	1.298712	2.164519	3.030327	0.007266	0.005190	0.003114
22	0.843319	1.405532	1.967745	0.004718	0.003370	0.002022
23	0.362627	0.604379	0.846130	0.002029	0.001449	0.000869

Source: [6, p. 156-164]

ambitious environmental standards. Most countries financed environmental protection measures from all possible sources: from European Union funds (for example, Poland and the Czech Republic), reimbursement of pollution fees (for example, Sweden and France), etc. Ukraine also needs to develop a set of tools for state support of TPPs/PPs, which will allow dynamic and effective achievement of European environmental standards at coal-fired power plants, while guaranteeing the safety of Ukraine's UES and the gradual transformation of the country's coal-fired regions, the well-being of which depends on operating thermal energy enterprises [6, p. 182].

However, when determining the admissibility/inadmissibility of state support for thermal energy and its volumes, Ukraine must be guided by Art. 262.4 Association Agreement [13] on services of general economic interest, the definition of which is already part of Ukrainian legislation. By analogy with European legislation, the Law of Ukraine “On the provision of state aid to economic entities” [14] separates the provision of services of general economic interest from the general rules for the provision of state aid [6, p. 113].

State support can be provided by Ukraine without restrictions on its volume. In comparison with Art. 107 of the Agreement, Art. 262 of the Association Agreement [13] contains an additional criterion for determining state aid as admissible, in particular: aid for investments in order to ensure compliance with mandatory standards defined by EU directives specified in Annex XXX to Chapter 6 (“Environment”) of Chapter V of this Agreement [13], “during the implementation period specified therein, in particular the adaptation of enterprises and equipment to new requirements, may be allowed in the amount of up to 40% of acceptable costs” [13].

At the same time, Part 4 of Art. 262 of the Association Agreement [13] states that enterprises authorized to provide services of general economic interest are subject to the established rules of state aid, to the extent that the application of these rules does not legally or in fact prevent the performance of individual tasks defined for them [13].

The specified norm is a special regulatory norm compared to the exceptions from the general rule regarding the inadmissibility of providing state aid, established by Part 2 of Art. 262 of the Association Agreement [13], which allows state support beyond the established limit of 40%, if such a concession is necessary to achieve the general economic interest. However, funding measures up to 40% of the planned

costs will not have the desired effect: operators of large incineration plants in the new electricity market will not have the tools to compensate for the remaining 60% of costs from the price of electricity [6, p. 111].

The correct solution would be to revise the marginal prices, which would allow coal generating companies to transfer their costs to the price of electricity and not to increase the weighted average prices for a day-ahead market. After all, in Ukraine, the price difference between the average price on the wholesale market – 1,607.48 UAH/MWh) and the coal component of 1,400 UAH/MWh is only 207.48 UAH. This amount does not cover the operational costs of thermal power plants. The price of electricity in the EU and Ukraine at night (non-peak) does not even compensate for the fuel component (in Ukraine: with the estimated cost of coal – 1,400 UAH/MWh and the price of electricity below 1,000 UAH/MWh) [6, p. 79]. Therefore, it is obvious that under such conditions, environmental investments and measures to increase the maneuverability of TPP/PP cannot be financed from the price of electricity, but only with the help of other state support mechanisms.

Undoubtedly, while supporting the Green Course of the EU, Ukraine must reduce the share of electricity production using coal. However, the existing, but modernized, coal-fired generation capacities must continue to operate as maneuvering and/or reserve capacities, because during/in the event of the «winding down» of nuclear energy, the existing coal-fired generation capacities can become a support during the end of the operational life of the NPP units [6, p. 180]. Therefore, one of the main tasks of the government of Ukraine should be to find or develop, within the framework of the NPPE, mechanisms for financing investment projects for the construction of gas cleaning equipment of TPP/PP, the implementation of which will ensure not only the «greening» of electricity generated by thermal power plants, but also their economic security and stable competitive positions on the European electricity market.

### **Conclusions**

Thus, in the course of the research, the Report of the IEP of the National Academy of Sciences of Ukraine “Economically justified approach to the introduction of the National Plan for the reduction of emissions in Ukraine based on the experience of reducing emissions of harmful pollutants into the air by large combustion plants in Europe” was studied in detail and the European experience of state support for TPP/PP was considered. It was emphasized that



among the mechanisms that were used and continue to be used to support coal generation, the most significant in terms of funding are the transitional payment mechanism, which is currently used in Poland, Germany, Portugal, the Czech Republic, Greece, Italy, and contracts for difference, which are still used in Austria, Denmark, the Netherlands, Great Britain, etc. countries. It is justified that for Ukraine it is more expedient to finance reconstruction/modernization/technical re-equipment projects using the transitional payment mechanism, for which the transitional payment before payment will be calculated: for household consumers – as the product of the corresponding rate of transitional payment for final household consumers (UAH/month) and the number of household consumers connected to the network of the given Transmission System Operator; for non-household consumers – as the product of the corresponding transitional payment rate (UAH/kWh) and the amount of electricity consumed by final non-household consumers. The inclusion in this way of a transitional payment to electricity supply tariffs (which include the cost of purchasing electricity on the market, the cost of services for its distribution and transmission, as well as the cost of the services of the electricity supplier) will not have a significant impact on their growth for both domestic and non-domestic consumers, instead, it will allow to have additional revenues, which TPPs/PPs will be able to direct to finance their reconstruction/modernization/technical re-equipment projects. The introduction of transitional payment can certainly serve only as one of the alternative options for financing the implementation of TPP/PP modernization projects and, accordingly, ensuring their economic security, but it does not finally resolve the issue of financial support for the implementation of projects for the reconstruction/modernization/re-equipment of thermal power plants, which are provided for by the National Reduction Plan emissions from large combustion plants.

