EUROPEAN
COMMISSION

Brussels, 14.7.2021
COM(2021) 562 final

2021/0210 (COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the use of renewable and low-carbon fuels in maritime transport and amending Directive 2009/16/EC

(Text with EEA relevance)

{SEC(2021) 562 final} - {SWD(2021) 635 final} - {SWD(2021) 636 final}

EXPLANATORY MEMORANDUM

1. CONTEXT OF THE PROPOSAL

• Reasons for and objectives of the proposal

By contributing to around 75% of EU external trade volumes and 31% of EU internal trade volumes, maritime transport is an essential component of Europe's transport system and plays a critical role for the European economy. Every year, around 400 million passengers embark or disembark in EU ports, including around 14 million on cruise ships. Maritime transport fulfils an important role in safeguarding the connectivity of islands and peripheral maritime regions with the rest of the single market[1]. Efficient maritime transport connections are essential to the mobility of EU citizens, in developing EU regions and to the EU economy as a whole.

The maritime transport sector operates in an environment of open markets and international competition. Maritime transport services within the EU are open to all EU shipowners, maritime transport services between EU Member States, and between EU Member States and third countries (non-EU countries), can be provided by operators of all nationalities. A level playing field for ship operators and shipping companies is critical to a well-functioning EU market for maritime transport.

In September 2020, the Commission adopted a proposal to cut greenhouse gas emissions by at least 55% by 2030[2] and put the EU on a responsible path to becoming climate neutral by 2050. To achieve climate neutrality, a 90% reduction in transport emissions is needed by 2050. All transport modes, including maritime transport, will have to contribute to the reduction efforts.

Achieving significant reductions in CO_2 emissions of international maritime transport requires using both less energy (increasing energy efficiency) and cleaner types of energy (using renewable and low-carbon fuels). The Communication on the 2030 Climate Target Plan[3] explains that: *"Both the aviation and maritime sectors will need to scale up efforts to improve the efficiency of aircraft, ships and their operations and to increase the use of sustainably produced renewable and low-carbon fuels. This will be assessed in greater detail in the context of the ReFuelEU Aviation and FuelEU Maritime initiatives that aim to increase the production and the uptake of sustainable alternative fuels for these sectors. The necessary technology development and deployment has to happen already by 2030 to prepare for much more rapid change thereafter."*

Depending on the policy scenarios assessed in the framework of the 2030 Climate Target Plan (CTP) and in support of the Sustainable and Smart Mobility Strategy, renewable and low-carbon fuels should represent between 6% and 9% of the international maritime transport fuel mix in 2030 and between 86% and 88% by 2050 to contribute to the EU economy-wide GHG emissions reduction targets[4].

---

1 EU Transport in figures, the statistical pocketbook 2020, https://ec.europa.eu/transport/media/media-corner/publications_en

2 COM(2020) 563 final

3 COM(2020) 562 final

4 The scenario assessing a combination of carbon pricing and regulatory measures (so-called MIX) projects a share of 7.5% for 2030 and 86% by 2050.

The CTP notes that the renewables share in the transport sector has to increase through the development of electrification, advanced biofuels and other renewable and low carbon fuels as part of a holistic and integrated approach, and that hydrogen based synthetic fuels will be crucial for the decarbonisation in particular in the aviation and maritime sector.

The push for the maritime transport sector to use cleaner fuels is also present at international level. In 2018, the International Maritime Organisation (IMO) has adopted its initial strategy on the reduction of GHG emissions from ships. In the list of identified candidate short-term measures, the IMO includes promoting the uptake of alternative low-carbon and zero-carbon fuels and providing shore-side electricity.

Currently, the fuel mix in the maritime sector relies entirely on fossil fuels. This can be explained by insufficient incentives for operators to cut emissions and by the lack of mature, affordable, and globally utilisable technological alternatives to fossil fuels in the sector. A number of market failures partly cause and reinforce these problems. These include:

– interdependencies between supply, distribution and demand of fuels;

– lack of information on future regulatory requirements;

– long life span of assets (vessels and bunkering infrastructure).

The FuelEU Maritime initiative proposes a common EU regulatory framework to increase the share of renewable and low-carbon fuels in the fuel mix of international maritime transport without creating barriers to the single market.

Considerations on possible obstacles to the single market, distortion of competition between operators and diversion of trade routes are particularly relevant to fuel requirements, since fuel costs make up a substantial share of ship operators' costs. The proportion of fuel costs in the operating costs of ships can range from around 35% of the freight rate of a small tanker to around 53% for container/bulk vessels. Therefore, variations in marine fuel prices may impact significantly the economic performance of ship operators.

At the same time, the price differential between conventional marine fuels of fossil origin and renewable low-carbon fuels remains high. To maintain competitiveness while still steering the sector towards the fuel transition that it must inevitably undertake, clear and uniform obligations are needed on ships' use of renewable low-carbon fuels.

An increased predictability of the regulatory framework is expected to stimulate technology development and fuel production and help the sector unlock the existing chicken-and-egg situation between demand and supply of renewable and low-carbon fuels. Clear and uniform obligations on ship's use of energy is necessary to mitigate the risk of carbon leakage, which maritime transport is prone to due to its international nature and the possibility to bunker fuel outside the EU. Owing to the cross-border and global dimension of maritime transport, a common maritime Regulation is preferred, over a legal framework requiring EU Member States to turn EU legislation into national law. The latter could result in a patchwork of national measures with differing requirements and targets.

• **Consistency with existing policy provisions in the policy area**

The FuelEU Maritime is part of the 'basket of measures' designed to address emissions from maritime transport while maintaining a level playing field. It is fully consistent with other measures presented as part of the 'Fit for 55' package and builds on existing policy tools such

as Regulation (EU) 2015/757 of the European Parliament and of the Council[5], which establishes an EU system to monitor, report and verify (MRV) CO_2 emissions and other relevant information from large ships using EU ports.

A basket of measures is considered necessary to address various and distinct market failures hindering the deployment of mitigation actions in the maritime sector. Beside the FuelEU Maritime initiative that aims at increasing the demand for renewable and low-carbon fuels (RLF), the Commission proposes to extend the European Emissions Trading System (ETS)[6] to the maritime sector and to review the Energy Taxation Directive (ETD)[7]. These two initiatives should ensure cost-effective emission reductions in the sector and that the price of transport reflects the impact it has on the environment, health and energy security.

