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SUSTAINABLE DEVELOPMENT IN THE MARITIME TRANSPORTATION OF GOODS

RESEARCH PAPER FOR FINAL YEAR INTERNSHIP

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INTRODUCTION

On September 2023, the World Maritime Theme will celebrate the 50th anniversary of the MARPOL Convention, adopted in 1973. This latest instrument was landmark as providing one of the first response for accidental marine pollution from vessels. Half a century has passed and still today, the Convention remains an essential element for monitoring maritime pollution and has been the basis for nourishing a broad legal framework for preserving natural resources from maritime transportation.

From fifty years, the use of vessels around the world has only exploded. Maritime transportation, whether cruise ships than cargo vessels, have multiplied. Precisely, sea transport of goods has more than doubled, being considered as the first transcontinental means of transport of goods. In this perspective, the layout of maritime trade has been developed, particularly with the phenomenon of containerization. Yet, while the global economy has enhanced following the multiplication of those giants of the sea, this growth has been at the expense of the conservation of sustainable natural resources. Nowadays, one remarkable concern is to comprehend that maritime trade is reaching the limits of an environmental-friendly interest.

The protection of the environment is a long-standing route that has found its roots in the lack of predictability that consequently led to natural disasters, in particular, ships accidents that provoked pollutant spills and oil slicks. The core of the monitoring of natural resources was, on the one hand, to shift the focus from a preventive method to a proactive one. On the other hand, it also consisted in sensibilizing the question of sustainability as a principle per-se, independent from economic or development concerns. It is in this peculiar perspective that sustainable development concerns rose. In particular, the European Union has been an essential stakeholder in its development, contributing therefore to consolidating an efficient legal framework for its monitoring. All in all, sustainable development was a transversal tool, applicable to natural resources management as well as wealth contributors.

Tackling the protection of environment directly refers to the notion of pollution. Though this latest is rarely defined as such in legal tools. Still, this notion refers to a form of contamination by harmful substances in a natural environment. Particularly, maritime transportation, meaning the transport via waterways, plays an important role in its impact on natural resources. Though,

the delimitation of "environment" remains slightly complex. In fact, the <u>Stockholm Declaration</u> of 1972 concentrated the natural resources of the earth, air, water, land, flora, fauna, etc. Nevertheless, in the perspective of "sustainable environment" as proclaimed later on, one must particularly highlight the place of generations and particularly human beings, as being fully part of the environment as well. All in all, human behavior is always related to environmental externalities. Therefore, one must always take a referential to environment management alongside development.

To sum up, in a context of increasing trade and based on pecuniary motives, it is necessary to bear in mind that transportation is the optimum basis for starting a monitoring of natural resources. Parting from the legal framework that is settled in this perspective, one may consider the accuracy of such regulations nowadays. In particular, to what extent is sustainable development a current priority for sea transportation of goods?

In order to apprehend the limits of maritime transportation regarding natural environment, it is a prerequisite to tackle, at once, the notion of sustainable development as an evolutive concept, applicable to the maritime transportation system (I). From this basis, some remarks can arise, namely, the effectiveness of such legal framework. It is towards this angle that appreciating the current challenges from maritime transportation, particularly the polluting discharges from containers (II), that a well-founded opinion may be drawn.

PART 1 - THE EVOLUTIVE PRINCIPLE OF SUSTAINABLE DEVELOPMENT IN MARITIME TRANSPORTATION

The concept of protecting the environment has been lengthily discussed and shaped. With time, the concept of eco-development appeared, according to which, the management of natural resources had to be in line with the increase of one country's growth tools. It is in this perspective that got recognized, progressively, the principle of sustainable development (A). This concept was originally framed in the sole eco-centric approach. But with time, it became an authentic transversal principle applicable to transport (B), therefore, turning into a great vector for change.

A) The progressive recognition of the principle of sustainable development

1. The use of sustainable development as a vector in civil society

« Economic expansion is not an end in itself; Its first aim should be to enable disparities in living conditions to be reduced (...) It should result in an improvement in the quality of life as well as in standards of living. As befits the genius of Europe, particular attention will be given to intangible values and to protecting the environment, so that progress may really be put at the service of mankind »¹. The Paris Summit Declaration of 1972, considered as the greatest starter for the environmental framework, was already, at the time, depicting the need to combine economic challenges with environmental requirements and, all in all, linking the environment to economic development.

In fact, the management of natural resources hadn't been taken into consideration until the 1950's when global environment - but also the reflection on the biosphere - were forged within a set time period that emerged from World War II and the Cold War². Post-war years were successful; by the time, the 1944 Bretton-Woods system marked the beginning of a new

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¹ Statement from the Paris Summit, 19 to 21 October 1972 – See in particular para. 3

² Yannick MAHRANE, Marianna FENZI, Céline PESSIS et Christophe BONNEUIL, « *De la nature à la biosphère - L'invention politique de l'environnement global, 1945-1972* », Presses de Science Po, 2014

economic order based on production and mass consumption. The Trente Glorieuses ("Thirty glorious years" of postwar growth) were characterized by a demographic growth, increasing food production, industrialization, pollution, and consumption of nonrenewable natural resources. To quote "The Limits of Growth", published by The Club of Rome in 1972³, the amount of their increase is called "exponential growth" meaning it is unmanageable. Yet, those years were eventually called the *Trente Pollueuses*⁴ (the "thirty polluting years"), furthermore, this model switched to an energetic system based on petroleum, but also through the culture of the automobile, all this considered, dependent on a polluting model. At the time, the report already suggested the idea that development and environment should be considered as a single issue, leading therefore to the need of embracing a "worldwide challenge". But this concept was not yet really put into practice. In fact, the Cold War had generated tens of thousands of cubic meters of nuclear wastes, millions of tons of waste, greenhouse gases (GHGs) and industrial pollutants, threatening climate balance and ecosystems. But still, the environmental issue was not being taken seriously. Indeed, the 1945 Charter of United Nations did not mention nor listed this challenge still, only three years after, the resounding pieces "Road to Survival" by William Vogt and "Our plundered Planet" by Fairfield Osborn were published, "prophesying" a coming global environmental disaster. It is only from the beginning of the 1960's that some societies started to be concerned by environment, firstly, due to the consequences of the "Bomb P" (the bomb population caused by its unmanageable growth). At this moment, some were dreading that the unlimited population of poor people of the Third World would threaten the limited resources of the planet⁷.

Meanwhile, particularly throughout the terrible Torrey Canyon accident in 1967, the environmentally friendly challenge started blooming. It followingly drove the ecological subject into a pure political object turned towards a sort of "culture worship" that was rather seen as an anti-societal group than as a very committed intervention. Progressively, the issue was handled by the civil society, notably through the creation of environmental NGOs, in the

³ Donella H. MEADOWS, Dennis L. MEADOWS, Report for the Club of Rome's Project on the predicament of manking; « *The Limits to Growth* », 1972

⁴ Céline PESSIS, Sezin TOPÇU, Christophe BONNEUIL, « *Une autre histoire des « trente glorieuses* », Ed. La Découvrte, 2013

⁵ Plamena HALACHEVA (under the direction of Hartmut MARHOLD), « Vers une nouvelle politique de développement durable de l'UE ? », European Institute, 2007

⁶ Yannick MAHRANE, Marianna FENZI, Céline PESSIS et Christophe BONNEUIL, « De la nature à la biosphère - L'invention politique de l'environnement global, 1945-1972 », Presses de Science Po, 2014

⁷ Sylvie BRUNEL, « *Le développement durable, un concept ancien* », Le développement durable, Chapter 2, 2012 ⁸ Gabriel WACKERMANN, « *Transports et environnement en Europe depuis 1945* », Relations Internationales n°96, Les transports dans la vie, 1998

early 1970's (particularly, "Friends of the Earth", in 1969 and "Greenpeace" in 1971, as an opposition movement against nuclear testing at sea). Both were blaming waste, pollution, and the disappearance of species which, in a sense enhanced the focus made on natural resources limits rather than on the single challenge of demographic growth.

In fact, "environment" and "quality of life" issues do not really emerge prior the 1970's as a full-fledged new field of intervention for public powers". Finally, the question of environment became a crucial geopolitical object particularly used as vehicle for international relations between east and west during the Cold War. As an illustration, and to quote Professor Yannick Mahrane, the conquest of the space and the spread of Apollo's 8 image of a fragile planet Earth invited the international community to imagine "a common future". Yet, at the time, the concern for managing natural resources was still circumscribed to an anthropologic point of view; the major objective by strengthening the control beyond natural resources was to increase, the wellbeing of individuals but not really taking care of the nature per se.

"Between 1945 and 1972, it is under the influence of a number of factors that representations, speeches, and action programs constituted the environment as an international political object" 10. The environment concept was "eminently politic" 11 and couldn't be handled, at the time, by any public powers if only, politics – the 1968 Conference on Human held by the UNESCO 12 in Paris illustrates this point -. Yet, progressively, the perspective of environment started embracing an "eco-centric" approach, disconnecting the only interest of men in adopting a cautious management of natural resources but not authenticating yet a proper setting for environment issues. For the first time, in 1971, Environment Ministers were appointed both in United Kingdom as in France, testifying this will of progressively bringing environmental issues to the forefront.

The <u>1972 Stockholm Declaration</u>¹³ took a step forward by symbolizing a new international politic field per se. At this point, was created the United Nations Environment Program (UNEP)

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⁹ François BERTRAND, Marie FOURNIER, « Les politiques européennes d'environnement et l'aménagement des territoires », Ed. Jean-Yves & Baudelle Guy, 2009

¹⁰ Yannick MAHRANE, Marianna FENZI, Céline PESSIS et Christophe BONNEUIL, « *De la nature à la biosphère - L'invention politique de l'environnement global, 1945-1972* », Presses de Science Po, 2014

¹¹ Jan-Henrik MEYER, Bruno PONCHARAL, « *L'européanisation de la politique environnementale dans les années 1970* », Vingtième siècle, Revue d'histoire, Ed. Presse Science Po, 2012

¹² United Nations, UNESCO, Paris Biosphere Conference, 1968

¹³ United Nations, Conference on the Human Environment (Stockholm Declaration), 1972

which would turn into the highest global authority on the environment. Indeed, global environment problematics such as climate change are not limited to national borders and tackling them required "immediate, collaborative, intergovernmental decisions and actions at the international level" ¹⁴. This Declaration set the pace for future environment programs starting with the 1972 Paris Summit¹⁵ that launched a European Environment policy (1973 European Community Action Program) which was the first European environmental program. What is more, it also established a General Direction for Environment; forasmuch as it symbolized the emergence of an international new politic field. Consequently, environmental principles were chartered such as Article 130r (2) of the Treaty of Rome¹⁶.

In the same way, the Organization for Economic, Co-operation and Development (OECD) adopted in 1972 "Polluter Pays Principle" according to which, "the polluter has to bear the cost of steps that he is legally bound to take to protect the environment, such as measures to reduce the pollutant emissions at source and measures to avoid pollution by collective treatment of effluent from a polluting installation and other sources of pollution" All in all, this new environmental framework contributed to moving the cursor from the isolated field of the economic perspective to a new ecological approach which had to be handled more strictly. Eventually, all these different steps contributed to consolidating a new approach dealing with the environment monitoring and particularly from the European Economic Community's (EEC) perspective.

Though, the community is "primitively and as a priority" ¹⁸ an organization for the economic integration which goal is to realize and guarantee a strong single market. Still, the EEC (then EU) was forced to take an interest in environmental problematics, particularly after the Stockholm Declaration ¹⁹ that had a catalytic effect on its approach. Nonetheless, the core of the

¹⁴ Geneviève ROY-LEMIEUX, Catherine KUSZLA, « *The United Nations Environment Porgramme Paradox : External versus Internal Social Responsabilities* », Ed. Revue Française d'Administration publique, 2018

¹⁵ 1972 Paris Summit (« Conference of Heads of State or Government of the Members and acceding States of the European Community »)

Art. 130r (2) EC Treaty « Community policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Community. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay »

¹⁷ Organisation for Economic Co-operation and Development (OECD), « *The polluter-pays principle* », OECD Analyses and Recommendations, 1992

¹⁸ Loïc PEYEN, « *Y-a-t-il une identité environnementale de l'Union Européenne ?* », Revue Générale du droit ; Chronique du Droit de l'Union, 2021

¹⁹ United Nations on the Human Environment, Stockholm Declaration, 1972

EEC interest, grounded on economy matters, drove their action even concerning the environment preservation; the century was not yet in favor of the advent of the sustainable development. Indeed, the message of said Declaration was sunken by pecuniary concerns²⁰. In fact, the action of the EEC on this field was primarily justified by the preservation of its single market. Therefore, the environmental action of the Community was a "condition of its survival and of its development"²¹.

In a way, it impeded the advance of an environmental framework, but in another, the "Europeanization"²² of this field was particularly quick due to environment restriction rules that contributed to commercial distortions in the single market. With this in mind, many tools having a positive effect on the environment were adopted by the Community (notably, Directive EEC 67/548 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances²³). But still, progress was light as all regulations were based on Art. 100 of the EC Treaty according to which, "the Council shall, acting unanimously on a proposal from the Commission and after consulting the European Parliament and the Economic and Social Committee, issue directives for the approximation of such laws, regulations or administrative provisions of the Member States as directly affect the establishment or functioning of the common market". Besides, its action was mainly utilitarian; in this perspective, Art. 3 of the Treaty of the European Union states that "the Union establishes a single market", and then, on a second plan, that it works for a sustainable development in Europe. Thus, as the economy is being a reference, the protection of natural resources cannot be done at any cost. The 1968 Conference on Biosphere held in Paris developed this conception according to which, it is necessary to "conciliate economic shortterm needs and the maintain of long-term biologic process which renew the resources"²⁴.

