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THE ACTIVITIES OF INTERNATIONAL ORGANISATIONS IN THE FIELD OF MARINE ENVIRONMENTAL PROTECTION AND THE PROMOTION OF ALTERNATIVE ENERGY SOURCES IN THE MARITIME SECTOR

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INTRODUCTION

The world's oceans are a vital component of the biosphere, ensuring the quality of the planet's natural environment on a global scale. Issues relating to the protection of the world's oceans have taken on global significance for all nations, as harmful substances are dispersed over vast areas and considerable distances from a specific source of pollution via ocean currents, surface runoff and interactions with the atmosphere. This determines the need to protect the marine environment from pollution caused by the operation of ships as the most pressing issue of our time.

Modern seagoing vessels are complex floating structures equipped with powerful power plants and systems which, during operation, generate various types of waste. Alongside the tasks of technical improvement of ships and their equipment, there is the task of optimally utilising existing regulatory and technical means, which allows, on this basis, the refinement of experience in preventing pollution of the marine environment and the atmosphere. In the current context of vessel operation, there is an urgent need to explore ways of modernising vessel control systems, aimed at implementing new principles to protect the marine environment from pollution caused by vessels[1].

That is precisely why international cooperation in this field is of paramount importance for global cooperation as a whole. Indeed, Article 1(4) of the 1982 United Nations Convention on the Law of the Sea defines 'pollution of the marine environment' as '…the introduction by man, directly or indirectly, of substances or forms of energy into the marine environment, including estuaries, which causes or is likely to cause such harmful effects as damage to living resources and marine life, danger to human health, hindrance to activities at sea, including fishing and other legitimate uses of the sea, impairment of the quality of water used for human consumption, and deterioration of recreational conditions'[2].

[1] Іванова А.В., Костиря О.В. Юрисдикція держави порту в системі засобів щодо захисту і збереження морського середовища. *Юридичний науковий електронний журнал*. 2022. № 10. С. 700–706. https://doi.org/10.32782/2524-0374/2022-10/176

[2] United Nations Convention on the Law of the Sea 1982 URL: http://consultant.parus.ua/?doc=00O5WDC64C

1. International legal regulation of maritime safety and the prevention of marine pollution

Numerous international organisations deal with issues relating to the study of the world's oceans, namely: the safety of navigation, the protection of human life at sea, and the protection of the marine environment. Today, there are more than 60 international organisations whose activities are, to a greater or lesser extent, linked to maritime shipping. Among them, intergovernmental organisations and specialised agencies of the United Nations play the most significant role. International non-governmental organisations do not bring together states themselves, but only certain associations and societies that actively influence global shipping policy. The main focus of these organisations is the development and implementation of documents that regulate or support maritime transport.

The International Maritime Organization (IMO), which has operated as a specialised agency of the United Nations since 1958, wields the greatest authority and influence over the safety of maritime navigation. Since its establishment, the IMO's primary objectives have been to enhance safety at sea and prevent marine pollution. As the IMO is a technical organisation, the bulk of its work is carried out by its committees and subcommittees. The responsibility for developing the methodological and technical basis for future regulatory documents on the prevention of environmental pollution resulting from international maritime activities lies with the Marine Environment Protection Committee. In accordance with the IMO Convention (Part IX), the Marine Environment Protection Committee considers any matters falling within the competence of the IMO and relating to marine pollution from ships and the prevention thereof.

A key aspect of the IMO's work is the development and adoption of uniform standards in the field of maritime safety. The IMO has become responsible for implementing various international conventions and establishing rules and standards relating to the safety of life at sea and the protection of the marine environment from pollution. Among the IMO's greatest achievements is the adoption, under its auspices, of international conventions that serve as standards for ensuring maritime safety and protecting the marine environment from pollution.

These include, for example: the International Convention for the Safety of Life at Sea, 1974, as amended by the 1978 Protocol (hereinafter SOLAS 74), the 1966 International Convention on Load Lines (hereinafter LL 66), the 1978 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, as revised and amended by the 1995 Protocol (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers – hereinafter STCW 78/95), the International

Convention for the Prevention of Pollution from Ships (hereinafter MARPOL 73/78). In view of the emergence of new technologies in shipping, the IMO is working to develop new documents and improve existing ones. Certificates issued on the basis of these international conventions serve as confirmation (proof) of a vessel's compliance with international standards.

In its work, the IMO performs a number of functions, namely:

– takes effective measures to ensure safety and the protection of life at sea, including measures aimed at preventing pirate attacks on ships and their crews;

– develops and establishes standards and regulations at the international level concerning: the design, construction, equipment, manning, operation and disposal of seagoing vessels; maritime education and training of seafarers; the development of maritime infrastructure; innovative technologies and best practices; the management of maritime transport to ensure the safety, environmental sustainability and energy efficiency of global shipping;

– serves as a forum for the exchange of information between representatives of Member States and stakeholders on all matters relating to merchant shipping and maritime transport;

– promotes the sustainable development of the shipping and maritime sector, which is one of the IMO's key priorities for the coming years.