In addition, the basket of measures will include the review of several other directives, including:

– the Alternative Fuels Infrastructure Directive (AFID)[8]; and

– the Renewable Energy Directive (RED II)[9].

Next to these revised laws, the Commission will address the need for additional research and innovation (R&I) activities, in particular through the co-programmed Zero Emissions Waterborne Transport partnership proposed by the Waterborne Technology Platform under Horizon Europe[10]. It will also revise the Guidelines on State aid for environmental protection and energy[11] in line with the policy objectives of the European Green Deal, which should allow sufficient funding of the sector's green transformation (including for deployment of on-shore charging infrastructure), while avoiding distortion of competition.

Looking in more detail at the proposed actions, there is currently no mechanism, either at the IMO level or at EU level, to correct for the presence of negative externalities (the indirect costs of emissions that are otherwise not considered) in the sector. This prevents operators from taking into account, in their operational and investment choices, the social cost of their activity in terms of climate change and air pollution. The economic literature indicates pricing mechanisms as the instruments of choice to 'internalise' external costs. The main examples would be a tax fixed at the level of the external cost, or a 'cap and trade' instrument, such as the EU Emission Trading System (ETS), that sets a limit to the overall emissions and lets the market determine their appropriate price. Both are described as 'market-based measures'.

However, while emissions trading can achieve GHG emissions reductions cost- effectively and provides a uniform price signal that influences decisions of operators, investors and consumers, it does not sufficiently address all barriers to the deployment of low and zero-emissions solutions.

Additional policy actions are needed to ensure that the level playing field in maintained while removing obstacles to investments in clean energy technologies and infrastructure, in turn reducing abatement costs and complementing the action of the EU ETS. This is particularly

---

5 Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC (OJ L 123, 19.5.2015, p. 55).

6 Directive 2003/87/EC

7 Council Directive 2003/96/EC

8 Directive 2014/94/EU

9 Directive (EU) 2018/2001

10 https://www.waterborne.eu/

11 Communication from the Commission (2014/C 200/01)

relevant to support mitigation measures – such as the use of RLF in the maritime transport sector – that have a high potential to reduce emissions in the future but which, presently, face high abatement costs as well as specific market barriers.

While extending the EU ETS to the maritime sector will further drive energy efficiency improvements and narrow the price gap between conventional and low-emission technologies, its ability to support the rapid deployment of RLF technologies in the maritime sector strongly depends on its actual price level, which is unlikely to reach sufficient levels for this purpose in the short to medium term.

Similarly, legislation dealing with fuel *supply* (RED II) and *infrastructure* (AFID) has not had a significant impact on the uptake of RLF in the maritime sector and needs to be complemented by measures that are capable of creating a *demand* for RLF. In addition, the review of the RED II would not be able to address the high risk of fuel bunkering outside the EU for the shipping sector.

There is currently no EU regulatory framework specifically addressing the use of RLF in maritime transport. This initiative intends to fill this gap by increasing the demand for RLF in maritime transport while maintaining a level playing field and a well-functioning EU market for marine fuels and maritime transport.

- **Consistency with other Union policies**

This initiative aims at increasing the uptake of RLFs in EU maritime transport while maintaining a level playing field, both at sea and at berth, and contribute to achieving EU and international climate and environmental objectives. Ensuring a more diverse fuel mix and higher penetration of RLFs is critical to ensure the sector's contribution to the European ambition of climate-neutrality by 2050 as laid out in the European Green Deal. At the same time, a differentiated approach to the use of RLFs in navigation and in ports is important to account for different implications on air pollution with more stringent requirements for ships in ports and different availability of technologies (more options for ships in ports).

2. LEGAL BASIS, SUBSIDIARITY AND PROPORTIONALITY

- **Legal basis**

This initiative aims at maintaining high levels of connectivity, and preserving industry competitiveness in the maritime sector while stepping up its sustainability. Article 100(2) of the Treaty on the Functioning of the European Union (TFEU) empowers the Union to lay down appropriate provisions in sea transport.

- **Subsidiarity (for non-exclusive competence)**

Maritime transport is an international sector by nature. In Europe, approximately 75% of the voyages reported under the MRV are within the European Economic Area (EEA) (and could therefore be a proxy for intra-EU traffic) and only around 9% of the traffic is estimated to be domestic voyages (between ports within the same EU Member State). The cross-border dimension of the sector is therefore essential and calls for coordinated action at EU level.

Without action at EU level, a patchwork of regional or national requirements across EU Members States would risk triggering the development of technical solutions that may not necessarily be compatible with each other. Several EU Member States are already developing national maritime strategies that include specific approaches to ship emissions and in

particular the uptake of alternative fuels[12] with possible unintended effects and market distortions. As the problem drivers identified in the context of this proposal do not fundamentally differ from one EU Member State to another, and given the cross-border dimension of sector's activities, these issues can be best addressed at EU level. EU action can also inspire and pave the way to develop future measures accelerating the uptake of alternative fuels at global level[13].

Previous EU action on GHG issues has already stimulated a corresponding response from the IMO, notably the EU adopting the Regulation on Monitoring, Reporting and Verification of GHG emissions from ships led shortly afterwards to the IMO adopting a similar mandatory global GHG Data Collection System. A coordinated approach by EU Member States in responding to developments in GHG emission reduction at IMO has more recently ensured that mandatory operational energy efficiency measures are included within IMO's short term actions to reduce GHG. Projecting a common viewpoint from a considerable group of IMO Member States within the IMO fora means that the EU can have a significant impact on the direction and outcome of IMO discussions.

- **Proportionality**

The implementation of this initiative at the EU level is needed to achieve the economies of scale in the uptake of RLFs in maritime transport as well as avoiding carbon leakage, and ensuring level playing field between operators calling in EU ports and between the EU ports themselves. To give an example, obligations established at national level on the use of RLFs could divert traffic to competing ports of other Member States and distort competition. Accordingly, harmonisation at EU level is necessary to ensure a level playing field for all actors of the maritime cluster (in particular, operators, ports and fuel suppliers).

- **Choice of the instrument**

The impact assessment established that binding, regulatory measures are necessary to achieve the objectives. A regulation is the most appropriate instrument to ensure common implementation of the measures envisaged, while reducing the risk of distortion within the single market, which could result from differences in how EU Member States turn the requirements in national law. As the transition to RLFs requires significant investments from fuel suppliers, fuel distribution and a strong and clear demand push, it is vital that the regulatory framework provides a single, long-term and robust set of rules to all investors EU-wide. In particular, it is important to avoid creating a patchwork of differing measures at national level, which would be the case if implemented under a cross-sectoral directive.