 $^{^{20}}$ Sylvie BRUNEL, « Le développement durable, un concept ancien », Le développement durable, Chapter 2, $2012\,$

²¹ Loïc PEYEN, « *Y-a-t-il une identité environnementale de l'Union Européenne ?* », Revue Générale du droit ; Chronique du Droit de l'Union, 2021

²² Jan-Henrik MEYER, Bruno PONCHARAL, « L'européanisation de la politique environnementale dans les années 1970 », Vingtième siècle, Revue d'histoire, Ed. Presse Science Po, 2012

²³ Council Directive EEC 67/548, « *Directive on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances* », 1967

²⁴ Yannick MAHRANE, Marianna FENZI, Céline PESSIS et Christophe BONNEUIL, « *De la nature à la biosphère - L'invention politique de l'environnement global, 1945-1972* », Presses de Science Po, 2014

Finally, this association between economic efficacity and environmental promotion²⁵ was particularly at stake. To quote the "Global Report to the President, 2000"²⁶ forwarded by Jimmy Carter in 1991, "with various political and economic interests competing throughout the world of influence, it's hard to find ways in which agriculture, health care and environmental preservation can be pursued together". In fact, for some, this assembly was pretty "schizophrenic"²⁷ as the community action in the environmental field was ripped by contradictory considerations. All in all, this context condemned the Community to a lasting economic lecture of the environment.

At this point, it is necessary to highlight that the environment was not yet recognized as a referential nor as a principle. At the time, the aim was mainly to change the present system towards a sort of "eco-development". Therefore, a form of economic and natural interdependence contributed to making a form of law of nature that might be fundamental. To this end, one could point towards the ECCJ case Abdhu in 1985 which affirmed that "there can be no doubt that the protection of the environment against the risk of pollution constitutes an object of general interest which the Community may legitimely pursue"²⁸. Yet, the environment lacked a proper recognition, disconnected from economic purposes. It is mainly in the context of the end of the Thirty Glorious years that appeared a progressive concept of sustainable development.

2. The recognition of a landmark principle

A truthful turning point emerged in the mid-1970's when the conception of environment was taken much more into consideration as an essential component of the development of the society rather than as an economic vector. Progressively, the economical focus faded away and gave way to a more environmental-friendly approach; one best illustration on this point remains

²⁵ Gabriel WACKERMANN, « *Transports et environnement en Europe depuis 1945* », Relations Internationales n°96, Les transports dans la vie, 1998

²⁶ Gerald O. BARNEY, Foreword by President Jimmy CARTER, « *The Report Global to the President 2000* », 1988

²⁷ Loïc PEYEN, « *Y-a-t-il une identité environnementale de l'Union Européenne ?* », Revue Générale du droit ; Chronique du Droit de l'Union, 2021

²⁸ European Community Court of Justice, *Public Prosecutor v. Association de Défense des Brûleurs d'huiles Usagées (ABDHU)*, jugement of the Court of 7 february 1985

the actions taken on behalf of the EEC. At the time, the 1973 Action Program²⁹ was adopted by the European Coal and Steal Community (ECSC) giving rise to an environmental European policy. Several factors explained the shift in the early 1970's. To quote Charles-François Mathis, "environmental disasters which brought about higher public expectations and a heightened international awareness but above all the desire to limit the distortions of competition within the European Market that different environmental regulations on a national level could create"³⁰. Though environment was set at the core of the project, the economic perspective remained prevalent. Still, in this perspective, the EEC started its progress regarding its environmental framework. The end of the 1970's and start of 1980's was highlighted by the adoption of meaningful texts; among others, Directive 79/409 EEC on the conservation of wild birds which became the first European Directive³¹ aiming at the conservation of the nature. At the time, environmental challenges had deeply integrated the scope of action of the Community³² even though a stabilized legal framework still lacked.

A decisive moment occurred in 1986 with the <u>Single European Act (SEA)</u>³³. For the first time, the Community recognized environment as one peculiar guideline for its action. In fact, if the Treaty of Rome had ruled out the environment perspective, the SEA introduced the field of action at its Title 7 named "*Environment*". Indeed, while the environmental policy was launched since the 1965's - almost 200 regulations had been adopted from 1960 to 1980-, it was not until 1986 that it provided a legal basis in European treaties. For all that, even though environmental protection was a new concern that had been of little importance when the original treaty was drafted, some estimated this point not as such great step forwards as the environment action was formally set within a limited community competence³⁴ - "those provisions are unsatisfactory and remove a further alibi for inaction"³⁵. Nevertheless, in this perspective, the SEA aimed at deepening the development of the EEC through the environmental scope.

²⁹ Council of the European Communities, Declaration on the Programme of action of the European Communities on the environment, 1973

³⁰ Charles-François MATHIS, « European Environmental Policy », Encyclopédie d'histoire numérique de l'Europe, 2020

³¹ EEC, Council Directive 79/409, « Directive on the Conservation of wild birds », 1979

³² François BERTRAND, Marie FOURNIER, « Les politiques européennes d'environnement et l'aménagement des territoires », Ed. Jean-Yves & Baudelle Guy, 2009

³³ European Economic Community, Single European Act (SEA), 1986

³⁴ Julian LONBAY, « *The Single European Act* », Boston College International and Comparative Law Review, 1988

³⁵ David EDWARD, « The impact of the single act on the institutions », Common Market Law Review 24, 1987

Yet, the aim of preserving natural resources or at least, protecting natural resources was still concerned in a vague manner: one same object was depicted through various tools. In fact, "sustainability", "environmental sustainability", "environmental protection", "environmental policy" or also "ecological sustainability" are just as much a representation of the principle of "sustainable development" that wasn't consolidated yet³⁶. All in all, these references intensified the lack of legitimacy granted to the principle as such. At this stage, this ambiguity was clearly correlated with the difficulty of detaching the environment from economic issues. Indeed, one could ask whether the "ecologization of terms" in economic speeches was mainly related to a form of "economization of the environmental policies".

All those questions and doubts were alleviated from 1983 onwards when the principle of an environmental "development" had been "revived"³⁷. For the first time, in 1983, following the Brandt Commission³⁸, the United Nations Secretary required the handling of a Commission based on environment and development concerns and mainly composed by environmental specialists to draft a report. This instrument was released in 1987 as the "Brundtland Report" ("Our common future") and was considering simultaneously, development and environment (while the Stockholm Declaration only focused on human environment). This tool is landmark not only due to its institutional "backing" of the concept of sustainable development³⁹, but also for its approbation by the United Nations, authenticating therefore the principle as an elementary principle.

The first step of such report was to highlight the different ways in which poor and rich societies undermined environment. Such consideration pushed forward the combination of both the development and human activities on the environmental impact leading therefore to a form of dilemma based on the conciliation of respecting natural resources on the one hand and providing justice between people, on the other. The UN Commission brought an answer to such a difficulty by highlighting the notion of "sustainable development". Still, though this concept could have been developed and proclaimed as a principle, the report only stated that this latest

³⁶ François BERTRAND, Marie FOURNIER, « Les politiques européennes d'environnement et l'aménagement des territoires », Ed. Jean-Yves & Baudelle Guy, 2009

³⁷ Gilbert RIST, « *L'environnement ou la nouvelle nature du « développement »* », Le Développement, Chapter 10, 2007

³⁸ Brandt Commission, Report North-South, 1980

³⁹ Roberto BERMEJO, Inaki ARTO, David HOYOS, « Sustainable Development in the Brundtland Report and Its Distortion: implications for Development economics and International cooperation», Development Cooperation: facine the challenges of global change, 2010

refered to an instrument "meeting the needs of the present without compromising the ability of future generations to meet their own needs"⁴⁰. For once, the report went even further by calling for a form of "intergenerational equity" that assumed that future generations should be able to meet their needs, emphasizing therefore the effort of developing "the potential for renewable energy, which should form the foundation of the global energy structure during the 21st Century"⁴¹. To quote Erling Holden, this new perspective ensured that future generations would not have to face their proper circumstances by making more efforts than the present ones. In fact, every generation could benefit from any level of well-being compatible with a similar level of satisfaction, equal opportunities between and inside countries. Eventually, "sustainable development could be interpreted in prioritarian or equalitarian terms as well as in sufficientarian ones"⁴².

What is more, though this report was a step forward in the consolidation of the principle per se, remains the fact that the ideal of this commission was to redefine the relation between development and environment. In fact, the report highlighted that development decisions are not sufficient considering the environmental resources and its limits, focusing on the fact that there could be the rise of a social crisis if the society followed the same path⁴³. At this stage, the consolidation of such a principle capable to reform the system remained on the will of change rather than on the instruments used for it. Still, "sustainable development is not a fixed state of harmony but rather a process of change"⁴⁴. After all, despite hesitations from the political field which traduced an uncertain concept - particularly after the Rhodes Summit in 1988⁴⁵ -, the principle was particularly authenticated the following years with new environmental summits that consolidated the way of perceiving the sustainable development instrument. It is in this same trend that in 1990, the Dublin Council⁴⁶ adopted a declaration named "Imperatives of the environment".

⁴⁰ Report of the World Commission on Environment and Development : « *Our Common Future* », (Brundtland Report), 1987

⁴¹ Erling HOLDEN, « *Sustainable Development : Our common future revisited* », Article for the Scientific Journal Global Environment Change, 2014

⁴² Paul-Marie BOULANGER, « Sustainable development as practical intragenerational and intergenerational justice: interpretations, requirements, and indicator », Institut pour le Développement Durable, 2013

⁴³ Nigel ROOM, « *The Brundtland Report shaped the field of sustainability* », Network for business sustainability, 2014

⁴⁴ Michael MASSEY, « Sustainable development 20 years after Brundtland: time for more patience and pragmatism », Royal Institute of International Affairs, 2007

⁴⁵ European Council, Rhodes Summit, 1988

⁴⁶ European Council, Dublic Council, 1990

Eventually, the Brundtland Report did not only set the pace for the consecration of the "sustainable development" principle but enhanced the importance to set an international conference for complying human needs with natural limits. Its aim was primarily to set out a long-term environmental strategy for achieving sustainable development from the year 2000 onwards. It is in this perspective that was held the <u>Earth Summit held in Rio in 1992</u>⁴⁷ ("*United Nations Conference on Environment and Development*") that stroked a turning point in awareness of environmental issues and "*laid the foundations for the global advance towards sustainable development*"⁴⁸. This event was essential not only due to the number of Head of States present for discussing on environmental issues, but also due to its raising-awareness character on climatic changes. In fact, by considering the number of participants, the environmental concerns were spread a little more widely⁴⁹.

The Earth Summit agreed on concrete measures to "reconcile" so economic activities with the preservation of the planet, always guided by the goal of providing a sustainable future for all people. At this stage, five major documents were adopted, among which the Earth Charter focusing on 27 principles for enabling the enforcement of Sustainable Development and particularly the "Agenda 21" considered as an action plan for the 21st century. To quote Brian KEEBLE in its paper "Reflexions on the Earth Summit", this step taken promoted the said "Spirit of Rio" and hopefully provided that "the Earth Summit turns out to have been a beginning and not an end". In fact, said conference didn't modify the definition provided by the Brundtland Report in 1987; still, to quote Professor Francesca Pellegrino, it focused on a more "ecocentric" approach of the principle of sustainable development.

As a result, the Summit also influenced the construction of the European Economic Community under the <u>Maastricht Treaty</u>⁵³ – particularly the achievement of its single market - when it included in the treaties the principle of sustainable development⁵⁴. Therefore, the European

⁴⁷ United Nations Conference on Environment and Devlopment, Earth Summit, Rio 1992

⁴⁸ United Nations Conference on Sustainable Development, « Sustainable development 20 years on from the earth summit », 2012

 $^{^{49}}$ Gilbert RIST, « L 'environnement ou la nouvelle nature du « développement » », Le Développement, Chapter 10, 2007

⁵⁰ Stephanie MEAKIN, « *The Rio Earth Summit : Summary of the United Nations Conference on Environment and Development* », Science and Technology division, 1992

⁵¹ Brian KEEBLE, « Reflections on the Earth Summit_», Medecine and War Vol. 9, Ed. Taylor & Francis, 1993

⁵² Francesca PELLEGRINO, « Sviluppo sostenibile dei trasporti marittimi comunitari », Ed. Giuffrè, 2009

⁵³ European Economic Community, Maastricht Treaty, 1992

⁵⁴ European Economic Community, Article 2 of the Rome Treaty (TEC) as a vector of economic development per se ("The Community shall have as its task, by establishing a common market and an economic and monetary union and by implementing common policies or activities to promote throughout the Community a harmonious, balanced and sustainable development of economic activities")

Community enhanced its environmental policy not only from a sectorial perspective but also as a driving force in order to strengthen its development. This tendency was emphasized particularly with the <u>Amsterdam Treaty</u> in 1997⁵⁵ which consolidated the environmental protection requirements as "components"⁵⁶ of the European Community's other policies and especially as a principle⁵⁷ (and not only a concept). Indeed, this progress was significant as sustainable development was so far used "more as a slogan than as a guiding principle" (Article 6 of the TCE⁵⁸ presented a strategy to achieve environmental integration objectives). This new outlook allowed the integration of environmental objectives in communitarian issues and particularly gave effect to the integration of the notion of sustainable development per se as an unavoidable principle.