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## ЗАБЕЗПЕЧЕННЯ ЕКОНОМІЧНОЇ БЕЗПЕКИ ТЕПЛОВИХ ЕЛЕКТРОСТАНЦІЙ ЗА ПРИСКОРЕНОЇ ДЕКАРБОНІЗАЦІЇ ГАЛУЗІ ЕНЕРГЕТИКИ

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У статті висвітлено результати деталізованого вивчення Звіту ІЕПр НАНУ «Економічно-обґрунтований підхід до запровадження Національного плану скорочення викидів в Україні на підставі досвіду скорочення викидів у повітря шкідливих забруднюючих речовин великими спалювальними установками в Європі» та розглянуто європейський досвід державної підтримки ТЕС/ТЕЦ. Акцентовано, що з-поміж механізмів, що застосовувалися та продовжують застосовуватись для підтримки вугільної генерації, найбільш значимими за обсягами фінансування є механізм перехідної оплати, який до тепер застосовується в Польщі, Німеччині, Португалії, Чехії, Греції, Італії та контракти на різницю, що до нині використовуються в Австрії, Данії, Нідерландах, Великобританії та ін. країнах. Обґрунтовано, що для України більш доцільним для фінан-

сування проєктів з реконструкції/модернізації/техпереоснащення є застосування механізму перехідної оплати, за якого перехідна оплата до сплати розраховуватиметься: для побутових споживачів – як добуток відповідної ставки перехідної оплати для кінцевих побутових споживачів (грн/міс) і кількості побутових споживачів, підключених до мережі даного оператора системи розподілу; для непобутових споживачів – як добуток відповідної ставки перехідної оплати (грн/кВтЧгод) і обсягу спожитої кінцевими непобутовими споживачами електроенергії. Включення у такий спосіб перехідної оплати до тарифів з електропостачання (що включають вартість закупівлі електричної енергії на ринку, вартість послуг з її розподілу та передачі, а також вартість послуг постачальника електроенергії) не матиме суттєвого впливу на їх зростання як для побутових, так і для непобутових споживачів, натомість дозволить мати додаткові надходження, які ТЕС/ТЕЦ зможуть спрямувати на фінансування проєктів з їх реконструкції/модернізації/техпереоснащення. Запровадження перехідної оплати безумовно може слугувати лише одним з альтернативних варіантів фінансування реалізації проєктів з модернізації ТАС/ТЕЦ та відповідно забезпеченням їх економічної безпеки, проте остаточно не вирішує питання щодо фінансового забезпечення реалізації проєктів із реконструкції/модернізації/техпереоснащення теплових електростанцій, що передбачаються Національним план скорочення викидів від великих спалювальних установок.

**Ключові слова:** декарбонізація енергетики, економічна безпека теплових електростанцій, механізм перехідної оплати.

## ENSURING ECONOMIC SECURITY OF THERMAL POWER PLANTS WITH ACCELERATED DECARBONIZATION OF THE ENERGY INDUSTRY

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The article highlights the results of a detailed study of the Report of the Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine "Economically justified approach to the introduction of the National Emission Reduction Plan in Ukraine based on the experience of reducing emissions of harmful pollutants into the air by large combustion plants in Europe" and considers the European experience of state support thermal power plants/ thermal power plants. It was emphasized that among the mechanisms that were used and continue to be used to support coal generation, the most significant in terms of funding are the transitional payment mechanism, which is currently used in Poland, Germany, Portugal, the Czech Republic, Greece, Italy, and contracts for difference, which are still used in Austria, Denmark, the Netherlands, Great Britain, etc. countries It is justified that for Ukraine it is more expedient to finance reconstruction/modernization/technical re-equipment projects using the transitional payment mechanism, for which the transitional payment before payment will be calculated: for household consumers – as the product of the corresponding rate of transitional payment for final household consumers (UAH/month) and the number of household consumers connected to the network of this distribution system operator; for non-household consumers – as the product of the corresponding transitional payment rate (UAH/kWh) and the amount of electricity consumed by final non-household consumers. The inclusion in this way of a transitional payment to electricity supply tariffs (which include the cost of purchasing electricity

on the market, the cost of services for its distribution and transmission, as well as the cost of the services of the electricity supplier) will not have a significant impact on their growth for both domestic and non-domestic consumers, instead, it will allow to have additional revenues, which the thermal power station/ thermal power plant will be able to direct to finance projects for their reconstruction/modernization/technical re-equipment. The introduction of transitional payment can definitely serve as only one of the alternative options for financing the implementation of projects for the modernization of thermal power plants/thermal power plants and, accordingly, ensuring their economic security, but it does not finally resolve the issue of financial support for the implementation of projects for the reconstruction/modernization/re-equipment of thermal power plants, which are provided for by the National Reduction Plan emissions from large combustion plants.

**Keywords:** decarbonization of energy, economic security of thermal power plants, transitional payment mechanism.

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