The proposal is highly technical in nature, and there is a high likelihood that it will have to be regularly amended to reflect technical and legal developments. To respond to this, a number of implementing measures are also planned. These will focus particularly on the technical specifications to implement the functional requirements.

---

12 This includes national plans being developed by the Netherlands, Sweden and Italy (in the form of their 'Guidelines for Energy and Environmental Planning Documents of the Port System Authorities (DEASP)'. Non-EU Member States like the UK and Norway have also established their own plans. It is important to mention them in this respect as their objectives may affect short-sea shipping traffic to and from the EU.

13 Currently listed in the Initial IMO Strategy on reduction of GHG emissions from ships among candidate mid-term measures, i.e. measures to be agreed by the IMO between 2023 and 2030.

3. RESULTS OF EX-POST EVALUATIONS, STAKEHOLDER CONSULTATIONS AND IMPACT ASSESSMENTS

- **Ex-post evaluations/fitness checks of existing legislation**

As this is a new proposal, no evaluations or fitness check have been carried out.

- **Stakeholder consultations**

The Commission actively engaged with stakeholders and conducted comprehensive consultations throughout the impact assessment process. Stakeholders' views started to be collected in response to the publication of the inception impact assessment (March and April 2020). A total of 81 replies were received, which informed the drafting process and helped to refine the approach and better identify the barriers that hamper the current use of RLFs in the maritime sector.

As part of preparing the proposal, other consultation activities included:

– An open public consultation, organised by the Commission, running from 2 July 2020 to 10 September 2020. A total of 136 responses were received, covering a variety of stakeholder groups. The responses came from ship owning and ship management (40), energy producers and fuel supply (37), short sea shipping (25), national public authorities (15), interest organizations (14), ports management and administrators (13), port terminal operator or other port services provider (13), academia research and innovation (12), inland waterways sector (11), shipbuilding and marine equipment manufacturers (10), regional or local public authorities (9), logistics suppliers, shippers and cargo owners (9), technical standardization bodies and class societies (2), investment and financing (2), and other (17)[14];

– A targeted stakeholders consultation organised by the consultant responsible for the impact assessment support study, running from 18 August 2020 to 18 September 2020 and directed at experts from the European Sustainable Shipping Forum (ESSF). The consultant also conducted a series of interviews with stakeholders, including industry representatives and national authorities, between 10 July 2020 and 1 December 2020;

– A stakeholders roundtable, organised by the Commission on 18 September 2020 with members of European Sustainable Shipping Forum[15] (ESSF) and the European Ports Forum[16] (EPF);

– Regular expert group meetings, in the framework of the ESSF sub-group on sustainable alternative power for shipping.

The information provided by stakeholders was key in allowing the Commission to refine the design of the policy options as well as to assess their economic, social and environmental impacts, compare them and determine which policy option is likely to maximize the benefits/costs ratio for the society.

The consultations showed that there is consensus among all stakeholder groups on the importance of addressing the uptake of RLFs in maritime transport as well as the specific problems identified by the impact assessment.

---

14 https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12312-FuelEU-Maritime-/public-consultation

15 https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=2869

16 https://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupDetail&groupID=3542

The consultations confirmed that all five drivers identified in the framework of the impact assessment of the proposal are relevant. The results suggest that the different stakeholders agree that high fuel and investment costs together with uncertainty for investors are the most important barriers. In terms of policy objectives, *'providing more certainty on the climate and environmental requirements for ships in operation'* appears to be the most important policy objective in view of stakeholders.

All stakeholder groups also expressed a preference for goal-based over prescriptive policy, which also concurs with another requirement for the policy voiced by most stakeholders, the technology neutrality. On policy measures, setting a clear regulatory pathway for decarbonising the current marine fuel received the highest scores from the stakeholders. On geographical scope, there was no obvious preference on the right geographical scope for the measures. In terms of measuring environmental performance and how emissions should be included in the policy framework, most stakeholders prefer a "well-to-wake" approach as that it takes into account not only emissions from the combustion of fuel on board the ship, but also upstream emissions from production, transport, and distribution of fuels. On ships at berth, requirements on the use of on-shore power supply are found to be relevant and necessary for achieving the decarbonisation objectives by most stakeholders.

- **Collection and use of expertise**

A study was conducted by an external contractor to support the impact assessment underpinning the proposal. This study was launched in July 2020 and was concluded in March 2021. The study provided valuable insights to the Commission services notably to design the policy options, assess some of the expected impacts, and collect the views of the directly impacted stakeholders. The Commission services also relied on the support from the European Maritime Safety Agency (EMSA) on technical aspects related to the present initiative.

- **Impact assessment**

The policy measures included in this proposal are informed by the results of an impact assessment. The impact assessment report [SWD(2021)635] received a positive opinion from the Commission Regulatory Scrutiny Board [SEC(2021)562]. In its opinion, the Board provided a number of recommendations about the presentation of the arguments in the impact assessment report. These recommendations have been addressed; Annex 1 to the impact assessment report provides a summary outline of how this was done.

Three policy options have been considered in the context of the impact assessment to achieve the identified objectives. These three options all share two main characteristics:

(1) the regulatory nature to provide legal certainty; and

(2) the focus on demand-side aspects to stimulate production and uptake of RLFs, address the chicken-and-egg situation and avoid carbon leakage.

Policy options provided different ways to design the obligation and differed in particular on their approach to technology choice and the way the required performance is achieved.

Policy option 1 is designed as a prescriptive approach, requiring share of specific fuels / fuel types to be used. It implies a technology selection by the regulator. Both policy options 2 and 3 are goal-based approaches, requiring a maximum yearly average GHG intensity limit to be met for the energy used on-board. This leaves the choice of technology to market operators. In addition, policy option 3 contains also mechanisms to reward over-achievers to encourage the

development of more advanced, zero-emissions technologies (pooling and multipliers for zero-emission technologies) reducing both air pollutants and greenhouse gases. All options require the most polluting ships in ports (containerships, and passenger ships) to use on-shore power supply (or equivalent zero-emission technology).

Following the assessment, policy option 3 is identified as the preferred option as it strikes the best balance between the objectives and the overall implementation costs. It not only answers the needs for flexibility, which have been stressed by stakeholders during the consultation activities (in particular operators and ports), but also reduces the risk of technology lock-in [and incentivises the early adoption of most advanced technologies].