Finally, this new step implied that sustainable development was a bigger objective "that cannot be attained exclusively by the environmental integration"⁵⁹. Thus, development became a principle that concerned many sectors which impact was particularly reinforced with the Amsterdam Treaty in 1997 that included for the first time, the principle of sustainable development in European treaties, therefore removing all ambiguities between different conceptions of "sustainability". This new legal instrument was also relevant as it emphasized said "integration principle"⁶⁰, according to which, environmental protection requirements would be "a component of the Community's other policies". This tool was a peculiar advance on this point as the Maastricht Treaty of 1992⁶¹ had already mentioned the principle still, limited to some sectors. The progress arising from this instrument was enhanced at the European Council in Cardiff in 1998⁶² where the integration strategy was highlighted, and councils were invited to rethink their field regarding the strategy in order to comply with the new "acquis Communautaire". Moreover, the European Council held in Helsinki in 1999⁶³, proposed a

⁵⁵ European Union, « Treaty of Amsterdam amending the treaty on EU, the treaties establishing the EC and certain related acts », 1997

⁵⁶ Stefani BÄR, R. Andreas KRAEMER, « *European Environment Policy After Amsterdam* », Journal of Environmental Law Vol. 10, 1998

⁵⁷ Said MAHMOUDI, « *Protection of the European Environment after the Amsterdam Treaty* », Stockholm Institute for Scandinavian Law, 2000

⁵⁸ <u>Article 6 European Community Treaty</u>: "The European Council highlights its conviction – mentioned in future Art. 6 of the Treaty – that the requirements on environmental protection must be integrated in the communitarian action policies, particularly in order to promote Sustainable Development"

⁵⁹ Marc PALLEMAERTS et Armelle GOURITIN, « *La stratégie de l'UE en faveur du Développement Durable* », Courrier Hebdomadaire du CRISP n°1961, 2007

⁶⁰ Stefani BÄR, R. Andreas KRAEMER, « European Environment Policy After Amsterdam », Journal of Environmental Law Vol. 10, 1998

⁶¹ European Union, Maastricht Treaty, 1992

⁶² European Union, Cardiff European Council, 1988

⁶³ European Union, European Council Helsinki, 1999

European strategy for sustainable development aiming at ensuring the policy coherence based on a sustainable development from an economic, social, and environmental perspective.

Breaking away from the European framework, the <u>Kyoto Protocol</u>⁶⁴, adopted in 1997 (entered into force in 2005) complemented the <u>Rio Declaration</u>⁶⁵ and deepened this issue by spotting industrialized countries on their Greenhouse Emissions Gases (GHGs). This instrument was a real improvement as it did not limit itself to general guidelines but tackled effective challenges: it settled a quota system of emissions but also committed the countries to a reduction of 5% of their emissions. Particularly, the Protocol set a clear "bipolarization" between industrialized countries of the north (countries of Annex I) and under-developed countries of the south; to quote Moïse Tsayem Demaze, "the protocol thus accepts the dichotomy between development and the environment and even considers that development is synonymous with environmental degradation"⁶⁶. From this moment onwards, the struggle for sustainable development, takes a new direction.

Four years after, the Goteborg Summit⁶⁷ of 2001 pursued this tendency and agreed on a strategy for sustainable development by adding an environmental dimension to the *Lisbon Process* that had been held in 2000, for employment, economic reform, and social cohesion. In fact, the European Summit was convinced that "clear and stable objectives for sustainable development will present significant economic opportunities". In particular, "the European Union should promote issues of global environmental governance and ensure that trade and environment policies are mutually supportive". To sum it up, this new step accurate the will to establish sustainable development as one dimension per se for the construction of the European Union. In fact, the Laeken Declaration⁶⁸ held in 2001 characterized the Union as a leader that aimed at framing globalization according to ethical principles and, primarily, fixed in solidarity and sustainable development. Therefore, it was the starting point of the first transversal policy⁶⁹ for a sustainable development strategy in Europe.

⁶⁴ United Nations Organisation, *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, 1997

⁶⁵ United Nations General Assembly, Report of the United Nations Conference on environment and development, Rio Declaration, 1992

⁶⁶ Moïse TSAYEM DEMAZE, «Le protocole de Kyoto, Le clivage Nord-Sud et le défi du développement durable », Espace Géographique, Vol. 38, 2009

⁶⁷ European Union Council, Goteborg European Council, 2001

⁶⁸ European Council, Laeken Declaration, 2001

⁶⁹ Camille JOSEPH (Direction by Denis STOKKINK), « <u>Le développement durable dans l'agenda politique européen</u> », Pour la Solidarité – European Think and do Tank, 2019

The 2002 Johannesburg Summit⁷⁰ ("World Summit on Sustainable Development" – WSSD) aimed at reviewing the process and was primarily concerned by the implementation of policies rather than by setting new targets. At this stage, the term of sustainable development that had been defined in 1987 assumed both environmental and economic issues (particularly in the scope of development). Still, this concept had been broadened "in recognition of the non-environmental aspects of sustainability and the non-economic aspects of development".

Followingly, and as a cornerstone for the inclusion of the principle of Sustainable Development in the EU construction, the <u>Lisbon Treaty</u>⁷², introduced said principle as a goal for the EU⁷³ and particularly was introduced into the Preamble and <u>Article 37 of the EU Charter of Fundamental</u> <u>Rights</u>⁷⁴. Consequently, sustainable development was considered as a right for individuals per se⁷⁵, as it is already the case for a right for life, etc.

Finally, the $\underline{2012}$ Earth Summit⁷⁶ that was held in Rio ($\underline{Rio} + \underline{20}$) "renewed"⁷⁷ the commitment to sustainable development via the promotion of an economically, socially, and environmentally sustainable future. Still, the conference enlarged the notion of sustainable development by including the principle of poverty eradication as part of its process. However, though the Conference reaffirmed the principles stated 20 years prior, the summit recognized above all the "uneven progress" and the fragile results that had been made all along. The main conclusion that can be drawn from such Conference was above all a memorandum of decades of principles that failed to be implemented because of a system deeply rooted in inequal principles. But this statement, which is more theoretical than practical, did not punctuate the great advance of sustainable development progression.

⁷⁰ United Nations, World Summit on Sustainable Development (Johannesburg Summit), 2002

⁷¹ Yasmin VON SCHIRNDING, « *The world summit on Sustainable Development: reaffirming the centrality of health* », Globalization and Health, 2005

⁷² European Union, Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community, 2007

⁷³ Maria KENIG WITKOWSKA, « *The Concept of Sustainable Development in the EU Policy and Law* », Journal of Comparative Urban Law and Policy, 2017

⁷⁴ <u>Article 37 European Union Charter of Fundamental Rights</u> – « A high level of environmental protection and the improvment of the quality of the environment must be integrated into the policies of the Union and ensured in accordance with the pricriple of sustainable development »

⁷⁵ Eloise SCOTFORD, « Environmental Rights and Principles in the EU Context: investigating Art. 37 of the Charter », Bloomsburry Academic, 2018

⁷⁶ United Nations Conference on Sustainable Development, Rio+20, 2012

⁷⁷ United Nations Conference on Sustainable Development, « *The Future We Want - Rio + 20 Charter* », Rio de Janeiro, see particularly preamble, 2012

In 2015, the <u>Paris Agreement</u> pursued its advance and introduced its session by affirming that "climate change is a global emergency (...) requiring international cooperation and coordinated solutions at all levels". In fact, the summit settled a limit of 2°C not to be overstepped during the century which clearly drew practical "reactive" actions. This summit was a cornerstone in the field of sustainable development worldwide and set the pace to various other institutional meetings.

Currently, sustainable development is coordinated with climatic change. But still on this point, the main driving force to attain set objectives are rather "reactive" but not "preventive". This argument is illustrated by several examples, among others the <u>Climate Ambition Summit in 2020</u>⁷⁸ which highlighted that the fifth anniversary of the Paris Agreement was insufficient. Despite significant progress in adopting tools for environmental protection, the situation remains the same: at the international level, fine texts setting out major objectives can still be adopted without promising yet, major results. Regardless of all efforts made in this trend, sustainable development has become more of a utopia than a reality. Yet, the principle has enlarged itself towards new areas, becoming therefore an essential tool for development, and transport remains one peculiar target.

B) The notion of sustainable development: A transversal principle applied to transports

1. The introduction of sustainable development concerns in the field of transports

In February 2023, a commercial train derailed in Ohio, US, while contaminating all the surrounding environment with toxic wastes and preventing population to provide themselves from natural water that was consequently polluted. This is one among thousands of examples depicting the fact that transportation can be related to environment. But to what extent? The principle of sustainable development has, in fact, gone through many steps before acquiring its legitimacy and being applicable. Indeed, the subject being originally constraint and limited to environmental issues, progressively got applied to economic objectives and social challenges (namely due to its "development" factor). One of the major steps to be taken was to implement

⁷⁸ United Nations, Climate Ambition Summit, 2020

it to the transport sector. It is meaningful to remind that, at the essence, the principle was rather "substantial", lacking a clear authentication. With time, it turned into a full-fledged procedural concept⁷⁹, considered as a vector for development rather than a proper objective per se, providing its "*expansion*"80.

One must highlight the fact that sustainable development particularly enhances economic efficiency. By mentioning a sustainable "development", the expression directly refers to this perspective of improving the mode of production of growth. One could ask himself how much sustainable development and economic tools are related? And therefore, what place has transportation in one country's development? Though sustainable development is a global challenge, the most accurate response was provided by the European Union at a regional scale, monitoring a progressive framework for managing the preservation of natural resources.

Recording to the <u>Decision of Sustainable Development in 2000</u>⁸¹, elaborated by the European Conference of Ministers of Transport, "transport is a fundamental factor in wealth creation". In fact, in a perspective of achieving the European economic integration, it was necessary to provide an effective system of transportation to ensure the facility of accessing labor markets, housing, work opportunities or even goods and services. Therefore, free movement is an essential component for the economic growth of a society and remains one elementary step for controlling the management of natural resources.

From 2000 onwards, the European Union particularly acted in such perspective, notably with the 2001 European Commission White Paper "European Transport Policy for 2010: time to decide" where it proposed the settlement of 60 measures to implement a transport system, capable of rebalancing modes of transport. This resolution emphasized sustainability as "the foundation and standard of European transport policy" and highlighted the necessity to create "a comprehensive and integrated transport system".

⁷⁹ Plamena HALACHEVA (under the direction of Hartmut MARHOLD), « *Vers une nouvelle politique de développement durable de l'UE ?* », European Institute, 2007

⁸⁰ Jean-Paul RODRIGUE, « *Transportation, sustainability and decarbonization_*», The Geography of Transport System, 2020

⁸¹ European Conference of Ministers of Transport, « Decision on Sustainable Development », 2000

⁸² European Communities Commission, « White Paper: European transport policy for 2010: time to decide », 2001

⁸³ European Parliament, Davide PERNICE, « Politique commune des transports : aperçu général », 2023

Moreover, this tool marked the concretization of the Goteborg summit for a sustainable strategy in Europe and was followed by the 2006 Commission communication on "Strengthening the European neighborhood policy"84. This latest instrument particularly encouraged Member states to strengthen their political cooperation and particularly by the possibility of extending European networks already implemented. Alongside, the same year, the EU released its Sustainable Development Strategy (SDS) in order to find "the responses to be adopted to tackle the principal sustainable development challenges", notably climate change, green energy but, in particular, sustainable transport. From this step onwards, a focus is made, particularly in 2008, with the European Parliament resolution "Sustainable Transport European Policy" and in fact, this same perspective is strengthened, further on, with the 2009 Communication "A sustainable future for European transport"85. Despite aiming at ensuring a transport both safe and secure, this latest instrument also seeks "a more environmentally sustainable transport"86 alongside with its desire of technology innovation and improving its competitiveness and effectiveness.

Naturally, from the moment the <u>Lisbon Treaty</u>⁸⁷ consolidated the principle as a full-fledged right, transportation was an item among others that was about to be developed. In this perspective, in 2011, the Commission released its White Book related to "durable mobility" and towards a European unique space for transports that is both competitive and resource efficient. To quote the preamble, "European Transport is at crossroads; the challenges of the past still exist, but new ones are being added" **88*. Indeed, the instrument placed at its core the petroleum issue but also the GHGs challenge and reminded that efficient transport was crucial to achieving future prosperity of the continent.

On a larger scale, the <u>United Nations Conference in 2012</u>⁸⁹ affirmed the essential relations between international trade and environment. Long ago, the <u>Earth Summit</u> held in Rio in 1992, had already push forward a "multilateral trading system open, fair, certain, non-discriminatory, predictable, following the objectives of sustainable development" and particularly focused on

⁸⁴ Commission of the European Communities, « *Communication from the commission to the council and the european parliament on strengthening the european neighbourhood policy* », 2006

⁸⁵ Commission of the European Union, « *Communication for a sustainable future for European Transport* », 2009 ⁸⁶ *Ibid.*

⁸⁷ European Union, Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community, 2007

⁸⁸ European Commission, White Paper « <u>Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system</u> », 2011

⁸⁹ United Nations Conference, « The future we want » (Rio +40 Conference), 2012

the fact that trading and environmental policies "should support each other". This perspective was considered as the basis for the "mutual support" theory between a liberal international trade and the improvement of the environmental protection. Such principle emerged in the international practice to "facilitate" the link between Environmental Multilateral Agreements and International Agreements on Trade. According to this school of thoughts, there is in fact, an opened-up form of multilateral exchange allowing the efficient use of resources, contributing to the increase of productions and revenues and eventually, to alleviate the weight that environment handles. More than a single consideration, this principle was reaffirmed by the General Agreement on Tariffs and Trade (GATT) and the World trade Organization (WTO) in 1995⁹². This theory is based on two assumptions; on the one hand, there is a kind of "scale effect" meaning that the increasing pollution is due to the intensification of the economic activity. Therefore, the growth of international trade will consequently increase the use of international transportation services that are, in practice, big energy consumers and large emitters of GHGs. On the other hand, there is a compositional effect highlighted. This latest refers to the way in which the trade system modifies each single part of a sector of national trade and its specialization, provoking therefore, more emissions and pollution. For all that, the WTO moved forward and developed the principle of "mutual support" by precising the existence of a form of "synergy" between free trade and environmental policies. In 2006, in a similar way, the OECD developed the concept of "decoupling" that could be assimilated to the latest one.