With the aim of enhancing the safety of shipping, the International Maritime Organisation, the International Labour Organisation and a number of other organisations have, at their sessions, adopted a series of key international conventions, resolutions, codes and recommendations aimed at ensuring the safety of navigation and the protection of the environment. The main objective of these documents is to improve maritime safety through the mandatory application of uniform standards, both during the shore-based management of vessels and during their operation by crews. The marine environment, with its resources, fulfils economic, social, environmental and other functions. Consequently, pollution of the marine ecosystem is an extremely detrimental factor for society and the environment, with corresponding consequences.

Taking into account existing types of maritime activities and sources of pollution, the following categories of pollution can be identified: pollution caused by maritime activities on the seabed; pollution caused by commercial shipping and port operations; shipbuilding and ship repair activities; pollution caused by the introduction of non-native species or genetically modified organisms into the marine environment; pollution caused by the discharge of rubbish, food, domestic and operational waste into the sea; pollution caused by harmful emissions from ships into the atmosphere; pollution caused by extraordinary circumstances – such as accidents; pollution caused by

discharges from land-based sources; pollution caused by burial in the marine environment.

The International Maritime Organisation takes measures to protect the marine environment from pollution caused by shipping by developing and adopting international conventions through its member states; these conventions are then brought into force and oblige the governments of IMO member states to comply with the established rules and standards. IMO conventions tackle the problem of global ocean pollution in several ways, such as:

– Prevention of pollution during ship operations (for example, resulting from the discharge of water into the sea after tank washing). This is achieved through the implementation of appropriate measures during the design, outfitting and operation of ships;

– Reducing the number of accidents. This is achieved by introducing strict and mandatory standards and navigation procedures on a global basis, aimed at improving the safety of shipping;

– Mitigating the consequences of accidents. Measures applied to limit pollution in the event of accidents (for example, reducing tank capacity);

– Ensuring compensation for losses. The cost of pollution-related losses can be enormous. Measures are taken to ensure that the party suffering losses as a result of pollution receives appropriate compensation;

– Assistance with implementation. The IMO provides technical and other assistance to national governments in developing plans to combat pollution.

One of the first international treaties to address the issue of marine ecology was the 1954 International Convention for the Prevention of Pollution of the Sea by Oil, which entered into force in 1958, but the growing role of maritime transport in ocean pollution necessitated significant changes, strengthening and expanding the provisions of the 1954 Convention. Over the past decades, a wide range of measures has been adopted to prevent and control marine pollution caused by the operation of ships and to mitigate any consequences that may arise as a result of accidents or collisions involving ships. These measures, as practice shows, are effective in reducing sources of pollution from ships and demonstrate the efforts of the IMO and the shipping industry towards environmental protection.

When considering the issue of protecting the marine environment from pollution caused by ships, it is first necessary to determine the scope of coastal states' powers to take measures designed to ensure an adequate level of protection for the marine environment. To this end, reference should be made to the provisions of the 1982 United Nations Convention on the Law of the Sea (hereinafter UNCLOS)[3], which divides the powers of states in the field of

[3] United Nations Convention on the Law of the Sea 1982 URL: http://consultant.parus.ua/?doc=00O5WDC64C

protecting the marine environment from pollution from ships into those to the adoption of laws and regulations aimed at protecting the marine environment from pollution from ships, and those relating to ensuring compliance with national laws and regulations, as well as international norms and standards regarding the prevention of marine pollution from ships. The scope of these powers of states varies depending on the maritime zone for which protective rules are established, as well as on who takes measures to ensure compliance with the prescribed rules and standards.

Paragraph 1 of Article 211 of the 1982 United Nations Convention states that 'States, acting through a competent international organisation, shall establish international rules and standards for the prevention, reduction and control of pollution of the marine environment from ships and shall promote the establishment of..... systems of measures to minimise the risk of accidents that may cause pollution of the marine environment, including the coastline". Furthermore, paragraph 2 of Article 211 of this Convention establishes the obligation of States to apply, in respect of ships flying their flag, national laws and regulations to prevent, reduce and control pollution of the marine environment from ships. These national laws must be at least as effective as generally recognised international norms and standards[4].

Within their internal waters and port waters, States have full sovereignty and may impose specific requirements relating to the reduction, control and prevention of marine pollution, which foreign vessels must comply with in order to enter and remain in those waters. Such rules must be published and notified to the competent international organisation – the IMO. In accordance with Article 211(3) of the 1982 UN Convention, two or more States have the right to agree on measures taken to protect the marine environment within their internal waters and to adopt them in identical form. Each State party to such agreements may request information from a vessel situated in its territorial sea and flying the flag of another State party to the agreements regarding its destination, as well as its compliance with the established requirements for entry into port. Thus, the provisions of paragraph 3 of Article 211 of the aforementioned Convention have provided an opportunity for the development of the concept of port State control regarding the protection of the marine environment from pollution[5].

With regard to foreign vessels within the territorial sea exercising the right of innocent passage, the coastal State may take measures aimed at protecting the marine environment from pollution caused by ships. In accordance with

[4] United Nations Convention on the Law of the Sea 1982 URL: http://consultant.parus.ua/?doc=00O5WDC64C

[5] United Nations Convention on the Law of the Sea 1982 URL: http://consultant.parus.ua/?doc=00O5WDC64C

the provisions of Article 21(3) and Article 211(4) of the 1982 UN Convention, such special rules and laws must be published, must not restrict the right of innocent passage, and must not be discriminatory in nature[6].