The increased penetration of RLFs in the maritime fuel mix will translate into significant reduction of greenhouse gas emissions and air pollution emissions. The related savings in external costs have been estimated at EUR 10bn for air pollution and EUR 138.6bn for climate change, relative to the baseline and expressed as present value for 2021-2050 period. These have been calculated in the impact assessement based on the modelled projected penetration of renewable and low carbon fuels. Savings in the order of EUR 2.3bn are expected to be realised by ship operators due to reduced operating costs (maintenance, crew, etc.). This reduction will be driven by somewhat lower maritime transport activity relative to the baseline. An additional noticeable impact concerned the use of advanced fuels and propulsion technologies, and indirectly the impact it has on innovation. The initiative is expected to boost the penetration of fuel cell-powered vessels (18.9%) in the fleet as well as electric propulsion (5.4%) by 2050 (compared to no penetration of these technologies in the baseline).

The main cost resulting from the proposed intervention is borne by ship operators and amounts to EUR €89.7bn. It results from increased capital costs (EUR 25.8bn) and fuel costs (EUR 63.9bn). Indirect costs for the ports will relate to the provision of the necessary bunkering infrastructure and are estimated at EUR 5.7bn. Administrative costs for ship operators are estimated at EUR 521.7m resulting from data collection, submission and verification of the compliance plans and the annual energy report, cooperation during audits and inspections as well as crew training. Additional EUR 1.8m have been identified for the establishment of guidelines by ports to guarantee the safe handling of RLFs. Specific costs related to fuel certification could not be quantified. Enforcement costs for public authorities are expected to be limited (EUR 1.5m) and focus on the provision of the necessary IT reporting tools. The preferred option thus provides net benefits amounting to EUR 58.4bn over the time horizon of the initiative.

- **Fundamental rights**

The proposal has no implications on the protection of fundamental rights.

4. BUDGETARY IMPLICATIONS

The preferred option will have budgetary implications for the Commission. The expected costs of IT services and IT system development are up to EUR 0.5m. This is based on the cost of THETIS-MRV and experience with existing THETIS-EU modules supporting various pieces of EU legislation, such IT-developments costs are estimated at EUR 300,000. The preferred policy option would also need an additional functionality to support the pooling of ships for compliance. This additional tool is estimated to cost EUR 200,000. IT development and procurement choices will be subject to pre-approval by the European Commission Information Technology and Cybersecurity Board.

5. OTHER ELEMENTS

- **Implementation plans and monitoring, evaluation and reporting arrangements**

The Commission will follow the progress, impacts and results of this proposal through a set of monitoring/evaluation mechanisms. The Commission will measure progress towards achieving the specific objectives of the proposal, in particular through the data collected annually as part of the EU Monitoring, Reporting and Evaluation (MRV) system.

Requests for information (reports, survey replies) will be carefully balanced so as not to put an additional burden on stakeholders by creating disproportionate new reporting requests.

Five years after the end of the implementation date of the legal proposal, the Commission will evaluate the rules to check whether the initiative's objectives have been reached. The evaluation will inform future decision-making processes to ensure the necessary adjustments for reaching the set objectives.

- **Detailed explanation of the specific provisions of the proposal**

Article 1 describes the subject matter of the proposed Regulation, which lays down rules to reduce the greenhouse gas intensity of energy used on-board by ships arriving at, within or departing from ports under the jurisdiction of a EU Member State, to promote the harmonious development and consistent use of renewable and low-carbon fuels across the Union, without introducing barriers to the single market to promote the reduction of greenhouse gas emissions from maritime transport.

Article 2 lays down the scope.

Article 3 sets out several definitions.

Article 4 establishes the limit to the yearly greenhouse gas intensity of the energy used on-board by a ship.

Article 5 establishes requirements for the use of on-shore power supply or zero-emission energy at berth for specific ship types and lists possible exceptions.

Article 6 lays down the common principles for monitoring compliance.

Article 7 establishes what should be included in the monitoring plans.

Article 8 lists the situations in which the monitoring plan should be amended.

Article 9 establishes the principles related to the certification of biofuels, biogas, renewable fuels of non-biological origin and recycled carbon fuels.

Article 10 lays down the scope of the verification activities to be performed by verifiers.

Article 11 sets the general obligations and principles for the verifiers.

Article 12 sets out the main principles to be respected during the verification procedures.

Article 13 lays down the rules on accreditations of the verifiers for the activities to be performed under the scope of this Regulation.

Article 14 defines the parameters that companies should monitor and record to demonstrate compliance.

Article 15 sets out the task for the verifiers in relation to the information provided by the companies.

Article 16 establishes the compliance database and lays down the main parameters for reporting.

Article 17 establishes flexibility provisions, allowing operators to bank or borrow, within a certain limit, a compliance surplus to enable compliance.

Article 18 sets out the main principles and procedures for possible pooling of compliance balances.

Article 19 lays down the conditions to the issue a FuelEU certificate of compliance.

Article 20 establishes the penalties to be incurred if compliance has not been achieved.

Article 21 establishes the principles for the allocation of penalties to to support renewable and low-carbon fuels in the maritime sector.

Article 22 establishes the obligation for ships to carry a valid FuelEU certificate of compliance.

Article 23 lays down the rules for ship inspections.

Article 24 establishes the right to review the decisions affecting companies.

Article 25 requires the designation of competent authorities responsible for the application and enforcement of this Regulation.

Article 26 establishes the conditions conferring delegated powers to the Commission under this Regulation.

Article 27 establishes the committee procedure for the exercise by the Commission of the power to adopt implementing acts.

Article 28 requires the Commission to report to the European Parliament and the Council on the application of this Regulation, at least every five years.

Article 29 amends Directive 2009/16/EC to add the FuelEU certificate of compliance to its Annex IV.

Article 30 sets the date of entry into force and application of this Regulation.

Annex I defines the formulas and methodology for establishing the yearly average greenhouse gas intensity of the energy used on-board by a ship.

Annex II provides the list of default values that can be used in determining the emission factors used in the formula described in Annex I.

Annex III provides the list of zero-emission technologies that can be used in alternative to the connection to on-shore power supply at berth, as well as, specific criteria for their use.

Annex IV defines the minium elements of the certificates to be issued by the managing body of the port in cases where ships cannot make use of on-shore power supply for justified reasons.