In this perspective, a situation of breaking the link between "environmental bads" and "economic goods" occurred developing therefore, the existent causality link between environmental changes and economic variables. All in all, both principles refer to a concept of coherence 95 – harmonious reading of a set of rules to respect rights and obligations – but also a principle of coexistence by integrating different legal tools to maintain the obligations required as well as legal framework providing those rights. On this point, one could refer to the

 $^{^{90}}$ Mehdi ABBAS, « Libre-échange et changements climatiques : « soutien mutuel » ou divergence ? », Mondes en Développement, n°162, 2013

⁹¹ Laurence BOISSON DE CHAZOURNES, Makane MOÏSE MBENGUE, « A propos du principe du soutien mutuel – Les relations entre le Protocole de Cartagena et les accords de l'OMC », Revue Générale de Droit International Public n°4, 2007

⁹² World Trade Organization, Mutual Support Thesis, 1995

^{93 «} Synergy » OMC (to be completed)

⁹⁴ OECD, « Decoupling the Environmnetal Impacts of Transport from Economic Growth », 2006

⁹⁵ Laurence BOISSON DE CHAZOURNES, Makane MOÏSE MBENGUE, « A propos du principe du soutien mutuel – Les relations entre le Protocole de Cartagena et les accords de l'OMC », Revue Générale de Droit International Public n°4, 2007

Rotterdam Convention in 1998 (known as "PIC Convention", which stated that "trade and environmental policies should be complementary in order to ensure the achievement of a sustainable development"; the Cartagena Protocol of 2000⁹⁷ took a step forward and finally recognized this principle as being autonomous and not singly related to complementarity. From this moment onwards, the environmental policy was an area itself that was regulated on its own and set the path to a full-fledged Sustainable transport system.

To strengthen the European common transportation policy, the Trans-European transport network (TEN-T) was further developed with the <u>EU Regulation 1315/2013</u> on *Union guidelines for the development of the Trans-European transport network*⁹⁸. In 2015, the <u>2030 Agenda</u>⁹⁹ rose a list of Sustainable Development Objectives (SDOs) to achieve in 2030, that will be further on, complemented by the <u>2015 Paris Summit</u>¹⁰⁰ establishing some limits for climatic change. Certainly, it is in this will of "synergy" between member states – notably through the commitment to the "*Policy Coherence for Development*" (PCD) – that sustainable development became a referential for all activities. This principle turned into a prerequisite for the well-functioning of transportation, and in general, for the economic growth of the community.

The 2016 Commission's communication "A European strategy for Low-Emission mobility" strengthened the point according to which, the transport sector should better contribute to climatic objectives. This challenge was put forward through the aim of many guidelines; among others, the necessity to invest in public transport modalities, the necessity of sending cheaper prices for all transport means in order to better reflect the polluter-pays principle and user-pays principle.

A big step is taken with the Commission Communication in 2019 adopting "The European Green Deal", defined as "a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are

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 $^{^{96}}$ « Convention on the Prior Informed Consent Procedure for Certain Hazardeous Chemicals and Pesticides in International Trade » (Rotterdam Convention – PIC), 1998

⁹⁷ United Nations, « Cartagena Protocol on Biosafety to the Convention on Biological Diversity », 2000

⁹⁸ European Parliament, « Regulation n°1325/2013 on Union guidelines for the development of the trans-European transport network and repealing Decision No 661/2010/EUR », 2013

⁹⁹ United Nations, « Transforming our world: the 2030 Agenda for sustainable development », 2015

¹⁰⁰ United Nations, Climate Change Conference (Paris Summit), 2015

¹⁰¹ European Commission Official Website, Policy Coherence for Development

¹⁰² European Commission, Communication « European Strategy for Low-emission mobility », 2016

no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use"¹⁰³. This strategy provided short-term actions guidelines for settling long-term results. This wide instrument tackled different spheres of action; among others, it struggled for fresh air, clean water, healthy soils, renovated energy, cleaner energy, recycling, etc. It is in such a perspective that, in 2020, the Commission followingly released the "Sustainable and Smart Mobility Strategy – putting European transport on track for the future"¹⁰⁴. This latest instrument is turned towards the atmospheric pollution from transportation and aims at reducing 90% of emissions from the transport sector from then to 2050 (in particular, the challenge aims at reducing up to 30 million no-emission vehicles to 2030). A few months followingly, the 2020 "Sustainable Europe Investment Plan"¹⁰⁵ was adopted, in correlation with the management and financing of the Green Deal Investment Plan.

As a consequence, in July 2021, the European Commission launched the "transport-blending facility" project call in order to develop sustainable transport infrastructures in Europe. A few months after, in December, the Commission launched the "Green Mobility pack" providing four new initiatives to strengthen sustainable transport in the European Union: in particular, the modernization of the TEN-T, long-distance transportation, making road transport more fluid and launching urban sustainable mobility plans. Moreover, from January 2021 the Euro 6.D Full rule applied to all light-duty vehicles was tightened up to strengthen pollutant emission threshold (in particular, carbon monoxide (CO), hydrocarbon (HC) and nitrogen oxides (NOx). There are, indeed, some environmental rules that a vehicle motor must respond to; the first norm was implemented in 1992 and fixed a limit in pollution rate in g/km. Still, there is an ongoing process of adoption of new stringent rules; the 7th norm is to be adopted in 2025, providing therefore the limitation of greenhouse gas emission from thermal motors.

At this stage, one could indeed highlight the burdensome normative framework that was supported from the 2000's onwards; the European Union has drastically handled the monitoring of environment as an accelerator for its development and its social cohesion, responding therefore to the sustainable philosophy of development. If mobility is the "motor" of an

¹⁰³ European Commission, « Communication for the European Green Deal », 2019 Communication

¹⁰⁴ European Commission Communication, « *Stratégie de mobilité durable et intelligente – mettre les transports européens sur la voie de l'avenir* », 2020

¹⁰⁵ European Union, « Sustainable Europe Investment Plan » (SEIP), European Green Deal 2019

¹⁰⁶ European Commission Communication, « *Stratégie de mobilité durable et intelligente – mettre les transports européens sur la voie de l'avenir_*», 2020

economic and social life, it is costless. Pollutants, due to the transportation have increased so much they represent ¼ of total emissions for EU. Still, transportation in general may be burdensome; yet, depending on each sector, not all are facing the same challenges.

2. The monitoring of the maritime transportation of goods

Transports are huge sources of economic growth for a society but, meanwhile, represent a vector of interference on its environment. As mentioned previously, transportation is directly related to sustainable development concerns. Notwithstanding, some transports are pioneering and when mentioning the importance of natural resources in mobility, one cannot dismiss the weight of maritime transportation and particularly, maritime transportation of goods.

For centuries, two legal concepts have prevailed; on the one hand, Grotius claimed for a sea domination; on the other hand, Selden defended the total liberty among the maritime space. To quote Alessandro Crosetti¹⁰⁷, it is only recently due to the increase of maritime trade traffic and the exploitation of waters that the "exigency of international norms aimed at regulating and disciplining the activity".

International maritime transportation of goods exists since the year dot. If one had to trace back its history, it could mention 1492 when Christopher Colombus discovered America and launched the start of international trade by ships. Since then, shipping goods hasn't stop – to quote Antoine Frémont, "to each period, its predilection ship" 108. Maritime transportation has been modulated through the centuries and has always occupied a predominant place. In fact, oceans represent a vast source of wealth for inter-continental trade and nowadays, 90% of international trade is derived from maritime transportation, while the excipient is left to aviation transportation. This figure highlights the growing importance of maritime transportation regarding international trade: in 1950, it represented 550 million tons; in parallel, in 2019, it represented around 2 million tons. What is more, for the same period, air transportation only represented around 2 million tons. Finally, "international maritime transportation is an integral part of economic international relations; it is a related industry to international trade but also

¹⁰⁸ Antoine FRÉMONT, « *Le transport maritime depuis 1945 : facteur clé de la mondialisation* », Entreprises et Histoires n°94, 2019

¹⁰⁷ Alessandro CROSETTI (traduced by Anne BROGINI), « Aspects juridiques de la protection de la mer en Méditerranée », Méditerranée au prisme des rivages, 2015

an autonomous industry contributing to the national economic development of each state" 109. In fact, it is pioneering the issue of sustainable development and has led to a numerous legal instrument to regulate its monitoring.

All in all, maritime transportation mainly leads to an essential issue dealing with the boundary of waters and their management. In the previous centuries, each negotiator had its own regulatory tool to manage its waters 110 – among others, one could mention the Lex Rhodia of the IXth century, dealing with the obligation for shippers to contribute to the loss of goods that were throwed in the sea; the Laws of Wisby in the 15th century etc... -. Therefore, the issue of pollution at sea was monitored by the territory in charge of the waters, preventing therefore any form of international control. Still, at the time, and as described previously, the core of those regulations was based on economy and trade. The first environment tool that really provided the protection of natural resources for national seas appeared after the 20th century, based on the "booming" of the industry and trade liberalization.

In 1948, the Intergovernmental Maritime Consultative Organization was created which purpose was to "provide machinery for cooperation among governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade"111. Still, the Convention barely mentioned the issue of protecting natural resources and simply stated, followingly, "encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships". All in all, it is necessary to precise that such institution was devoted from any coercive competences – in fact, as depicted, it is only a "consultative" organization -. The protection of natural resources was not stringent.

Yet, a further step is taken in the early 1950's with the adoption of the OILPOL Convention¹¹² in 1954, that provided, indeed, new functions for the IMCO (that would become the IMO). This convention was still relatively limited in its field of application as it primarily addressed pollution "resulting from routine tanker operations and from discharge of oily wastes from

¹⁰⁹ Georges ASSONITIS, « Réglementation Internationale des transports maritimes dans le cadre de la CNUCED », Ed. Graduate Institute Publications, 2015

¹¹¹ Convention of the International Maritime Organization (IMO) – see in particular Article 1 a), 1958

¹¹² International Maritime Organization, International Convention for the Prevention of Pollution of the Sea by Oil (Oilpol convention), 1954

machinery spaces". In fact, though this instrument only tackled voluntary causes of pollution from maritime transportation, the convention established prohibited zones in which the discharge of oil or of mixtures containing a part of oil was forbidden. This provision is used back in the 1958 Convention on High Seas¹¹³ where it first mentions the issue of preventive actions ("every state shall take measures to prevent pollution of the seas from the dumping of radioactive waste, taking into account any standards and regulations which may be formulated by the competent international organization"). Though, the principle per se is still hidden, for once, some measures are to be adopted prior a pollution occurs.

At the time, the legal framework regarding maritime environment was focused on voluntarily pollution. Still, the 1967 Torrey Canyon tanker oil spill revealed the "inadequacies" of existing mechanisms to prevent oil pollutions from ships. In fact, the incident spilled around 120.000 tons of crude oil in the sea and resulted in the biggest oil pollution incident ever recorded at that time. Indeed, the event triggered civil society attention on the deficiencies of the system and reconsidered a legal framework that could also include accidental pollution events. In fact, followingly, the International Maritime Organization (IMO) decided in 1969 to set an international conference to prepare a "suitable" international agreement to highlight and reinforce the limits on the contamination of the sea, of the air and of the land from ships.

It is in such context that the IMO would adopt in 1973 the MARPOL Convention¹¹⁵ (*International Convention for the Prevention of Pollution from ships*, which for once, recognized the importance of accidental pollution but still, pressured the threat of operational pollution. Also, it expanded its application field by including among others, chemicals, harmful substances, sewage or also garbage as forms of pollution that had to be considerate. In fact, this tool is peculiarly important for the maritime transportation framework but also for environmental law and represents a pioneering advance in this field.

What is more, the instrument is impregnated by the spirit of the <u>Stockholm convention of 1972</u> and the obligation for states to adopt preventive measures (regulated by Principle 21¹¹⁶). On

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¹¹³ United Nations, Convention on High Seas, 1958

¹¹⁴ Law Explorer website, Faculty of Law, Queensland University of Technology, Brisbane, « *Environmental and Natural Ressources Law* », see in particular IMO and Marine pollution from ships, 2015

¹¹⁵ International Maritime Organization, « *International Convention for the Prevention of Pollution from ships* » (MARPOL Convention), 1973

¹¹⁶ Principle 21 Stockholm Declaration, 1972, « states have the sovereign right to exploit their own resources pursuant to their own environmental policies... »

that point, "states must take all measures possible to preserve the marine environment, with a view to cooperation rather than mere reciprocity" 117. This principle is to be dissociated for the one of "internalizing costs" 118 according to which, it aims at limiting the level of interference on environmental protection. In parallel, the precautionary principle 119 provides that "appropriate measures are taken where there is reason to believe that substances or energy introduced into the marine environment are likely to cause harm, even where there is no conclusive evidence to prove a causal relation between inputs and their effects" 120. This principle was confirmed later, being recognized as a fundamental principle, by the International Court of Justice, notably in 1997 in the Gabcikovo-Nagymaros case 121.