Within the exclusive economic zone, the coastal State may adopt laws and regulations aimed at reducing, controlling and preventing pollution of the marine environment from ships, but only within the framework of international standards and norms with which, pursuant to paragraph 5 of Article 211 of the said Convention, all applicable measures must comply. However, in accordance with subparagraph (a) of paragraph 6 of Article 211 of the Convention, there may be specific areas within the exclusive economic zone where the adoption of special mandatory measures is required to prevent pollution of the marine environment from ships. The designation of such areas is based on technical reasons related to oceanographic and economic conditions, as well as the use of the area or the protection of its resources and the specific nature of vessel traffic. In such cases, States may adopt additional laws and establish regulations, but only after consulting with other interested States, provided that the IMO confirms the need for special protection of the area in question[7].

It is worth noting that the term 'special area' appears not only in the 1982 United Nations Convention on the Law of the Sea but also in the annexes to the MARPOL 73/78 Convention; however, the terms refer to different concepts. Thus, according to the 1982 UN Convention, a special area is a part or specific section within the exclusive economic zone of a state, within which that state adopts additional protective measures. The Convention limits the scope of issues to which such additional rules may apply; these include rules governing the discharge of waste or harmful substances, as well as navigation practices[8].

The provisions of the MARPOL 73/78 Convention (Annex I, Regulation 10(1); Annex II, Regulation 1(7); Annex V, Regulation 5) state that a 'special area' is a sea area where, for recognised reasons relating to its oceanographic and environmental conditions and the specific nature of shipping, it is necessary to adopt special mandatory measures to prevent pollution of the marine environment. This definition imposes no restrictions on the extent of the sea; that is, a special area may include maritime areas subject to different regimes under international law, including entire seas, not merely individual sections of the exclusive economic zone. In special areas, a special regime is

[6] United Nations Convention on the Law of the Sea 1982 URL: http://consultant.parus.ua/?doc=00O5WDC64C

[7] United Nations Convention on the Law of the Sea 1982 URL: http://consultant.parus.ua/?doc=00O5WDC64C

[8] United Nations Convention on the Law of the Sea 1982 URL: http://consultant.parus.ua/?doc=00O5WDC64C

established, and the requirements for vessels within them are set out in the relevant provisions of the MARPOL 73/78 Convention, which provides for measures to reduce and prevent pollution of the marine environment by both oil and oil products, as well as other substances harmful to the marine environment, marine life and the atmosphere, which are carried on board ships or generated during their operation[9].

It should be noted that the classical legal concept of 'jurisdiction' occupies a significant place in sectoral maritime law; it signifies the extension of states' rights to maritime areas, effectively constituting the exercise of state authority within them[10], and also determines the establishment of appropriate legal regimes in such areas. At the same time, for a proper understanding of the legal nature of the regimes established in a specific maritime coastal zone, it is important to take the following considerations into account: 1) the security of the state requires it to have exclusive control over the coastline and the ability to defend access to it; 2) in order to promote its commercial, fiscal and political interests, the state must be able to control all vessels entering, leaving or anchoring in its coastal waters; 3) the exclusive exploitation and use of marine resources in these waters are essential for the survival and well-being of the people on its coast. Thus, the key reasons why states exercise their jurisdiction at sea are protection and security. It is precisely these two categories that form the basis for restricting the principle of freedom of navigation and establishing certain mandatory regulations or restrictions[11].

2. International cooperation in the dissemination of energy-efficient technologies in the maritime sector

Over the past few decades, there has been a growing global trend towards a comprehensive fight against global warming. Consequently, there has been an increase in public awareness and a growing sense of shared responsibility for environmental pollution. One of the key factors in mitigating climate change on Earth is the reduction of greenhouse gas emissions into the

[9] Міжнародна конвенція по запобіганню забрудненню з суден 1973 року URL: https://zakon.rada.gov.ua/laws/show/896_009#Text

[10] Fedotov O., Averochkina T. Traditions and Innovations in Legal Discourse on the Categories "Jurisdiction" and "Sovereign Rights". State and law in the context of globalization: realities and prospects: collective monograph / A.I. Hnatovska, L.I. Kormych, A.I. Kormych, N.M. Krestovska, etc. Lviv-Toruń: Liha-Pres, 2019. P. 1-19. https://doi.org/10.36059/978-966-397-182-7/1-19

[11] Kormych B., Averochkina, T., Gaverskyi, V. The Ukrainian Public Administration of Territorial Seas: A European Example. European Energy and Environmental Law Review. 2020. Vol. 29. Iss. 2. P. 26–38.

atmosphere[12]. Consequently, the issue of implementing various preventive measures to combat climate change has become a central theme in contemporary global politics.