Annex V defines the formulas for establishing the ship’s compliance balance and the penalty in case of non-compliance.

2021/0210 (COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the use of renewable and low-carbon fuels in maritime transport and amending Directive 2009/16/EC

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 100(2) thereof,

Having regard to the proposal from the European Commission,

After transmission of the draft legislative act to the national parliaments,

Having regard to the opinion of the European Economic and Social Committee[17],

Having regard to the opinion of the Committee of the Regions[18],

Acting in accordance with the ordinary legislative procedure,

Whereas:

(1) Maritime transport accounts for around 75% of EU external trade and 31% of EU internal trade in terms of volume. At the same time, ship traffic to or from ports in the European Economic Area accounts for some 11% of all EU CO_2 emissions from transport and 3-4% of total EU CO_2 emissions. 400 million passengers embark or disembark annually in ports of Member States, including around 14 million on cruise ships. Maritime transport is therefore an essential component of Europe's transport system and plays a critical role for the European economy. The maritime transport market is subject to strong competition between economic actors in the Union and beyond for which a level playing field is indispensable. The stability and prosperity of the maritime transport market and its economic actors rely on a clear and harmonised policy framework where maritime transport operators, ports and other actors in the sector can operate on the basis of equal opportunities. Where market distortions occur, they risk putting ship operators or ports at a disadvantage compared to competitors within the maritime transport sector or in other transport sectors. In turn, this can result in a loss of competitiveness of the maritime transport industry, and a loss of connectivity for citizens and businesses

(2) To enhance the Union's climate commitment under the Paris Agreement and set out the steps to be taken to achieve climate neutrality by 2050, and to translate the political commitment into a legal obligation, the Commission adopted the (amended) proposal for a Regulation of the European Parliament and of the Council on establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999

[17] OJ C , , p. .
[18] OJ C , , p. .

(European Climate Law)[19] as well as the Communication 'Stepping up Europe's 2030 climate ambition'[20]. This also integrates the target of reducing greenhouse gas (GHG) emissions by at least 55% compared to 1990 levels by 2030. Accordingly, various complementary policy instruments are needed to motivate the use of sustainably produced renewable and low-carbon fuels, included in the maritime transport sector. The necessary technology development and deployment has to happen by 2030 to prepare for much more rapid change thereafter.

(3) In the context of fuel transition to renewable and low carbon fuels and substitute sources of energy, it is essential to ensure the proper functioning of and fair competition in the EU maritime transport market regarding marine fuels, which account for a substantial share of ship operators' costs. Differences in fuel requirements across Member States of the Union can significantly affect ship operators' economic performance and negatively impact competition in the market. Due to the international nature of shipping, ship operators may easily bunker in third countries and carry large amounts of fuel. This may lead to carbon leakage and detrimental effects on the competitiveness of the sector if the availability of renewable and low carbon fuels in maritime ports under the jurisdiction of a Member State is not accompanied by requirements for their use that apply to all ship operators arriving at and departing from ports under the jurisdiction of Member States. This Regulation should lay down measures to ensure that the penetration of renewable low-carbon fuels in the marine fuels market takes place under the conditions of fair competition on the EU maritime transport market.

(4) In order to produce an effect on all the activities of the maritime transport sector, it is appropriate that this Regulation covers a share of the voyages between a port under the jurisdiction of a Member State and port under the jurisdiction of a third country. This Regulation should thus apply to half of the energy used by a ship performing voyages arriving at a port under the jurisdiction of a Member State from a port outside the jurisdiction of a Member State, half of the of the energy used by a ship performing voyages departing from a port under the jurisdiction of a Member State and arriving at a port outside the jurisdiction of a Member State, the entirety of the energy used by a ship performing voyages arriving at a port under the jurisdiction of a Member State from a port under the jurisdiction of a Member State, and the energy used at berth in a port under the jurisdiction of a Member State. Such coverage of a share of the energy used by a ship in both incoming and outgoing voyages between the Union and third countries ensures the effectiveness of this Regulation, including by increasing the positive impact on the environment of such framework. Simultaneously, such framework limits the risk of evasive port calls and the risk of delocalisation of transhipment activities outside the Union. In order to ensure smooth operation of maritime traffic, a level playing field among maritime transport operators and among ports, and avoid distortions in the internal market, all journeys arriving or departing from ports under jurisdiction of Member States, as well as the stay of ships in those ports should be covered by uniform rules contained in this Regulation.

(5) The rules laid down in this Regulation should apply in a non-discriminatory manner to all ships regardless of their flag. For reasons of coherence with Union and international rules in the area of maritime transport, this Regulation should not apply

[19] COM(2020) 563 final
[20] COM(2020) 562 final

to warships, naval auxiliaries, fish-catching or fish-processing ships, or government ships used for non-commercial purposes.

(6) The person or organisation responsible for the compliance with this Regulation should be the shipping company, defined as the shipowner or any other organisation or person, such as the manager or the bareboat charterer, that has assumed the responsibility for the operation of the ship from the shipowner and that, on assuming such responsibility, has agreed to take over all the duties and responsibilities imposed by the International Management Code for the Safe Operation of Ships and for Pollution Prevention. This definition is based on the definition of 'company' in Article 3, point (d) of Regulation (EU) 2015/757 of the European Parliament and of the Council[21], and in line with the global data collection system established in 2016 by the International Maritime Organization (IMO). In line with the polluter pays principle, the shipping company could, by means of a contractual arrangement, hold the entity that is directly responsible for the decisions affecting the greenhouse gas intensity of the energy used by the ship accountable for the compliance costs under this Regulation. This entity would normally be the entity that is responsible for the choice of fuel, route and speed of the ship.

(7) In order to limit the administrative burden, in particular that of smaller operators, this Regulation should not apply to wooden ships of a primitive build and ships not propelled by mechanical means and focus on ships with a gross tonnage above 5 000. Even though these latter ships represent only approximately 55% of all ships calling at ports under the Regulation (EU) 2015/757 of the European Parliament and of the Council, they are responsible for 90% of the carbon dioxide (CO_2) emissions from the maritime sector.

(8) The development and deployment of new fuels and energy solutions requires a coordinated approach to match supply, demand and the provision of appropriate distribution infrastructure. While the current European regulatory framework already partly addresses fuel production with Directive (EU) 2018/2001 of the European Parliament and of the Council[22] and distribution with Directive 2014/94/EU of the European Parliament and of the Council[23], there is also a need for a tool that establishes increasing levels of demand of renewable and low-carbon maritime fuels.