In fact, and as provided by Professor Jorge E. Viñuales, it is important to consider the legal framework on marine environment under four main guidelines¹²²: Firstly, the violation of the environment could be tolerated but only if the activity that flows from it is legitimate, meaning therefore that when it is not, a system of "internalization of negative externalities" must be set up. Secondly, the violation of the environment that overcomes a certain limit is prohibited; therefore, policies must enforce preventive tools to circumscribe the risks and rather focusing on the prevention than the reparation. Thirdly, the environmental regulation is made up to traduce an answer to a behavior that is not tolerated; therefore, the legal answer aims at controlling the impact of such incident. Eventually, legal systems must provide a reparation system for environment damage that is not controlled.

Nevertheless, the MARPOL elaboration set the path to further instruments that would provide the restriction and protection of maritime environment. One could point out the <u>1969 Civil liability convention</u>¹²³ (*Brussels Convention*), in hand with the <u>Fund Convention of 1971</u>¹²⁴ recognizing marine environment to be a protected resource and enforcing the stringent

¹¹⁷ Alessandro CROSETTI (traduced by Anne BROGINI), « *Aspects juridiques de la protection de la mer en Méditerranée* », Méditerranée au prisme des rivages, 2015

¹¹⁸ Jorge E. VINUALES, « *Introduction au droit international de l'environnement* », see in particular Environnement : Mer, Ed. Bruylant, 2015

¹¹⁹ Mary STEVENS, « *The Precautionary Principle in the International Arena* », Sustainable Development Law and Policy Volume 2, 2002

¹²⁰ IMO, « Convention on the Prevention of Karine Pollution by Dumping of Wastes and Other Matters » (Dumping Convention), 1972

¹²¹ International Court of Justice, Gabcikovo Nagymaros Case, 1995

¹²² Jorge E. VINUALES, « *Introduction au droit international de l'environnement* », see in particular Environnement : Mer, Ed. Bruylant, 2015

¹²³ United Nations, «International Convention on Civil Liability for oil pollution damage» (Civil Liability Convention), 1969

¹²⁴ International Maritime Organization, Fund Convention, 1971

regulation on those who polluted. Furthermore, the <u>London Convention on dumping</u>¹²⁵ that had been drafted in 1972 is a milestone due to its definition of the term "immersion" according to which, it represents "any deliberate discharge into the sea of wastes and other matter from ships, aircraft, platforms or other structures placed at sea". Therefore, this new notion extends the vision of sources of pollution beyond only the oil used for the functioning of the vessel.

Additionally, the regulation regarding maritime transportation started to reconsider its nature. The SOLAS Convention¹²⁶, adopted in 1974 is the continuity of conventions that were adopted since 1914 as a result of the sinking of the Titanic as it provides security to trade vessels and particularly to specify the construction, equipment or even security mechanisms. This latest tool is particularly important in the maritime field and set the path to other instruments to circumscribe maritime transportation. As an illustration, and in response to a spare of tanker accidents in late 1970's, the IMO decided to hold a conference on Tanker Safety and Pollution Prevention in 1978 which regulated the tanker design as well as the measures of such instrument.

The 1982 <u>United Nation Convention on the Law of the Sea</u>¹²⁷ – also known as the Montego Bay Convention - recognizes, for the first time, high sea as "common heritage of humanity", which highlights even more deeply, the importance to protect natural resources and marine environment but, above all, the boundaries to states sovereignty of seas. In fact, this instrument results from the long drafting work that was initiated in 1958 during the Conference of Geneva, outlining for the first time, the international law of the sea under four tools (territorial sea, high sea, continental plateau and fishing). Therefore, the oceans are not only seen as the space of transportation but as a perfect cooperation instrument. The Convention, indeed, cuts up the maritime territory under Exclusive Economic Zones (EEZ) according to which, the state has the right of exploiting its territory but also, and primarily, the duty to preserve its environment.

Yet, the 1987 Exxon Valdez incident changed the course of history as the 300-meter-long ship ripped and an oil spill began, blowing more than 2000 km of coastline. Followingly, in 1990,

¹²⁵ International Maritime Organization, « Convention on the prevention of marine pollution by dumping of wastes and other matter », 1972

¹²⁶ International Maritime Organization, « *International Convention for the Safety of Life at Sea* » (SOLAS Convention), 1974

¹²⁷ United Nations, « Convention on the Law of the Sea » (Montego Bay Convention), 1982

the Oil Pollution Act¹²⁸ was adopted, rewriting the rules for the oil and gas industry. Eventually, even though the aim was to set a legal framework that could prevent such accidents, one could rather consider a "reactive" trend of adopting tools from the beginning of this legal controlling of the marine environment. Obviously, there have been many evolutions since the 1990 regarding the management of marine environment worldwide; among others, the European Union has indeed drafted many new regulations and directives to prevent such incidents and provide a safe and clean marine environment – in fact, the European Maritime Safety Agency was created in 2002, aiming at reducing the risks of maritime accidents and providing a clear network for the monitoring of incidents that occurs at sea and, mainly, "to ensure high, uniform and effective maritime safety" 129.

Additionally, regional seas have been the core of concern from police makers. In fact, as an illustration, the Mediterranean Sea is nowadays a complete object of negotiation. The Convention for the Protection of the Mediterranean Sea Against Pollution¹³⁰, signed in 1976 in Barcelona regulates many different aspects of maritime management of the Mare Nostrum. Being a fragile area shared by more than 22 states, seven protocols were added to the convention, notably dealing with the dumping from ships, but also in case of emergencies, etc.

Nowadays, fifty years after the adoption of the MARPOL, the main problematic is to determine the efficiency of such legislative framework, and among other, whether sustainable development in maritime transportation of goods is effective. In a context of increasing trade and particularly concerning maritime transportation, the main concern particularly balances the massive level of trade, and in particular the maritime one, against the present framework provided for monitoring seas and preserving natural resources. All in all, environment is presently struggling against an unlimited level of trade.

¹²⁸ U.S. Congress, « Oil Pollution Act », 1990

¹²⁹ Adina VALEN, EU commissioner for transport, « European Maritime Safety Report », 2022

¹³⁰ United Nations Environment Program, Barcelona Convention, 1974

PART 2 – THE ONGOING CHALLENGES FOR A SUSTAINABLE MARITIME TRANSPORTATION OF GOODS: POLLUTING DISCHARGES FROM CONTAINERS

International trade has shaped new trends of free movement of goods. Maritime transportation, being the first means of transport for cross-continental exchange of goods had to be modulated to new patterns of consumption. The awareness on sustainable development challenges was particularly highlighted as the amount of goods transported increased exponentially and new instruments were developed so as to manage increasing tonnages of goods. Yet if the new patterns improved international trade, it was made at the expense of environment. There are in fact two concerns to consider. Maritime transportation represents a great challenge regarding its physical emissions deriving from the increasing level of shipping, containerization has turned into a great source of pollutants (A). Still, the invisible pollution issued from maritime transportation constitutes an ongoing challenge (B) that complements the main challenges for the international legal framework for sustainable development.

A) The physical emissions deriving from the increasing level of shipping: containerization as a source of pollutants

1. The recognition of an efficient tool for maritime trade: the concept of container

Transportation is inherently linked to development and economic growth and to illustrate this point, the EU maritime transportation represents nowadays 1% of GDP and more than 600 000 jobs¹³¹. Contemporary societies cannot do without maritime transportation of goods; on the contrary, it aims at increasing it. From the 1940's onwards, « *the energy revolution led to rapid innovations in maritime transportation* »¹³² which, consequently, allowed the shipping industry to get developed and the volume of cargo to increase. Furthermore, the need to ship always more under less requirements was an essential.

¹³² Shuyan WAN, Xiahoan YANG, (...) « Emerging marine pollution from container ship accidents: risk characteristics, response strategies, and regulation advancements », Journal of Cleaner Production, 2022

¹³¹ Jacques BEALL, CESE, France, « La politique européenne de transport maritime au regard des enjeux de développement durable et des engagements climat », 2017

It is in this perspective that the container got created. The 1972 Convention on Containers 133 defines this latest notion as "an article of transport equipment (lift-van, movable tank or other similar structure) fully or partially enclosed to constitute a compartment intended for containing goods; of a permanent character and accordingly strong enough to be suitable for repeated use; specially designed to facilitate the carriage of goods, by one or more modes of transport, without intermediate reloading and designed for handling, particularly when being transferred from one mode of transport to another" 134. Moreover, a container shall include all accessories and equipment except the accessories or spare parts of vehicles or packaging.

With the years, it became a necessary tool to enhance the trade system. It is now a prerequisite to have a look on the main aspects of containers as, to quote the OECD, it is considered as « the backbone of globalization »¹³⁵. Indeed, "it is no coincidence that every advance in navigation has preceded the three periods of globalization"¹³⁶. As a consequence, one cannot mention the transport evolutions without referring to natural resource's limitations.

From what has been developed previously, one could presume that economic benefits contravene natural resources. In fact, containerization is detrimental for environment and particularly attacks the ecosystems. To highlight the study realized by the OECD¹³⁷, there is a factor of pollution if natural ecosystems suffer attacks and particularly according to the tonnage of goods transported – while containers were developed to increase maritime trade, it is therefore strongly related to the environmental management -.

Pollution is a large notion that, corresponding to each sector, can vary. The UN Environmental Program defines it as "the indirect or direct alteration of the biological, thermal, physical or radioactive properties of ay medium in such a way as to create a hazard or potential hazard to human health or to the health, safety or welfare of any living species"¹³⁸. Nevertheless, this practice is not always defined under such terms; the MARPOL Convention of 1973 does not

¹³³ United Nations, IMO, « Customs Convention on Containers », 1972

¹³⁴ Customs Convention on Containers, 1972, See in Particular, Article 1 related to the Definition of container

¹³⁵ OCDE et European Union Intellectual Property Office, « Misuse of containerized Maritime Shipping in the Global Trade of Counterfaits », 2021

¹³⁶ Cyrille P. COUTANSAIS, « Transport maritime, Entre globalisation et Développement Durable », 2010

¹³⁷ OCDE, « Incidences sur l'environnement du transport de marchandises », 1997

¹³⁸ UN Environment Programme Official Website – Concepts, « Pollution »

mention "pollution" but rather "discharges"¹³⁹ that similarly provide the same characteristics. All in all, one could consider that "pollution" is the generic term of the effects against an ecosystem that are produced by different behaviors, as in particular, discharges. Still, at this stage, one could presume that discharges are a voluntary conduct and cannot be considered as accidental factors. In light of the definition of sustainable development and the characteristics for ensuring that future generations get access to same properties, pollution is an obstacle to sustainable development objectives.

In the maritime field, and according to the distance realized for shipping goods, pollution varies. Eventually, shipping goods also contributes to polluting the natural ecosystem regarding specificities of their environment, this point is to be related to the issue of species transported through ballast waters and introduced, further on, in stranger waters.

Nowadays, the part of containerization in international trade as well as in shipping pollution is increasing. Seventy years ago, in 1956, Ideal X (oil tanker issued from the 2nd World War) was transformed by engineer Mc Lean and turned into a box for transporting goods crosscontinental. Progressively, this new tendency « revolutionized » the port handling; to quote Julien Nespola, "maritime transportation was a concept between two ports: the goods were directly manipulated; with containers, we have switched to a door-to-door concept - the container was manipulated", 140. From 1966 onwards, the concept of container was generalized across continents and turned into the best solution for trading worldwide; in fact, « in 40 years, the transport capacity has been multiplied by more than 20: from 1000 twenty-foot equivalent unit (TEU) in the 1960's to more than 20 000 today »141. Containerization was a gain of time and of practicality. Finally, one can consider that containers are not only turning into practical solutions for shipping but particularly, becoming the core of a big business. To draw an illustration on this point, in 1978, the French engineer Jacques Saadé created the CMA CGM group¹⁴² ("Compagnie Maritime d'Affrètement") which highlighted the importance of containerization. At the time, the focus was made on Asia, already considered as the « world factory ».

¹³⁹ MARPOL Convention, Article 2 « *Discharge – in relation to harmful substances or effluents containing such substances, means any release howsoever caused from a ship and includes any escape, disposal, spilling, leaking, pumping, emitting or emptying* ».

¹⁴⁰ Julien NESPOLA, Serge RENAULT « Le transport en conteneurs roule sur cinq jambes – Réponse à la conteneurisation du monde méditerranéen », Revue Outre-Mer n°25, 2010

¹⁴¹ Antoine FRÉMONT, « Le conteneur : de la révolution à la dépendance ? », Administration n°275, 2022

¹⁴² Jacques GÉRAULT, « Du transport maritime à la logistique intégrée », Administration, 2022

Still, some rules regulated the containerization shipping — in 1960, the International Organization for Standardization (IOS) already provided a framework regarding containers. It is particularly in 1988 that the container era started its golden age as, for once, the rule according to which containers had to respect the size of the Panama Canal were broken up leaving therefore a possibility for ships to get bigger. From this moment onwards, the race to gigantism started: there were no more limits regarding the size or even the weight of vessels. Therefore, compared to the capacities in 1986 "vessel TEU capacities in 2007 are 9,44 times higher, in 2019, 17,84 times higher". Nowadays, around 200 million filled containers are transiting every year.