Reducing anthropogenic emissions, mitigating their effects, absorbing greenhouse gases, ensuring a gradual transition to low-carbon fuels, introducing alternative energy sources, improving energy efficiency and other measures have been developed and implemented by the international community to achieve the common goal of preventing global warming. And the greening of the political, economic and legal sectors has become a prerequisite for preserving the Earth's climate system[13].

The issue of legal methods and instruments for preventing atmospheric pollution from ships has, relatively recently (since the 1990s), become one of the IMO's areas of focus[14]. At the same time, general issues regarding the regulation of shipping's impact on the natural environment began to attract the attention of the global community as early as the 1960s and 1970s[15], and the maritime sector is currently striving to respond fully to modern, ever-growing environmental challenges and threats. It should be noted that one of the main regulatory frameworks for the IMO's activities is the UNCLOS Convention, which serves as the 'constitutional' basis for modern maritime activities and sets out the guiding principles for their implementation.

Given that the IMO was established long before the adoption of this Convention, the necessary level of harmonisation of earlier rules and powers was achieved by incorporating provisions on the primacy of UNCLOS into a number of conventions adopted by the IMO. And although the IMO is mentioned directly only in Article 2 of Annex VIII to UNCLOS, many provisions of this Convention refer to a 'competent' or 'relevant' international organisation, which specifically means the IMO[16]. Among other things, UNCLOS, as a 'framework convention', is of a general nature and can be implemented primarily only through its incorporation into other legislative

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[12] Єременко К.С. Формування категоріального апарату національного законодавства у сфері альтернативної енергетики. Правова держава. 2021. № 43. С. 68–75. https://doi.org/10.18524/2411-2054.2021.43.240980

[13] Єременко К.С. Дослідження реляційної взаємодії між ІМО та ООН у питанні скорочення викидів парникових газів. Альманах міжнародного права. 2022. Вип. 28. С. 24–33. https://doi.org/10.32841/ILA.2022.28.03

[14] Lim K. The Role of the International Maritime Organization in Preventing the Pollution of the World's Oceans from Ships and Shipping. URL: http://surl.li/msokc

[15] Langlet D. Shipping and the Ecosystem Approach. In: Regulation of Risk. Leiden, The Netherlands: Brill, Nijhoff. 2022. https://doi.org/10.1163/9789004518681_015

[16] Implications of the United Nations Convention on the Law of the Sea for the international Maritime Organization. Study by the Secretariat of the International 174 Maritime Organization (IMO). LEG/MISC.8. 30 January 2014. 139 p. URL: https://www.kuestenpatent-kroatien.at/LEG%20MISC%208-1.pdf

acts and international agreements. This is confirmed by many provisions of this Convention, which require States to 'take into account', 'put into effect' and 'implement' the relevant rules and standards developed by a 'competent organisation'[17].

Thus, as a specialised agency within the UN system, the IMO performs a quasi-legislative function in implementing UNCLOS by developing and adopting international rules and standards that contribute to the codification and progressive development of the law of the sea; these are well-considered and provide a sound legal basis for the functioning of global shipping. It should be noted that the IMO has successfully transformed itself from what was initially a technical advisory body into a fully-fledged international organisation with global functions. For many decades, the IMO has complemented its role as a competent international organisation and a standard-setter for international rules and standards in the field of shipping by also developing standards to address the problem of global warming and combat anthropogenic emissions from ships[18].

It is generally believed that the process of reducing greenhouse gas emissions from ships only began with the adoption of Annex VI to MARPOL 73/78; however, this is not entirely accurate, as as early as the late 1960s the Council of the Intergovernmental Maritime Consultative Organisation (later renamed the International Maritime Organisation, IMO) considered the possibility of adopting standards to reduce air pollution from ships and began cooperating with other international organisations on this matter. As is well known, the issue of air pollution from ships was initially included on the Organisation's agenda, which subsequently led to the adoption of MARPOL 73/78, but was later removed and remained off the IMO's agenda for more than several decades.

Even as the issue of air pollution from shipping began to attract attention once again, regulations aimed at reducing and controlling air pollution led to changes in environmental legislation rather than in maritime legislation[19]. This is evidenced by the adoption of agreements such as the 1972 Stockholm Declaration on the Human Environment, the 1979 UN Convention on Long-

[17] Implications of the United Nations Convention on the Law of the Sea for the international Maritime Organization. Study by the Secretariat of the International 174 Maritime Organization (IMO). LEG/MISC.8. 30 January 2014. 139 p. URL: https://www.kuestenpatent-kroatien.at/LEG%20MISC%208-1.pdf

[18] Beckman R., Sun Z. The Relationship between UNCLOS and IMO Instruments. Asia-Pacific Journal of Ocean Law and Policy. 2017. P. 201–246. https://doi.org/10.1163/24519391-00202003

[19] Argüello G. The International Maritime Organization's Contribution to Regime Interaction: Past, Present, and Future. Max Planck Yearbook of United Nations Law. 2022. Vol. 25. https://doi.org/10.1163/18757413_02501003

Range Transboundary Air Pollution, which was subsequently supplemented by binding Protocols, the 1985 Vienna Convention for the Protection of the Ozone Layer, the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer, and the 1992 United Nations Framework Convention on Climate Change, which was also supplemented by binding Protocols. These instruments have become crucial to the development of the IMO's current strategy for reducing greenhouse gas emissions from ships, as significant legal changes outside the regulatory framework for maritime activities have acted as a catalyst for regulatory action within the IMO[20].