(9) While instruments such as carbon pricing or targets on the carbon intensity of activity promote improvements in energy efficiency, they are not suited to bring about a significant shift towards renewable and low-carbon fuels in the short and medium term. A specific regulatory approach dedicated to the deployment of renewable and low-carbon marine fuels and substitute sources of energy, such as wind or electricity, is therefore necessary.

(10) Policy intervention to stimulate demand of renewable and low-carbon maritime fuels should be goal-based and respect the principle of technological neutrality. Accordingly, limits should be set on the greenhouse gas intensity of the energy used on-board by ships without prescribing the use of any particular fuel or technology.

---

21 Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC (OJ L 123, 19.5.2015, p. 55).

22 Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328, 21.12.2001, p. 82).

23 Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure (OJ L 307, 28.10.2014, p. 1).

(11) Development and deployment of renewable and low carbon fuels with a high potential for sustainability, commercial maturity and a high potential for innovation and growth to meet future needs should be promoted. This will support creating innovative and competitive fuels markets and ensure sufficient supply of sustainable maritime fuels in the short and long term to contribute to Union transport decarbonisation ambitions, while strengthening Union's efforts towards a high level of environmental protection. For this purpose, sustainable maritime fuels produced from feedstock listed in Parts A and B of Annex IX of Directive (EU) 2018/2001, as well as synthetic maritime fuels should be eligible. In particular, sustainable maritime fuels produced from feedstock listed in Part B of Annex IX of Directive (EU) 2018/2001 are essential, as currently the most commercially mature technology to decarbonise martime transport already in the short term.

(12) Indirect land-use change occurs when the cultivation of crops for biofuels, bioliquids and biomass fuels displaces traditional production of crops for food and feed purposes. Such additional demand increases the pressure on land and can lead to the extension of agricultural land into areas with high-carbon stock, such as forests, wetlands and peatland, causing additional greenhouse gas emissions and loss of biodiversity. Research has shown that the scale of the effect depends on a variety of factors, including the type of feedstock used for fuel production, the level of additional demand for feedstock triggered by the use of biofuels, bioliquids and biomass fuels, and the extent to which land with high-carbon stock is protected worldwide. The level of greenhouse gas emissions caused by indirect land-use change cannot be unequivocally determined with the level of precision required for the establishment of emission factors required by the application of this regulation. However, there is evidence that all fuels produced from feedstock cause indirect land-use change to various degrees. In addition to the greenhouse gas emissions linked to indirect land-use change – which is capable of negating some or all greenhouse gas emissions savings of individual biofuels, bioliquids or biomass fuels – indirect land-use change poses risks to biodiversity. This risk is particularly serious in connection with a potentially large expansion of production determined by a significant increase in demand. Accordingly, no feed and food crop-based fuels should be promoted. Directive (EU) 2018/2001 already limits and sets a cap on the contribution of such biofuels, bioliquids and biomass to the GHG emissions savings targets in the road and rail transport sector considering their lower environmental benefits, lower performance in terms of greenhouse reduction potential and broader sustainability concerns.

(13) However, this approach must be stricter in the maritime sector. The maritime sector has currently insignificant levels of demand for food and feed crops-based biofuels, bioliquids and biomass fuels, since over 99% of currently used marine fuels are of fossil origin. Therefore, the non-eligibility of food and feed crop-based fuels under this Regulation also minimises any risk to slow down the decarbonisation of the transport sector, which could otherwise result from a shift of crop-based biofuels from the road to the maritime sector. It is essential to minimise such a shift, as road transport currently remains by far the most polluting transport sector and the maritime transport currently uses predominanetly fuels of fossil origin. It is therefore appropriate to avoid the creation of a potentially large demand of food and feed crops-based biofuels, bioliquids and biomass fuels by promoting their use under this Regulation. Accordingly, the additional greenhouse gas emissions and loss of biodiversity caused by all types of feed and food crop-based fuels require that these fuels be considered to have the same emission factors as the least favourable pathway.

(14) The long lead times associated to the development and deployment of new fuels and energy solutions for maritime transport require rapid action and the establishment of a clear and predictable long-term regulatory framework facilitating planning and investment from all the stakeholders concerned. A clear and stable long-term regulatory framework will facilitate the development and deployment of new fuels and energy solutions for maritime transport, and encourage investment from stakeholders. Such framework should define limits for the greenhouse gas intensity of the energy used on-board by ships until 2050. Those limits should become more ambitious over time to reflect the expected technology development and increased production of marine renewable and low carbon fuels.

(15) This Regulation should establish the methodology and the formula that should apply to calculate the yearly average greenhouse gas intensity of the energy used on-board by a ship. This formula should be based on the fuel consumption reported by ships and consider the relevant emission factors of these fuels. The use of substitute sources of energy, such as wind or electricity, should also be reflected in the methodology.

(16) In order to provide a more complete picture of the environmental performance of the various energy sources, the GHG performance of fuels should be assessed on a well-to-wake basis, taking into account the impacts of energy production, transport, distribution and use on-board. This is to incentivise technologies and production pathways that provide a lower GHG footprint and real benefits compared to the existing conventional fuels.

(17) The well-to-wake performance of renewable and low-carbon maritime fuels should be established using default or actual and certified emission factors covering the well-to-tank and tank-to-wake emissions. The performance of fossil fuels should however only be assessed through the use of default emission factors as provided for by this Regulation.

(18) A comprehensive approach on all the most relevant GHG emissions (CO_2, CH_4 and N_2O) is necessary to promote the use of energy sources providing a lower GHG footprint overall. In order to reflect the global warming potential of methane and nitrous oxides, the limit set by this Regulation should therefore be expressed in terms of 'CO_2 equivalent'.

(19) The use of renewable energy sources and alternative propulsion, such as wind and solar energy, greatly reduces the greenhouse gas intensity of the overall ship energy use. The difficulty to accurately measure and quantify these energy sources (intermittence of the energy use, direct transfer as propulsion, etc.) should not impede their recognition in the overall ship energy use through means of approximations of their contribution to the ship's energy balance.

(20) Air pollution produced by ships (sulphur oxides, nitrogen oxides and particulate matter) at berth is a significant concern for coastal areas and port cities. Therefore, specific and stringent obligations should be imposed to reduce emissions at berth from ships that draw power from their engines during their stay in port. According to the data collected within the framework of Regulation (EU) 2015/757 in 2018, passenger ships and containerships are the ship categories producing the highest amount of emissions per ship at berth. Accordingly, emissions from these categories of ships should be addressed as a priority.