Nevertheless, if containers were attractive for their convenience, this inducement led to a concurrent attitude. In fact, containerization economy is owned by five pioneers. Among others, the World Shipping Council particularly gathers twenty shipowners that represent 90% of world's liner and transport ship capacity¹⁴⁴. Therefore, providing a clear monitoring of containers can be regulated easily through a dew actor. What is more, containerization is a transportation that has been adapted to a consumption model; to quote Cyrille P. Coutansais, the challenge would not be the same if our model of development was modified: "globalization has had the perverse effect of moving production sites further away from consumption ones" 145. Indeed, nowadays, the main production on the Asian continent moves to the European one to be consumed.

At this point, the first concern dealing with containerization regarding sustainable development is related to the congestion of maritime routes and the potential accidents that can derive from it. Of course, this way of transporting goods is the most effective, « it is the only one capable of ensuring the routing over very long distances at very good prices ». Still, the first challenge is dealing with the accessibility and the management of such vessels. In fact, « the development of containerization is three times faster than the one of worldwide production where volumes are doubling every eight years »¹⁴⁶. However, ports have not followed the same trend; the race to gigantism of vessels hindered itself to maritime regulations that prevailed. The main problem deals with its congestion, « in 1938, 2 vessels of 50m were transiting; today, 150 vessels cross

¹⁴³ Takuma MATSUDA, Enna HIRATA, Tomoya KAWASAKI, « *Monopoly in the container shipping market : an econometric approach* », 2021

¹⁴⁴ Alexandra DU BOUCHERON, « A la recherche du conteneur perdu », France Culture, 2019

¹⁴⁵ Cyrille P. COUTANSAIS, « Transport maritime, Entre globalisation et Développement Durable », 2010

¹⁴⁶ Julien NESPOLA, Serge RENAULT « Le transport en conteneurs roule sur cinq jambes – Réponse à la conteneurisation du monde méditerranéen », Revue Outre-Mer n°25, 2010

waters, among which, some are 350m length »¹⁴⁷. In fact, between 2016 and 2019, the port congestion had led to the blocking of around 32% of the world's fleet but by July 2022, this proportion had risen to 37%¹⁴⁸.

As a consequence, one of the main challenges regarding port congestion is the collision that could arise from it. There are in fact, eight types of container ship accidents: collision (that represents 1/3 of accidents), stranding, fire, loss of containers (12% of accidents), drifting, fuel and chemical leaks and explosion. Still, there is indeed a certain degree of uncertainty and unpredictability due to the different categories of products that a container may have: indeed, some may leak toxic chemical substances, some may produce large amount of oil spills by carrying fossil fuels. Eventually, there may also be the release of harmless daily necessities. The number of container ship accidents significantly increased in the last years, « most accidents occur in ports, harbors, piers, anchorages, berths and open seas » 149. The first element that one could summit is the fact that those accidents mainly occur due to a lack of space. This congestion is a challenge for permitting a free course of vessels. From the moment the container ship loses containers, contamination derives from containers that sink in waters. Those accidents threaten natural environment and eventually « pose a threat to human health ».

In general, there are several sources for polluting seas when dealing with shipping. Fuel traffic by sea and the pollution arising from it constitute an important field in maritime sphere. Indeed, while containers generally transport physical goods (though it can also transport chemical substances), tankers are specially conceived for the transport of oils and fuels and their structure is elaborated in a perspective of containing liquid substances – both depend on different regulations. Even though fuel leaks are considered as the most dramatic source of shipping discharges pollution, several types of products may be spilled at sea (notably, oily substances). In fact, such products share a common characteristic with fuels: "they float" Nevertheless, the pollution arising from the loss of tankers containing oil and leading to fuel leaks in oceans represents one of the first threat. Still, it is essential to highlight the fact that operational

eau de mer », Université Paris VI, 2006

¹⁴⁷ United Nations, Conference on trade and development, « *Étude sur les transports maritimes* », 2022 ¹⁴⁸ *Ihid*.

Shuyan WAN, Xiahoan YANG, «Emerging Marine pollution from container ship accidents: risk characteristics, response strategies and regulation advancements », Journal of Cleaner Production, 2022
 Gwënaelle LE GOFF-BUCAS, «Le comportement des polluants flottants en cas de déversement accidentel en

discharges are generally the most pollutant therefore, not only focusing accidental leaks but also the behavior of marine agents.

This source of pollution has already been well-settled in international law as the MARPOL Convention introduced as its first component, Annex 1, the regulations for the prevention of pollution by oil, following the Exxon Valdez accident, in 1983. What is more, this regulation has been further developed with Annex 2 of said Convention that regulates the control of pollution by noxious liquid substances in bulks. In 1990, the IMO consequently adopted the International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC) to provide measures for managing pollution incidents, nationally as well as in cooperation with other countries ¹⁵¹. Even though, the loss of oils is an essential component for shipping pollution at sea, there has been, in the recent years, a concern towards the loss of containers itself. For as much, some rules were adopted regarding this issue. The International Convention for

Safe Containers drafted in 1972¹⁵² already regulated the shipping of goods through those means. Mainly, this instrument aimed at « maintaining a high level of safety of human life in the transport and handling containers » but also « to facilitate the international transport of containers by providing uniform international safety regulations ». Nevertheless, the safety requirements are not complied if vessels tend to become bigger and bigger.

Around 83% of container vessel accidents are categorized as serious or very serious, meaning there is a high probability of causing containers sink, contaminating the surroundings, and even causing wider impacts because of ocean currents¹⁵³. In this race for gigantism and for the benefit of the global trade, the merchant fleet is a growing threat to the environment.

Another problem arises regarding the content of containers as there is no clear declaration of its content. Indeed, one cannot prevent whether the sink container is filled by oil or plastic. Hitherto, container companies are required to set some guidelines to ensure the security of its maritime course. In this regard, among others, shipowners may ensure a satisfactory general condition¹⁵⁴ – making sure there are no deformations, ensuring that all joints are present in order to ensure watertightness – etc.

 $^{^{151}\} IMO, \\ \textit{``International Convention on Oil Pollution Preparedness', Response and Cooperation (OPRC) ````, 1990 \\$

¹⁵² Convention for Safe Containers (CSC Convention) adopted in 1972

¹⁵³ Ibid

¹⁵⁴ CMA CGM Official Website, « Vérification de l'état du conteneur avant empotage »

Of course, the content of containers is essential as the action to take is different according to each substance loaded in the container. Indeed, as the response depends according to its composition, for explosive substances, towing and blowing it up in the sea may be a better solution to avoid high risks of explosion. Still, for containers with flammable and reactive substances, there must be an analyze of the nature of the risk to determine whether the risk should be minimized first.

Even if the figure is uncertain, there are, every year, around 10 000 containers lost at sea. In 2018, the 73rd Marine Environment Protection Committee (MEPC) recognized the importance of increased marine pollution caused by sunken containers. With technological advances, there are indeed some new tools to be developed to ensure the tracking of containers or at least, provide more details regarding their content. In this respect, in 2017, the start-up "Sea-Track-Box" was launched and aimed at tracking a container that fell in the sea. Also, other instruments have been developed in the last years, notably the ARGOS-type tags that are preventive mechanisms of collision.

Nevertheless, even if the will to secure containerization is primary, the main solution would rather be limiting the exponential growing size of ships that represent the major threat for collision and losses in the sea, but also, and more and more, a factor of pollution regarding the management of their ballast waters.

2. The management of ballast waters originating from container ships

The main problematic around container ships falls within their size: the bigger the vessel is the more resources it would require. The following part will analyze the considerations dealing with the quantity of emissions of a container ship in the air. Still, before tackling this issue, one must firstly consider the concern dealing with material discharges of a container ship and in particular, one of the worse sources of pollution that such giants of the sea release are their material discharges, namely their ballast waters.

As a principle, vessels require a precise mechanism to ensure their stability at sea. Prior 1880, it used solid materials (rocks, shovelled sands) that were stocked in the ship's holds to keep them in the holds and, above all, to prevent the boat from capsizing. But from the 20th century,

the global fleet was refitted and were introduced steel-hulled ships. From this moment onwards, solid materials were less used in favor of pumped water (that could be sea water or water from currents). The water was turned into a material to balance the boat. In fact, the <u>International Conference on Ballast Water Management</u> for ships, ruled out in 2004¹⁵⁵, defined such resource as "water with its suspended matter taken on board a ship to control trim, list, draught, stability or stresses of the ship".

Naturally, if the global shipping fleet increases and gets bigger, the use of water also arises. To illustrate this point, in 2004, the International Maritime Organization (IMO) evaluated that, that year, around 10 billion cubic meters of water were transported by 45,000 ships in the context of global trade¹⁵⁶. In reality, the quantity used clearly depends on the vessel's load. As a result, the introduction of more and more container ships is putting pressure on the quantity of water transported on the seas; consequently, globalization is again a serious contribution to environment management.

But this wouldn't be problematic if the waters were kept in the ships. Still, the mechanism is the following one: the ship pumps the water from seas or water current in its holds – "to maintain safe operating conditions throughout the voyage" ¹⁵⁷ -. Yet, water could be mixed with substances or fuels; to quote the OCDE, "the water discharged is generally a contaminated substance, polluted by hydrocarbons and possibly by other waste present in the ballast tanks" ¹⁵⁸. This is an important challenge for tankers transporting fuels or oil substances when it is a matter of "operational pollution"; the water carried in the bilged of oil tankers is contaminated by fuels leaking from tanks during cargo operations.

Additionally, one topical concern is that water is also hosting a multitude of bacteria's, microbes, small invertebrates, eggs, cysts, larvae... etc. This ecosystem proliferates and reproduces itself in the boat's hold. Again, the quantity of water depends on the quantity loaded on the ship. Therefore, when the ship transports goods to another port, it releases the cargo as well as a quantity of water in order to stabilize the ship. Thus, the quantity of goods is reloaded, and another phenomenon of pumping water is reiterated. Still, this practice also concedes a mix of different waters. Eventually, the concentration of water that has been transported and

 $^{^{155}}$ International Conference on ballast water management for ships, 2004, See in particular, Article 1 for the definition of « Ballast Water »

¹⁵⁶ Xavier TARABEUX, « Une politique pénale en faveur des droits de l'environnement en mer méditerranée », Les cahiers de la Justice n°3, 2019

¹⁵⁷ IMO Officila Website, Ballast Water Management

¹⁵⁸ OCDE, « Incidences sur l'environnement du transport de marchandises », 1997

therefore modified is reintroduced in the waters of the port. As a consequence, the release of ballast waters may introduce "non-native organisms" in the port of discharging of the goods that cannot be accommodated to a new ecosystem or even, may become harmful to natural species in the environment¹⁵⁹. Thus, loading and unloading untreated ballast water poses an important threat to the environment as well as to public health or even the economy, "as ships become a vector for the transfer and spread of threatening aquatic invasive species from one part of the world to another". 160.

This point can be illustrated by the example of Zebra mussels, originating from the Black Sea that were introduced, further on, in the waters of Canada and US in the lates 1980's. This specie is particularly known for removing plankton – "foundation" of many food chains – but also by filtering water so much it allows sunlight to penetrate and warm up the water which consequently, "leads to an increase of aquatic vegetation and algal growth" 161. Eventually, the inclusion of such a new specie affected the ecosystem and lead a huge financial program of treating waters amounting to more than \$25,000 in 2021 only for the Massawippi Lake.

Alongside, one should also point out to the transfer of phytoplankton which, at the end, causes harmful algae blooms and significantly affects the ecosystems due to its toxicity that directly affects the species that were initially living in the waters. All in all, the concentration of such component triggers skin allergies, respiratory or even digestive disorders which, directly impacts human health. In this context, the shipping activity directly affects the environment and potentially affects the sustainability of a healthy living environment. At this point, regarding the definition of sustainable development, one could indeed highlight that such activities interrupt the well-being continuity of future generations. The introduction of new algae had indeed created new perturbations notably clogging water intakes and pipes at power stations 162.

Such damage represents an ecologic cost for the invaded environment but is also an economic charge. As an illustration, for the concentration of zebra mussels, the monitoring and control of

¹⁵⁹ US Dipartment of Agriculture, National Invasive Species Information Center, Ballast Water

¹⁶⁰ Clear Seas Blog – Official website

¹⁶¹ Nature Conservancy Canada, Invasive species, Zebra mussel

¹⁶² Clear Seas Blog – Official website

such species had arisen to a cost of around \$30 billion in the Great Lakes in the 1990's. Likewise, the economic losses of US and Canada were estimated up to \$5 billion¹⁶³.

Even if container ships were at the time, fewer and smaller, the 1973 MARPOL Convention, Resolution 18, recognized the potential for ballast waters discharges to cause harms, few steps were taken in this perspective. Moreover, the 1991 "International Guidelines for preventing the introduction of unwanted aquatic organisms and pathogens from ships' ballast water and sediment discharges" adopted by the Marine Environment Protection Committee (MEPC) already set the tone. The instrument recommended in vain "that Member States apply appropriate provisions of the Guidelines to minimize the probability that ballast water and sediment will contain unwanted aquatic organisms and pathogens and as guidance in the development of a long-term solution to the problem of the discharge of ballast water and sediment leading to the unplanned and unwanted introductions of non-native plants, animals and pathogens that are known to have caused injury to public health and property and to the environment" 164.

In 1992, the <u>Rio Declaration</u> recognized of "major international concern" ballast water discharges. Nevertheless, what is the relevance of these statements when the world merchant fleet has only multiplied and expanded?