Article 2 of the 1992 United Nations Framework Convention on Climate Change defines the primary objective of the Convention and all related legal instruments as 'achieving, in the implementation of the relevant provisions of the Convention, the stabilisation of greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within the time-frame necessary for ecosystems to adapt naturally to climate change, which will allow food production not to be jeopardised and will help ensure further economic development on a sustainable basis." This objective has become the benchmark for reducing greenhouse gas emissions at all levels of response, including in the work of the IMO.

The issues of cooperation and information exchange within the framework of the initiative to decarbonise the maritime sector are currently becoming increasingly relevant. With the support of the IMO, projects have been established at international level aimed at exchanging information on technical developments and capacity building in developing countries[21]. The key issue remains the incorporation of energy-efficient solutions in shipping into the national legislation of developing countries. With the support of the IMO, specialised projects have been established in this area, aimed at ensuring an appropriate level of decarbonisation of the maritime sector in line with the IMO's strategic priorities. The most significant of these are as follows:

The IMO–Singapore 'Next GEN' initiative, which aims to bring together key stakeholders in the maritime sector and to develop decarbonisation initiatives and support further cooperation[22];

The IMO–Norway 'GreenVoyage2050' project, which supports the maritime sector's transition to a low-carbon future; the project focuses on

[20] Argüello G. The International Maritime Organization's Contribution to Regime Interaction: Past, Present, and Future. Max Planck Yearbook of United Nations Law. 2022. Vol. 25. https://doi.org/10.1163/18757413_02501003

[21] IMO's work to cut GHG emissions from ships. URL: https://www.imo.org/en/MediaCentre/HotTopics/Pages/Cutting-GHGemissions.aspx

[22] NextGEN holds first meeting to push maritime decarbonization. URL: https://www.imo.org/en/MediaCentre/PressBriefings/pages/NextGENproject.aspx

cooperation with selected developing countries, including small island developing states and least developed countries; the project's ambition is aligned with the objectives of the IMO's Priority Strategy on Greenhouse Gas Emissions from Maritime Activities[23];

The IMO – EU 'GMN' project – the Global Maritime Network of Centres of Cooperation in Maritime Technologies, funded by the EU and implemented by the IMO; The project aims to promote technologies and operations that enhance the energy efficiency of the maritime sector and help least developed countries navigate the future of low-carbon shipping[24];

The Global Industry Alliance for Low-Carbon Shipping ('LowCarbon GIA') is a public-private partnership established as part of the IMO – Norway 'GreenVoyage2050' project, with the aim of bringing together leaders in the maritime sector to support an energy-efficient and low-carbon maritime transport system. Leading shipowners and operators, classification societies, manufacturers and suppliers of engines and technologies, oil companies and ports have joined forces within the 'LowCarbon GIA' project to collectively identify and develop innovative solutions to overcome common barriers to the adoption and implementation of energy-efficient technologies, best practices in the operation and introduction of alternative fuels with low or zero sulphur content[25];

The IMO–UNDP–GEF 'GloFouling' project aims to tackle the problem of fouling on ship hulls, which increases the roughness of the hull surface, leading to higher fuel consumption and overall greenhouse gas emissions[26];

The IMO – Republic of Korea 'GHG-SMART' project is a training programme on sustainable maritime transport designed to support developing countries in reducing greenhouse gas emissions from shipping; The project will contribute to the implementation of IMO measures and the development of national strategies to reduce greenhouse gas emissions across various shipping sectors and in ports; it is targeted at developing and least developed countries[27];

The 'FINSMART' round table is a platform for regular dialogue between key stakeholders in the maritime sector, aimed at supporting the acceleration

[23] The IMO-Norway GreenVoyage2050 Project is supporting shipping's transition towards a low carbon future. URL: https://greenvoyage2050.imo.org/

[24] About GMN. Energy efficiency in shipping – why it matters. URL: https://gmn.imo.org/about-gmn/

[25] About the Low Carbon GIA. Global MTCC Network. URL: https://greenvoyage2050.imo.org/about-the-gia/

[26] Biofouling and greenhouse gas (GHG) emissions from ships. URL: https://www.glofouling.imo.org/ghg-emissions

[27] IMO and Republic of Korea partner to address ships' GHG emissions. URL: https://www.imo.org/en/MediaCentre/PressBriefings/pages/39-GHG-SMART- .aspx

of financial flows, particularly in developing countries, with a view to decarbonising the maritime sector[28];

The 'Blue Solutions for Asia' project is based on an agreement between the IMO and the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety to carry out preparatory activities for the development of a project proposal aimed at reducing emissions from maritime transport in East and South-East Asia. The project is collaborating with the Partnership for Environmental Management of the Seas of East Asia (PEMSEA) to achieve its objectives. The project involves a series of information-gathering activities: planning workshops, conferences, interviews, identification of candidate demonstration projects, and partnership discussions involving all key stakeholders, including government partners, the shipping industry, port authorities and operators, technology providers, financial institutions and local authorities[29].