(21) The use of on-shore power supply (OPS) abates air pollution produced by ships as well as reduces the amount of GHG emissions generated by maritime transport. OPS

represents an increasingly clean power supply available to ships at berth, in view of the growing renewables share in the EU electricity mix. While only the provision on OPS connection points is covered by Directive 2014/94/EU (Alternative Fuels Infrastructure Directive – AFID), the demand for and, as a result, the deployment of this technology has remained limited. Therefore specific rules should be established to mandate the use of OPS by the most polluting ships.

(22) In addition to OPS, other technologies might be capable of offering equivalent environmental benefits in ports. When the use of an alternative technology is demonstrated to be equivalent to the use of OPS, a ship should be exempted from its use of OPS.

(23) Exceptions to the use of OPS should also be provided for a number of objective reasons, certified by the managing body of the port of call and limited to unscheduled port calls for reasons of safety or saving life at sea, for short stays of ships at berth of less than two hours as this is the minimum time required for connection, and for the use of on-board energy generation under emergency situations.

(24) Exceptions in case of unavailability or incompatibility of OPS should be limited after ship and port operators have had sufficient time to make the necessary investments, in order to provide the necessary incentives for those investments and avoid unfair competition. As of 2035, ship operators should plan carefully their port calls to make sure that they can carry out their activities without emitting air pollutants and GHG at berth and compromise the environment in coastal areas and port cities. A limited number of exceptions in case of unavailability or incompatibility of OPS shoud be maintained in order to provide the possibility for occasional last-minute changes in port call schedules and calls in ports with incompatible equipment.

(25) A robust monitoring, reporting and verification system should be put in place by this Regulation in order to trace compliance with its provisions. Such system should apply in a non-discriminatory way to all ships and require third party verification in order to ensure the accuracy of the data submitted within this system. In order to facilitate achieving the objective of this Regulation, any data already reported for the purpose of Regulation (EU) 2015/757 should be used, when necessary, for verifying compliance with this Regulation in order to limit administrative burden imposed on companies, verifiers and maritime authorities.

(26) Companies should be responsible for monitoring and reporting the amount and type of energy used on-board by ships in navigation and at berth, as well as other relevant information, such as information on the type of engine on board or presence of wind assisting technologies, with a view to showing compliance with the limit on the greenhouse gas intensity of the energy used on-board by a ship set out by this Regulation. To facilitate the fulfilment of these monitoring and reporting obligations and the verification process by the verifiers, similarly to Regulation (EU) 2015/757, companies should document the envisaged monitoring method and provide further details on the application of the rules of this Regulation in a monitoring plan. The monitoring plan, as well as its subsequent modifications, if applicable, should be submitted to the verifier.

(27) Certification of fuels is essential to achieve the objectives of this Regulation and guarantee the environmental integrity of the renewable and low-carbon fuels that are expected to be deployed in the maritime sector. Such certification should be undertaken by means of a transparent and non-discriminatory procedure. With a view to facilitating certification and limiting the administrative burden, the certification of

biofuels, biogas, renewable fuels of non-biological origin and recycled carbon fuel should rely on the rules established by Directive (EU) 2018/2001. This approach of certification should also apply to fuels bunkered outside the Union, which should be considered as imported fuels, in a similar way as Directive (EU) 2018/2001. When companies intend to depart from the default values provided for by that Directive or this new framework, this should only be done when values can be certified by one of the voluntary schemes recognised under Directive (EU) 2018/2001 (for well-to-tank values) or by means of laboratory testing or direct emissions measurements (tank-to-wake).

(28) Verification by accredited verifiers should ensure the accuracy and completeness of the monitoring and reporting by companies and the compliance with this Regulation. In order to ensure impartiality, verifiers should be independent and competent legal entities and should be accredited by national accreditation bodies established pursuant to Regulation (EC) No 765/2008 of the European Parliament and of the Council[24].

(29) Based on the data and information monitored and reported by companies, the verifiers should calculate and establish the yearly average greenhouse gas intensity of energy used on-board by a ship and the ship's balance with respect to the limit, including any compliance surplus or deficit, as well as the respect of the requirements to use on-shore power supply at berth. The verifier should notify this information to the company concerned. Where the verifier is the same entity as the verifier for the purpose of Regulation (EU) 2015/757, such notification could be done together with the verification report under that Regulation. Such information should be then reported by the company concerned to the Commission.

(30) The Commission should establish and ensure the functioning of an electronic database that registers the performance of each ship and ensures its compliance with this Regulation. In order to facilitate reporting and limit administrative burden to companies, verifiers and other users, this electronic database should build upon the existing THETIS-MRV module and take into account the possibility to reuse information and data collected for the purpose of Regulation (EU) 2015/757.

(31) Compliance with this Regulation would depend on elements that could be beyond control of the company, such as issues related to fuel availability or fuel quality. Therefore, companies should be allowed the flexibility of rolling-over a compliance surplus from one year to another or borrowing an advance compliance surplus, within certain limits, from the following year. The use of OPS at berth, being of high importance for local air quality in port cities and coastal areas should not be eligible for similar flexibility provisions.

(32) In order to avoid technology lock-in and continue supporting the deployment of most performant solutions, companies should be allowed to pool the performances of different ships and use the possible over-performance of one ship to compensate for the under-performance of another ship. This creates a possibility to reward overcompliance and incentivates investment in more advanced technologies. The possibility to opt for pooled compliance should remain voluntary and subject to agreement of the concerned companies.

[24] Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93 (OJ L 218, 13.8.2008).

(33) A document of compliance ('FuelEU certificate of compliance') issued by a verifier following the procedures established by this Regulation, should be kept on board ships as evidence of compliance with the limits on the greenhouse gas intensity of the energy used on-board by a ship a with the requirements on the use of OPS at berth. Verifiers should inform the Commission of the issuance of such documents.

(34) The number of non-compliant port calls should be determined by verifiers in accordance with a set of clear and objective criteria taking into account all the relevant information, including time of stay, the amount of each type and energy consumed, and the application of any excluding conditions, for each port call in the Union. This information should be made available by the companies to the verifiers for the purpose of determining compliance.