A step forward was taken in 2004 when the IMO adopted the <u>Ballast Water Management</u> <u>Convention</u>¹⁶⁵ (BWM convention). At the time, a definition of ballast water management is depicted as being "Any mechanical, physical, chemical and biological processes, either singularly or in combination, to remove, render, harmless or avoid the uptake or discharge of Harmful Aquatic Organisms and Pathogens within Ballast Water and Sediments" From this moment onwards, the ballast water treatment was monitored. Firstly, the convention laid down three rules to be respected by its member states, in particular the requisite for all ships to have a Ballast Water Management Plan approved by the Administration, the necessity to get a ballast

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¹⁶³ Ceren BILGIN GÜNEY, « *Ballast water problem: Current status and expected challenges* », Istanbul Technical University review Article, 2022

¹⁶⁴ Resolution MEPC « Revision of the list of substances to be annexed to the protocol relating to intervention on the high seas in cases of marine pollution by substances other than oil », 1991

¹⁶⁵ IMO, « International Convention for the control and management of ships' ballast water and sediments », 2004

¹⁶⁶ Ceren BILGIN GÜNEY, « Ballast water problem: Current status and expected challenges », Istanbul Technical University review Article, 2022

water book record and eventually, the fulfillment of ballast water management requirements for ships.

This latest point is further developed by the convention that draws up to methods that were introduced, respectively in 2004 and in 2017. The initial management mechanism is entitled "Ballast Water Exchange Standard – D-1". In this situation, the ships are required to exchange their coastal ballast waters with open seawaters if only conducted 200 nautical miles from the nearest land and only in waters with a depth of at least 200m. The convention furthers details this first mechanism by depicting three acceptable ballast water exchange methods, the sequential method (empties the coastal water in the ballast tanks in the open sea and fills the tanks with open seawater again, which contributes in an exchange of 95% of ballast water contained), the flow-through method (aiming at overflowing the ballast water from the ballast tanks from the overflow outlets on the deck or by using different devices) and finally, the dilution method according to which, it discharges the same amount of water from the bottom at the same rate as the water is taken from the top.

On another hand, the IMO developed in 2017 another management mechanism which aims at specifying the maximum number of viable organisms and settle harmful microbes' indicators, harmful to human health that are allowed to be discharged. All in all, the IMO precised its framework, in particular in 2016 with the adoption of "Guidelines for Approval of Ballast Water Management Systems" (regarding the requirements for the approval test; regarding the changes of temperature, ...etc.). Still, even if this instrument is rather complete, it is however inefficient. In fact, the convention solely entered into force in 2017, more than ten years after its adoption and in 2010, the IMO declared that only 22 countries were member states, accounting therefore for 22,6% of world merchant ship tonnage. Nevertheless, though the convention is more a technical tool than a practical one, it is noteworthy to highlight all measures adopted in order to minimize the damage arising to ballast water mistreatment.

In effective, the treatment of ballast water is still a costly and long proceeding to maintain sustainable features. However, there are, in theory, mainly two proceedings adopted directed toward the treatment of the water. On a first stage, the particles and organisms present in the ballast water are removed from the ballast water under mechanical methods. Then, occurs the treatment stage according to which, different methods are employed at the same time ensuring the water is the clearest possible. One of the first tool to be used are filters – clogging problems

are in fact avoided with a system of backwashing and the cleaning of filters-. Also, physical treatment methods are progressively set up to raise the temperature of the ballast water which effectively wipes out any form of survival of present bacteria. Nonetheless, several physic mechanisms exist with a view to reduce the proliferation of organisms in the waters – ultrasound technologies, electrochemical systems, etc.-. The latest solution – and the most used - developed by physicians are UV radiations according to which the treatment disrupts all chemical bonds in DNA and RNA.

Though, all these alternatives have a cost and are time consuming. The only response to ballast water management would be to get back to old practices and use solid materials. Otherwise, naturally, the optimum would be the reduction of freight maritime transportation that would indeed slow down considerably the use of any kind of resource to this end. In this perspective, it is essential to consider that if physical discharges contribute to the damage of environment, the atmospheric releases are the other side of the same coin and are proliferate with the evolution of maritime transportation.

B) The invisible pollution issued from shipping: an ongoing challenge

1. The multiple risks of atmospheric emissions from maritime transport of goods

"In the collective unconscious, maritime pollution is the one visible, which soils beach and kills seabirds" 167. One could expect that the worse source of pollution is the physical one. To draw an overview of all maritime transportation of goods consequences on environment, one must eventually target all atmospheric discharges, generally conceived as the "invisible pollution". Pollution was already defined previously and, indeed, atmospheric discharges are in line with such principle ("direct or indirect alteration of the biological, thermal, physical properties as to create a hazard to human health or welfare of any living species"). Now, the issue of invisible pollution is relatively linked. This latest concept is particularly defined as "the introduction into the atmosphere of chemicals, particulates or biological materials that cause discomfort, disease or death to humans, damage and other living organisms such as food crops, or damage the

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 $^{^{167}}$ Laurent FEDI, « Le transport maritime international face à la pollution atmosphérique : enjeux stratégiques du $21^{\rm ème}$ siècle », DMF, 2012

natural environment or built environment"¹⁶⁸. More precisely, air pollutants are substances contained in the air that are harmful for humans and the environment. Nowadays, those elements constitute a primary source of pollution that is being monitored and developed in a tendency of preserving the air quality.

Air pollution is classified into "anthropogenic" and "non-anthropogenic" origins, the latest, including natural events and therefore, circumventing the human conduct. Nevertheless, manmade pollution is the most frequent and the oldest one as in fact, natural pollution without human intervention only appeared as a result of human conducts; "as human populations became settled and increasingly burned biomass and fossil fuels indoors, the exposure to air pollution and its negative consequences rose significantly" 169. What is more, pollutants can be divided into two categories, primary pollutants ("directly emitted from a process, such as carbon monoxide gas from a motor vehicle or sulfur dioxide released from industrial processes"170) and secondary pollutants ("ozone and particulate matter that are not emitted directly but formed in the air when primary pollutants react or interact", 171). Eventually, air pollution has both a direct and indirect impact. Concerning the environment, indirect impact is the most harmful as it results in the effect of pollutants in the air. Still, air pollution has already been regulated; several tools monitor atmospheric emissions in order to provide a safe environment. A safe environment gathers several elements, not only tackling ecosystems; indeed, referring to the definition given by the Brundtland Report, it aims at protecting present and future generations, which, also embraces the importance of wellbeing.

In reference to the <u>UN Program on Environment</u>, a solid system of governance of air quality is a system that "requires governments to establish and regularly review applicable air quality standards, taking into account public health objectives; determines institutional responsibility for these standards; monitors compliance with air quality standards; defines the consequences of non-compliance with these standards; ensures the implementation of air quality standards through the adoption of appropriate and coordinated air quality plans, regulatory measures and the deployment of administrative capacity"¹⁷². There are in fact, only a few international tools to regulate air pollution.

¹⁶⁸ Mahendra PRATAP CHOUDHARY, « Causes, Consequences and Control or Air Pollution », 2013

¹⁶⁹ Guy HUTTON, « *Assessment paper Air Pollution* », Copenhagen Consensus on Human Challenges, 2011 ¹⁷⁰ *Ibid*.

¹⁷¹ *Ibid*.

¹⁷² UN Program for the environment, Série sur la pollution de l'air, « Règlementation de la qualité de l'air »

One could point out to the <u>UN Convention for Climate Change</u>¹⁷³, 1992 ("human activities have been substantially increasing the atmospheric concentrations of greenhouse gases, that these increases enhance the natural greenhouse effect, and that this will result on average in an additional warming of the Earth's surface and atmosphere and may adversely affect natural ecosystems and humankind"), the <u>Goteborg Protocol of 1999</u>¹⁷⁴, the <u>Stockholm Convention on Persistent Organic Pollutants of 2001</u>¹⁷⁵, or even the <u>Vienna Convention on Protection of Ozone Layer of 2019</u>¹⁷⁶.

European Regulation in this area is rather dense as the European Parliament has considerably acted in this sense. The <u>Directive 2004/107</u> Relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air¹⁷⁷ is one of the most important in this field as long as is sets targets values for Member States. Such instrument is complemented, later on, by Directive 2008/50 On ambient air quality and cleaner air for Europe¹⁷⁸. More precisely, the EU has started legislating in reference to marine fuels. On this point, the <u>Directive 2005/33 of July 2005¹⁷⁹ regarding marine Sulphur content on marine fuels</u>, that amended Directive 1999/32 particularly tackled the issue of air pollution from marine transportation of goods. This amendment followed the 2001 Directive on National Emissions Ceiling for certain atmospheric pollutants, directly proposing a plan of action for maritime traffic.

Still, the overall picture of national legislation on air quality is "heterogeneous" (different cultures, different sources of obligations, etc.). Nevertheless, the legal framework monitoring this issue is mainly handled by the World Health Organization, meaning by consequent, that air pollution is rather tackled under the necessity to guarantee safe conditions of life rather than preserving the environment (sustainable development from an ecocentric perspective seems to be secondary – "air quality levels to protect the health of populations, by reducing levels of key air pollutants, some of which also contribute to climate change" (181)). Additionally, the European

¹⁷³ United Nations, Framework Convention on Climate Change, 1992

¹⁷⁴ Protocol to abate acidification, eutrophication and ground-level ozone (Gothenburg Protocol), 1999

¹⁷⁵ Stockholm convention on persistent organic pollutants, 2001

¹⁷⁶ Vienna Convention on Protection of Ozone Laver, 2019

¹⁷⁷ EU Directive 2004/107 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air, December 2004

¹⁷⁸ EU Directive 2008/50 on ambient air quality and cleaner air for Europe, May 2008

¹⁷⁹ EU Directive 2005/33 amending Directive 1999/32/EC as regards the sulphur content on marine fuels

¹⁸⁰ UN Program for the environment, Série sur la pollution de l'air, « Règlementation de la qualité de l'air »

¹⁸¹ WHO official website, « New WHO Global Air Quality Guidelines aim to save millions of lives from air pollution », 2021

and national legislation, eventually, are in line with the WHO guidelines and in 2011, the European Commission proposed the inclusion of IMO Sulphur standards into EU legislation¹⁸².

That being said, the issue of air pollution is particularly at stake when dealing with transportations and the challenge for maritime transportation is to operate a shift in the consumption of its fuel that contributes to atmospheric discharges. Almost all vessels transporting goods worldwide are powered by combustion engines that, by consequent, emit pollutants into air. Today, 80% of global merchant fleet uses "bunker" as fuel¹⁸³ (fuel derived from petroleum, consequently being a fossil fuel). Those bunkers represent more than 70% of fuel used for maritime transportation¹⁸⁴ and this sustenance is explained by the facility of using such a substance – among others, the absence of taxation, economic benefits and eventually, the availability at all ports -.

Nevertheless, the consumption of such a substance is drastically harmful for the environment and particularly for ecosystems. The use of bunker contains 3,5% of Sulphur and its combustion releases enormous quantities of pollutants in the air – mainly Sulphur oxides (SOx) and nitrogen oxides (NOx)¹⁸⁵. Finally, those substances lead to the production of greenhouse effects a consequence, it leads to a sort of "trapping heat" effect¹⁸⁶. As the gases are retained on the surface of the planet, it contributes to the warming of the surface of the Earth and also leads to weather phenomenon unprecedented which, eventually, contribute to the rise of seas levels but also to a shift of wildlife habitats. What is more, those pollutants also contribute to the acidification of rains or even to the phenomenon of eutrophication¹⁸⁷ (according to which, the oxygen reduces in inner water and disadvantages natural species).

Naturally, compared with other means of transport, maritime transportation of goods is relatively environmentally friendly for its atmospheric discharges – *shipping goods emits an average of three grams of CO2 per tonne-kilometre, 10 times less than river transport and 30*

¹⁸² AirClim Seas At Risk, Bellona Foundation, North Sea Foundation, Transport & Environment European Environmental Bureau, « *Air Pollution from air ship* », 2011

¹⁸³ Mathieu VIDARD, « La Terre au carré », France Inter, 2022

 ¹⁸⁴ Surfrider Fondation Europe « Les scrubbers, moins de rejets atmosphériques pour plus de rejets en mer », 2020
 ¹⁸⁵ Joël MARTINE, « Fin du fioul lourd sur les navires marchands et de croisière ? Une pollution peut en cacher une autre », 2020

¹⁸⁶ Christina NUNEZ, National Geographic, « Carbon dioxide levels are at a record high. Here's what you need to know », 2019

¹⁸⁷ Elodie SANTELLI, « *La prévention de la pollution atmosphérique par les navires* », Université Aix-Marseille, 2010

times less than road transport¹⁸⁸-. Nevertheless, as this phenomenon occurs when the boat is moving as well as when it is docked¹⁸⁹, those emissions particularly harm the ecosystems. In addition, this situation is particularly exacerbated by the operation of container ships which consume indeed, much more fuels. To quote the Swiss newspaper "Le Temps", "Heavy fuel oil is the impure blood of globalization; A very large container ship burns between 140 and 300 tones a day, in engines as tall as buildings. A smaller merchant ship burns between 25 and 65 tones" 190. In fact, shipping containers produce even more GHGs than some small countries. According to the IMO, maritime transportation accounts for almost 3% of global GHGs which represents indeed, three times France's annual emissions 191 or Germany 192. Air pollution is indeed a grave challenge for sustainable development philosophy.