The Maritime Innovation Forum on Zero and Low Emissions, organised by the IMO and the United Nations Environment Programme (UNEP) with financial support from Norway, aimed at bringing together all stakeholders to showcase the latest research and development initiatives supporting the decarbonisation of the maritime sector in line with the IMO's Priority Strategy on Greenhouse Gas Emissions[30]. The Forum's objectives are defined as: the exchange of innovative experience between relevant international policymakers, maritime administrations, climate change/environmental administrations, technology developers, the maritime industry, ports and the financial sector to accelerate cooperation and the development of innovations for climate action in the maritime sector and to identify practical solutions for implementing the necessary updates; to promote innovation through North-South and South-South cooperation, with a focus on the least developed countries and small island developing states; filling existing gaps to ensure the functioning of a global platform for discussing ideas related to promoting innovation, disseminating the latest developments and facilitating knowledge management, as well as information exchange[31].

When analysing the aforementioned projects, initiatives, forums and round-table discussions, the primary objective of which is the decarbonisation of the maritime sector, it is important to note their significant contribution to

[28] FINSMART Roundtable. URL: http://surl.li/mtcue

[29] IMO and Germany sign agreement to develop project to identify opportunities and solutions to prevent and reduce transport emissions. URL: https://www.imo.org/en/MediaCentre/PressBriefings/pages/IMO-Germany project.aspx

[30] IMO and UNEP to host 2021 Maritime Zero-Low Carbon Innovation Forum. URL: https://www.imo.org/en/MediaCentre/Pages/WhatsNew-1558.aspx

[31] Zero-and Low-Emission Innovation Forum: 27-29 September 2021. URL: https://www.imo.org/en/OurWork/PartnershipsProjects/Pages/MaritimeInnovation-Forum.aspx

the practical implementation of the IMO's strategic priorities for reducing greenhouse gas emissions. Particular mention should be made of Norway's financial contribution and the 'GreenVoyage2050' project[32], under which the most cost-effective measures from a practical standpoint were developed to meet the needs of providing assistance to states and support for the transfer of energy-efficient technologies that facilitate the adoption of 'green' technologies across the entire maritime sector. GreenVoyage2050 has consolidated existing and potential measures to improve the energy efficiency of ships by grouping them into technology clusters, assessing their maturity in terms of adoption within the maritime sector, and evaluating the proven track record of the technologies and principles.

Mature technologies are proven, new or existing technologies or principles that are widely adopted within the maritime sector. Semi-mature technologies are proven, new or existing technologies or principles that are adopted to a limited extent within the maritime sector. Immature technologies are new, untested, unproven existing or tested existing technologies or principles characterised by a relatively low number of installations, for which there is virtually no operational experience. A maturity analysis was conducted across the following technology groups: machinery technologies, engine and hull improvements, energy consumption on board, the use of renewable energy, and technological solutions for optimising ship operations[33]. This analysis enables stakeholders to identify the 50 most energy-efficient solutions for practical application or to select potentially attractive technologies for technical development in the field of decarbonisation of the maritime sector.

It is also worth noting the work of the 'GreenVoyage2050' project aimed at simplifying the process of transposing the provisions of Annex VI to MARPOL 73/78 into the national legislation of the parties concerned. To this end, the project website features a clause-by-clause analysis of Annex VI to MARPOL 73/78 in six languages[34], indicating whether the rules of Annex VI to MARPOL 73/78 must be implemented or are merely recommended for implementation in national legislation.

An important aspect of this Project is the development of a Ship-Port Interaction Guide containing practical measures to reduce greenhouse gas emissions[35]. This guide is designed to be implemented with limited or low

[32] Marine Environment Protection Committee (MEPC), 66th session: 31 March to 4 April 2014. URL: http://surl.li/msnmk

[33] Technology Groups. URL: https://greenvoyage2050.imo.org/technologygroups/

[34] Clause by Clause analysis of MARPOL Annex VI. 19 p. URL: https://greenvoyage2050.imo.org/wp-content/uploads/2022/09/Clause-byclause-analysis-of-2021-Revised-MARPOL-Annex-VI-EN_Final-min.pdf

[35] Ship-Port Interface Guide. Practical Measures to Reduce GHG Emissions. 2021. 46 p. URL: http://surl.li/mtczr

capital expenditure and operational investments. The recommended practical measures are relatively easy and quick to implement and have the potential to reduce greenhouse gas emissions, along with additional benefits. Among the practical measures recommended for implementation with limited capital are the following: promoting immobilisation in ports; promoting hull and propeller cleaning in ports; promoting simultaneous operations in ports; optimising the port stay process through pre-cleaning; improving the scheduling of vessels calling at multiple berths within a single port; improving vessel-berth compatibility through the enhancement of port master data; incorporating vessel deadweight optimisation through the enhancement of port master data; optimising transit speeds between ports[36].

The Guide explains each of the eight measures and provides practical recommendations for their implementation. In summarising the review of the IMO–Norway 'GreenVoyage2050' Project, it is important to note its significant contribution to the decarbonisation of the maritime sector and to promoting the adoption of energy efficiency standards at the international level. Almost all the guidelines and recommendations of this project could potentially be implemented in any country, particularly in Ukraine[37].

CONCLUSIONS

The key international legal instruments on climate change and the reduction of environmental pollution have laid the foundations for relevant measures in the legal regulation of activities in maritime areas, implemented under the auspices of the IMO with the aim of reducing the negative impact of shipping on atmospheric air and, consequently, mitigating the greenhouse effect and climate change. At the same time, the preservation of the marine environment and its legal protection against pollution have been on the agenda of the UN and the IMO since their inception, but the challenges and threats posed by routine shipping, rather than by accidental oil spills and other pollutants, transported chemicals, etc., have become paramount due to the constant emission of fossil fuel combustion products into the air, which has prompted the IMO to step up the development of effective strategies to prevent atmospheric pollution from ships.

The IMO is actively engaged in facilitating and guiding international cooperation and the exchange of energy-efficient technologies, with a focus on developing specialised projects to raise awareness among the global shipping community of the pathways and opportunities for transitioning to

[36] Ship-Port Interface Guide. Practical Measures to Reduce GHG Emissions. 2021. 46 p. URL: http://surl.li/mtczr

[37] Yeremenko K. International Maritime Organization and Decarbonization of Maritime Industry: Mandate and Instruments. Lex Portus. 2022. Vol. 8(3). P. 30–57. https://doi.org/10.26886/2524-101X.8.3.2022.2

environmentally friendly technologies, and on achieving the UNFCCC's objective of mitigating global climate change through the decarbonisation of the maritime sector, particularly in developing and least developed countries. This confirms the IMO's leading role in the technical and legal regulation of shipping, the protection of the natural environment, and its commitment to finding new areas of cooperation for the sustainable and effective development of modern shipping. The IMO's legal instruments on climate change mitigation are aimed at developing mechanisms to reduce emissions of greenhouse gases such as CO_2, SOx, NOx and volatile organic compounds, as well as at improving the energy efficiency of ships, encompassing the implementation of energy efficiency regulations and the promotion of international cooperation towards the use of alternative fuels.

Best practices from regional schemes designed to encourage reductions in greenhouse gas emissions from ships and to improve their energy efficiency could potentially be adapted for Ukraine; however, their implementation requires the harmonisation of national legislation with IMO international standards, the foremost of which are the introduction of sulphur emission limit standards for ships, the monitoring of emissions, the implementation of EEDI and SEEMP regulations, Ship Energy Efficiency Certificates, as well as the full implementation of MARPOL Annex VI into national legislation as the first step towards sustainable transport. Such steps will serve to attract private and international investment, which, in turn, will facilitate the implementation of the aforementioned incentive schemes for the maritime sector. These adaptive aspects must be implemented in a symbiotic balance of all elements, which will ensure the successful achievement of the overall objective of reducing the anthropogenic load in port areas and enhancing Ukraine's competitiveness at the international level.

SUMMARY

This article examines the key principles established by international standards regarding pollution prevention and environmental conservation, as the primary prerequisite for ensuring a modern system for managing the mitigation of climate change impacts in shipping, taking into account the ecosystem approach and the concept of sustainable development. Taking into account existing types of maritime activities and vessel operations, as well as sources of pollution, the following categories of pollution of the World Ocean have been identified: pollution caused by maritime activities on the seabed; pollution caused by the introduction of non-native species or genetically modified organisms into the marine environment; pollution caused by the discharge of rubbish, food, domestic and operational waste into the sea; pollution caused by extraordinary circumstances – such as accidents; pollution caused by burial in the marine environment.

It has been emphasised that the actual division of maritime areas automatically transforms the problem of marine pollution into an international one. The differences in the geographical characteristics of many regions of the world's oceans, which must be taken into account when exercising the freedom of the high seas, exacerbate the complexity of protecting the marine environment. The varying degrees of vulnerability of different regions have reinforced the idea of establishing 'special areas'. It has been emphasised that the fundamental international legal instruments on climate change and the reduction of environmental pollution have laid the groundwork for corresponding measures in the legal regulation of activities in maritime areas, carried out under the auspices of the IMO with the aim of reducing the negative impact of shipping on atmospheric air and, consequently, mitigating the greenhouse effect and climate change.

The IMO's legal instruments for climate change mitigation are aimed at developing mechanisms to reduce emissions of greenhouse gases such as CO_2, SOx, NOx and volatile organic compounds, as well as at improving the energy efficiency of ships, which includes the implementation of energy efficiency regulations and the promotion of international cooperation on the use of alternative fuels. Emphasis is placed on the role of seaports in reducing greenhouse gas emissions and introducing alternative energy sources through an analysis of incentive schemes at regional and sectoral levels.