Beyond a purely environmental issue, one must also highlight the philanthropic perspective. In Europe, around 50 000 people die every year due to maritime transportation atmospheric pollution. Some 40% of EU's population lives within 50km from seacoasts which, by consequent, arises the risk of atmospheric pollution for such communities¹⁹³. In fact, such substances are converted into "very small airborne particles linked to premature deaths"¹⁹⁴. It gets into the lungs circulate through tissues and enter the blood. Eventually, such proceeding can motivate inflammations leading to heart diseases and lung complications.

All in all, the main problematic is the future perspective that is actually depicted: the IMO prospects a growth of 50% to 250% by 2050 where the carbon footprint could reach 17% of CO2 global emissions in 2050. Above all, maritime transportation is the transport sector that acknowledges the biggest rise of emissions "due to the exponential growth of maritime exchanges" and the globalization explosion.

¹⁸⁸ French Ministry for Ecologic Transition, «Les coûts environnementaux du transport maritime de marchandises_», 2022

¹⁸⁹ OCDE, «Les incidences sur l'environnement du transport de marchandises_», 1997

¹⁹⁰ Sylvain BESSON, César GREPPIN, Le Temps, « Fioul lourd, le sang impur de la mondialisation », 2016

¹⁹¹ Isabelle AUTISSIER, « Faire évoluer les règles du maritime en fonction de son impact sur l'environnement », Revue juridique de l'environnement vol. 44, 2019

¹⁹² Antoine FRÉMONT, « Le conteneur : de la révolution à la dépendance », Administration n°275, 2022

¹⁹³ European Maritime Safety Agency (EMSA), « European Maritime Transport Environmental Report 2021 », 2021

¹⁹⁴ AirClim Seas At Risk, Bellona Foundation, North Sea Foundation, Transport & Environment European Environmental Bureau, « *Air Pollution from air ship* », 2011

¹⁹⁵ Marjorie DOUDKINOFF, « Réduire les émissions du transport maritime : les politiques publiques et leurs impacts sur les stratégies des compagnies maritimes de lignes régulières », Université Paris-Est, 2015

In this tendency, the <u>Kyoto Protocol</u>¹⁹⁶ committed industrial countries to limit and reduce their GHGs emissions according to individual targets. Those latest refer to gases of natural or anthropogenic origin that absorb and release part of solar rays, leading to the greenhouse gas effect¹⁹⁷, therefore, contributing to the warming of Earth's surface. Though there are among seven more influential, carbon dioxide (CO2) is the most targeted gas by the Kyoto Protocol, and the substance to monitor the most.

Yet, maritime transportation is left to a contrasting situation as long as it represents one of the best alternatives regarding GHGs (low emissions) but not regarding air pollutants. One distinction must be drawn between GHGs emissions - being a range of seven gases that contribute to climate change - and air pollutants – covering around seven substances that can be harmful for human, environment, and biodiversity - that, in fact, directly affect ecosystems and individuals nearby¹⁹⁸. All things considered, both emissions eventually affect environment and individuals living in it.

The maritime transportation of goods has particularly increased its emissions for a decade. While CO2 emissions didn't overpass more than 300 Mt in the late 1970's, it particularly bloomed in the 1990's, reaching 500 Mt in 2001, more than 650 Mt in 2011 and overpassing 700 Mt in 2019¹⁹⁹, representing therefore, more than 3,3% of total global man-made emissions²⁰⁰. Eventually, to quote Stefan Gössling, « even though shipping makes only a small contribution to global warming, the sector's expected growth will challenge a global economy seeking to decarbonize by mid-century »²⁰¹.

¹⁹⁶ United Nations, « Kyoto Protocol to the United Nations framework convention on climate change », 1997

¹⁹⁷ Institut National de la Statistique et des études économiques (INSEE), Greenhouse Gas Emissions

¹⁹⁸ EUROStat official website, « Emissions of Greenhouse gases and Air pollutants »

¹⁹⁹ Stefan GOSSLING, « A global review of marine air pollution policies, their scope and effectiveness », Ocean and Coastal Management, 2021

²⁰⁰ AirClim Seas At Risk, Bellona Foundation, North Sea Foundation, Transport & Environment European Environmental Bureau, « *Air Pollution from air ship* », 2011

 $^{^{201}}$ Stefan GOSSLING, « A global review of marine air pollution policies, their scope and effectiveness », Ocean and Coastal Management, 2021

2. The stringent regulatory framework: towards new perspectives

"Over the last 3 decades, activity in the marine shipping sector as measured in metric tonkm has grown on average by 5% every year" facing this urgency, serious new steps were taken for protecting the environment as well as new instruments. International tools have more and more considered the issue of air pollution from ships from 2005 onwards as the MARPOL Convention, that had been ratified in 1973, was amended, and Annex VI was further on adopted. This latest provision, entitled "Prevention of air pollution from ships" sets limits on Sulphur oxide and nitrogen emissions from ships exhausts and prohibits deliberate emissions of ozone. Being inspired by the different rules that the US adopted in this context, for the first time, the convention monitored air pollution from ships.

As a reminder, said convention was concentrated on covering protection of operational or accidental pollution of the marine environment with ships. Still, prior to 2005, the Convention circumvented atmospheric releases; thus, transparent pollution was not taken into account at the international level. In fact, the instrument regulated phenomenon of pollution from oil, by Nowious Liquid Substances in Bulk²⁰³, by harmful substances carried by sea, etc. Precisely, this reform aims at « *limiting NOx emissions from marine diesel engines with a power output of more than 130 kW and limiting the sulfur content of marine fuels* »²⁰⁴.

In 2011, the same perspective flourished with the adoption by the IMO of the Energy Efficiency Design Index (EEDI)²⁰⁵ for new ships that is used to calculate a vessel's energy efficiency. This process takes into consideration the ship's emissions, capacity as well as its speed; « *The lower a ship's EEDI, the more energy-efficient it is and the lower its negative impact on the environment* »²⁰⁶. In fine, it estimated grams of CO2 per transport work leading to a form of ratio where « *environmental cost* » is divided by « *benefit for society* »²⁰⁷. In fine, the aim consists in reducing CO2 emissions. This instrument was not left alone as in 2016, further measures were adopted, and particularly the IMO Data Collection System was released.

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²⁰² International Council on Clean Transportation (ICCT), « Air pollution and GHG emissions from Ocean-Going ships », 2007

²⁰³ IMO, UN World Maritime Day 28th september, « 2023 Theme MARPOL at 50 »

²⁰⁴ United States Environmnetal protection Agency, « Marpol Annex VI and the Act to Prevent Pollution from ships (APPS) », 2022

²⁰⁵ Marine Digital official website, « IMO Infographic : 10 years of action on GHG emissions from shipping »

²⁰⁶ MAN officiel website, « Energy Solutions – Future in the making »

²⁰⁷ Indian register of Shipping (IRCLASS), « Implementing Energy Efficiency Design Index (EEDI) »

According to this latest tool, ships were constraint to collect and report fuel oil consumption data from ships over 5,000 gt.

Though the monitoring of air pollutants from ships seems to be progressively controlled, the Zones Emission Control Areas (ZECA) were consecrated, underlining therefore the eminence of this issue. Such proceedings were provided by the MARPOL Convention and constrained all vessels circulating in such zones to use cleaner fuels, with less concentration of Sulphur and to get equipped with motors with less ozone emissions²⁰⁸. Such spaces were decided by member states of the IMO that must provide a form of impact assessment and determine whether or not, the zone must be controlled. In fact, there are currently four Zones ECA implemented worldwide - Canada, US of America, North Sea and Baltik Sea -. Besides, in 2022, the trend went further. Following the COP 22, the 78th Assembly approved the implementation of Sulphur Emission Control Areas (SECAs) for the Mediterranean Sea. This decision strengthened the will of protecting the « mare nostrum » alongside with the multiple regional regimes set up to protect this environment. Particularly, this ruling aims at limiting vessels that enter the Mediterranean Sea by constraining them to use fuel with a Sulphur content lower than 0.1% by mass, «Five times less polluting than the international standard in non-SECA areas »²⁰⁹. On the one hand, it is a step forward for the control of a fragile maritime space; on the other, it is also the strengthening of an already stringent regulation that is getting more usual.

In this mindset, it is important to highlight the amendments realized on the MARPOL Convention in 2020 so as to establish the « *IMO Objectives for 2020* ». In practice, this revision works towards the obligation to limit to 0,5% the concentration of Sulphur fuel-oil used by vessels when not comprised in Zone ECA. According to the organization, such reform would ensure a better air quality, provide positive impacts on human health, guarantee better quality fuels, compel refinery owners and operators to get aligned with new regulations and eventually, would force authorities to change their policies²¹⁰.

From an international perspective, the IMO is active in order to guarantee a better protection and monitoring of air pollution from maritime transportation. Nevertheless, as already

²⁰⁸ French Ministry for Ecologic Transition, Ville de Marseille, « *Qu'est-ce qu'une zone de règlementation des émissions de polluants (ECA)*? »

²⁰⁹ « Dictionnaire Permanent – Environnement et nuisances ; Pollution Océanique » (collective), Edition Legis, 2010

²¹⁰ OMI official website, « Objectif de 2020 de l'OMI : réduction des émissions d'oxyde de soufre des navires », 2020

mentioned previously, the European Union is also a pioneer actor in the fight against air pollution and the preservation of sustainable development standards.

One of the greatest tracks occurred in 2019 when the European Commission released the European Green Deal, "a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy, where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use"²¹¹. This policy is therefore an objective for integrating in the European legislation United Nation's 2030 Agenda²¹² and the Sustainable Development Goals (SDGs) – among the seventeen goals fixed is provided the conservation and sustainable use of oceans, seas and marine resources for sustainable development; of taking urgent actions to combat climate change and its impact -.

Alongside this approach, in July 2021, the European institutions adopted the Fit for 55 package; namely, a set of proposals to revise and update the European Union's legislation that would contribute to the « greening of the maritime transportation » and, in effective, that are « designed to realize the European Climate Law objectives : climate neutrality by 2050 and a 55 % reduction of net greenhouse gas (GHG) emissions by 2030, compared with 1990 levels » 213. All in all, this initiative was aiming at supporting the decarbonization of the maritime and shipping sector along with « the adaptation and innovation of ports » 214. The first step of such « emission reduction journey » 215 is achieving a 55% reduction in emissions compared to 1990 levels in 2030.

This project concentrates several issues, the main measures include particularly the expansion of the Emission Trading Scheme (ETS), the Cap-and-Trade system in order to include, in particular, shipping, the settlement of a Carbon Border Adjustment Mechanism (CBAM) (taxing imports according to their carbon footprint) and eventually, the creation of a Climate Social Action Fund to support those most affected by the ecological transition. Among those proposals that were made, maritime transportation is highlighted. In fact, the package tackled

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²¹¹ European Commission, Communication from the Commission to the European Parliament, « *The European Green Deal* ». December 2019

²¹² United Nations, « Transforming our world: Agenda 2030 for sustainable development », 2015

²¹³ European Parliament Official Website, Briefing towards climate neutrality, « Fit for 55 package », 2022

²¹⁴ European Parliament official Website, Legislative Train Schedule, « Fuel EU Maritime – Sustainable Maritime fuels ». 2023

²¹⁵ Marc IBANEZ DIAZ, « Fit for 55: dead on the debate floor », CIBOD, 2021

the Alternative fuels infrastructure regulation, the Energy Taxation Directive, the Effort-Sharing directive as well as the Fuel EU Maritime.

In fact, the Fuel EU Maritime is especially relevant as it was settled on the same day. Indeed, this measure « *introduced stringent limits on carbon intensity of the energy used by vessels from 2025, which should oblige them to use alternative fuels* ». This new framework applies to commercial vessels of at least 5 000 gross tones, notwithstanding their flag (fishing ships are exempted) and covers all energy used on board when the ship is at an EU port and on voyage between EU ports, and 50% of the energy used on voyages departing from or arriving to an EU port²¹⁶. Nevertheless, this agreement also projects the emission system to 2030. At this point, the instrument provides that from 2030, container and passenger ships at EU ports, will have to connect to onshore power supply (OPS) and use it for all energy needs.

There are, at this stage, many perspectives for future management of atmospheric pollution at the European level. In fact, the Plan for the Mediterranean Sea has particularly emphasized this trend. Despite clear guidelines, technical perspectives are also particularly innovative. One main advance may be depicted: the settlement of "scrubbers" (Exhaust Gas Cleaning System – EGCS). This technology, regulated by the IMO, are used to remove harmful elements from exhausted gas. On the one hand, such instrument reduced to content of Sulphur up to 3,5%. Still, on the other hand, scrubbers can work under an opened-up system or a closed one. Yet, opened-up scrubber's systems threaten marine life by contributing to the acidification of waters. In fact, the 2020 Global Sulphur Cap was set up prohibiting discharges from opened-up scrubbers' technologies. Still, though technologies are providing response for monitoring pollutant discharges, it seems to be at the expense of other properties.

At this stage, one could point out whether such guidelines are enough? are those objectives achievable? What can be remarked yet is that the framework for maritime transportation of goods has turned from a "reactive" perspective to a "preventive" figure. Nevertheless, is the short-term fixing solution the greatest response?

All in all, the expansion inter-continental trade and therefore, the rise of maritime transportation of goods is considered as a difficulty.

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 $^{^{216}}$ European Parliament official Website, Legislative Train Schedule, « Fuel EU Maritime – Sustainable Maritime fuels », 2023

Still, one could also consider it as a vector for change. The next years will be indispensable for making a transition and changing the codes but, more precisely, raising awareness of current consumption patterns which constitute the origin of all obstacles.

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