References

1. Іванова А.В., Костиря О.В. Юрисдикція держави порту в системі засобів щодо захисту і збереження морського середовища. *Юридичний науковий електронний журнал*. 2022. № 10. С. 700–706. https://doi.org/10.32782/2524-0374/2022-10/176

2. United Nations Convention on the Law of the Sea 1982 URL: http://consultant.parus.ua/?doc=00O5WDC64C

3. Міжнародна конвенція по запобіганню забрудненню з суден 1973 року URL: https://zakon.rada.gov.ua/laws/show/896_009#Text

4. Fedotov O., Averochkina T. Traditions and Innovations in Legal Discourse on the Categories «Jurisdiction» and «Sovereign Rights». *State and law in the context of globalization: realities and prospects: collective monograph* / A.I. Hnatovska, L.I. Kormych, A.I. Kormych, N.M. Krestovska, etc. Lviv-Toruń: Liha-Pres, 2019. P. 1-19. https://doi.org/10.36059/978-966-397-182-7/1-19

5. Kormych B., Averochkina, T., Gaverskyi, V. The Ukrainian Public Administration of Territorial Seas: A European Example. European Energy and Environmental Law Review. 2020. Vol. 29. Iss. 2. P. 26–38.

6. Єременко К.С. Формування категоріального апарату національного законодавства у сфері альтернативної енергетики.

Правова держава. 2021. № 43. С. 68–75. https://doi.org/10.18524/2411-2054.2021.43.240980

7. Єременко К.С. Дослідження реляційної взаємодії між ІМО та ООН у питанні скорочення викидів парникових газів. Альманах міжнародного права. 2022. Вип. 28. С. 24–33. https://doi.org/10.32841/ILA.2022.28.03

8. Lim K. The Role of the International Maritime Organization in Preventing the Pollution of the World's Oceans from Ships and Shipping. URL: http://surl.li/msokc

9. Langlet D. Shipping and the Ecosystem Approach. In: Regulation of Risk. Leiden, *The Netherlands.* Brill, Nijhoff. 2022. https://doi.org/10.1163/9789004518681_015

10. Implications of the United Nations Convention on the Law of the Sea for the international Maritime Organization. Study by the Secretariat of the International 174 Maritime Organization (IMO). LEG/MISC.8. 30 January 2014. 139 p. URL: https://www.kuestenpatent-kroatien.at/LEG% 20MISC%208-1.pdf

11. Beckman R., Sun Z. The Relationship between UNCLOS and IMO Instruments. *Asia-Pacific Journal of Ocean Law and Policy*. 2017. P. 201–246. https://doi.org/10.1163/24519391-00202003

12. Argüello G. The International Maritime Organization's Contribution to Regime Interaction: Past, Present, and Future. *Max Planck Yearbook of United Nations Law.* 2022. Vol. 25. https://doi.org/10.1163/18757413_02501003

13. IMO's work to cut GHG emissions from ships. URL: https://www.imo.org/en/MediaCentre/HotTopics/Pages/Cutting-GHGemissions.aspx

14. NextGEN holds first meeting to push maritime decarbonization. URL: https://www.imo.org/en/MediaCentre/PressBriefings/pages/NextGENproject.aspx

15. The IMO-Norway GreenVoyage2050 Project is supporting shipping's transition towards a low carbon future. URL: https://greenvoyage2050.imo.org/

16. About GMN. Energy efficiency in shipping – why it matters. URL: https://gmn.imo.org/about-gmn/

17. About the Low Carbon GIA. Global MTCC Network. URL: https://greenvoyage2050.imo.org/about-the-gia

18. Biofouling and greenhouse gas (GHG) emissions from ships. URL: https://www.glofouling.imo.org/ghg-emissions

19. IMO and Republic of Korea partner to address ships' GHG emissions. URL: https://www.imo.org/en/MediaCentre/PressBriefings/pages/39-GHG-SMART–.aspx

20. FINSMART Roundtable. URL: http://surl.li/mtcue

21. IMO and Germany sign agreement to develop project to identify opportunities and solutions to prevent and reduce transport emissions. URL:

https://www.imo.org/en/MediaCentre/PressBriefings/pages/IMO-Germany project.aspx

22. IMO and UNEP to host 2021 Maritime Zero-Low Carbon Innovation Forum. URL: https://www.imo.org/en/MediaCentre/Pages/WhatsNew-1558.aspx

23. Zero-and Low-Emission Innovation Forum: 27-29 September 2021. URL: https://www.imo.org/en/OurWork/PartnershipsProjects/Pages/ MaritimeInnovation-Forum.aspx

24. Marine Environment Protection Committee (MEPC), 66th session: 31 March to 4 April 2014. URL: http://surl.li/msnmk

25. Technology Groups. URL: https://greenvoyage2050.imo.org/ technologygroups

26 Clause by Clause analysis of MARPOL Annex VI. 19 p. URL: https://greenvoyage2050.imo.org/wp-content/uploads/2022/09/Clause-byclause-analysis-of-2021-Revised-MARPOL-Annex-VI-EN_Final-min.pdf

27. Ship-Port Interface Guide. Practical Measures to Reduce GHG Emissions. 2021. 46 p. URL: http://surl.li/mtczr

28. Yeremenko K. International Maritime Organization and Decarbonization of Maritime Industry: Mandate and Instruments. *Lex Portus.* 2022. Vol. 8(3). P. 30– 57. https://doi.org/10.26886/2524-101X.8.3.2022.2

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