(35) Without prejudice to the possibility of complying through the flexibility and pooling provisions, the ships that do not meet the limits on the yearly average greenhouse gas intensity of the energy used on-board shall be subject to a penalty that has dissuasive effect. The penalty should be proportionate to the extent of the non-compliance and remove any economic advantage of non-compliance, thus preserving a level playing field in the sector. It should be based on the amount and cost of renewable and low-carbon fuel that the ships should have used to meet the requirements of the Regulation.

(36) The penalty imposed for each non-compliant port call should be proportionate to the cost of using the electricity and at sufficient level to have a dissuasive effect from the use of more polluting energy sources. The penalty should be based on the power installed on board the vessel, expressed in megawatts, multiplied by a fixed penalty in EUR per hour of stay at berth. Due to lack of accurate figures on the cost of providing OPS in the Union, this rate should be based on the EU average electricity price for non-household consumers multiplied by a factor of two to account for other charges related to the provision of the service, including among others connection costs and investment recovery elements.

(37) The revenues generated from the payment of penalties should be used to promote the distribution and use of renewable and low-carbon fuels in the maritime sector and help maritime operators to meet their climate and environmental goals. For this purpose these revenues should be allocated to the the Innovation Fund referred to in Article 10a(8) of Directive 2003/87/EC.

(38) Enforcement of the obligations relating to this Regulation should be based on existing instruments, namely those established under Directive 2009/16/EC of the European Parliament and of the Council[25] and Directive 2009/21/EC of the European Parliament and of the Council[26]. The document confirming compliance of the ship with the requirements of this Regulation should be added to the list of certificates and documents referred to in Annex IV to Directive 2009/16/EC.

(39) Given the importance of consequences that the measures taken by the verifiers under this Regulation may have for the companies concerned, in particular regarding the determination of non-compliant port calls, calculation of the amounts of penalties and refusal to issue a FuelEU certificate of compliance, those companies should be entitled to apply for a review of such measures to the competent authority in the Member State

[25] Directive 2009/16/EC of the European Parliament and of the Council of 23 April 2009 on port State control (OJ L 131, 28.5.2009, p. 57).

[26] Directive 2009/21/EC of the European Parliament and of the Council of 23 April 2009 on compliance with flag State requirements (OJ L 131, 28.5.2009, p. 132).

where the verifier was accredited. In the light of the fundamental right to an effective remedy, enshrined in Article 47 of the Charter of Fundamental Rights of the European Union, decisions taken by the competent authorities and the managing bodies of the port under this Regulation should be subject to judicial review, carried out in accordance with the national law of the Member State concerned.

(40) In order to maintain a level playing field through the efficient functioning of this Regulation, the power to adopt acts in accordance with Article 290 of the Treaty on the Functioning of the European Union should be delegated to the Commission in respect of amendment of the list of well-to-wake emission factors, amendment of the list of the applicable zero-emission technologies or criteria for their use, to establish the rules on conducting the laboratory testing and direct emissions measurements, adaptation of the penalty factor, accreditation of verifiers, adaptation of the penalty factor, and modalities for the payment of penalties. It is of particular importance that the Commission carry out appropriate consultations during its preparatory work, including at expert level, and that those consultations be conducted in accordance with the principles laid down in the Interinstitutional Agreement on Better Law-Making of 13 April 2016. In particular, to ensure equal participation in the preparation of delegated acts, the European Parliament and the Council receive all documents at the same time as Member States' experts, and their experts systematically have access to meetings of Commission expert groups dealing with the preparation of delegated acts.

(41) In order to ensure uniform conditions for the implementation of this Regulation, implementing powers should be conferred on the Commission. Those powers should be exercised in accordance with Regulation (EU) No 182/2011 of the European Parliament and of the Council[27]. When establishing by means of implementing acts the templates for standardised monitoring plans, including the technical rules for their uniform application, the Commission should take into account the possibility of reusing information and data collected for the purpose of Regulation (EU) 2015/757.

(42) Given the international dimension of the maritime sector, a global approach to limiting the greenhouse gas intensity of the energy used by ships is preferable as it could be regarded as more effective due to its broader scope. In this context, and with a view to facilitating the development of international rules within the International Maritime Organisation (IMO), the Commission should share relevant information on the implementation of this Regulation with the IMO and other relevant international bodies and relevant submissions should be made to the IMO. Where an agreement on a global aproach is reached on matters of relevance to this Regulation, the Commission should review the present Regulation with a view to aligning it, where appropriate, with the international rules.

(43) The uptake of renewable and low-carbon fuels and substitute sources of energy by ships arriving at, within or departing from ports under the jurisdiction of a Member State across the Union, is not an objective that can be sufficiently achieved by the Member States without risking to introduce barriers to the internal market and distortions of competition between ports and between maritime operators. This objective can be better achieved by introducing uniform rules at Union level that create economic incentives for maritime operators to continue operating unimpededly

[27] Regulation (EU) No 182/2011 of the European Parliament and of the Council of 16 February 2011 laying down the rules and general principles concerning mechanisms for control by Member States of the Commission's exercise of implementing powers (OJ L 55, 28.2.2011, p. 13).

while meeting obligations on the use of renewable and low-carbon fuels. Accordingly, the Union may adopt measures, in accordance with the principle of subsidiarity as set out in Article 5 of the Treaty on European Union. In accordance with the principle of proportionality as set out in that Article, this Regulation does not go beyond what is necessary in order to achieve that objective,

HAVE ADOPTED THIS REGULATION:

CHAPTER I

GENERAL PROVISIONS

Article 1

Objective and purpose

This Regulation lays down uniform rules imposing:

(a) the limit on the greenhouse gas ('GHG') intensity of energy used on-board by a ship arriving at, staying within or departing from ports under the jurisdiction of a Member State and

(b) the obligation to use on-shore power supply or zero-emission technology in ports under the jurisdiction of a Member State,

in order to increase consistent use of renewable and low-carbon fuels and substitute sources of energy across the Union, while ensuring the smooth operation of maritime traffic and avoiding distortions in the internal market.

Article 2

Scope

This Regulation applies to all ships above a gross tonnage of 5000, regardless of their flag in respect to:

(a) the energy used during their stay within a port of call under the jurisdiction of a Member State,

(b) the entirety of the energy used on voyages from a port of call under the jurisdiction of a Member State to a port of call under the jurisdiction of a Member State, and

(c) a half of the energy used on voyages departing from or arriving to a port of call under the jurisdiction of a Member State, where the last or the next port of call is under the jurisdiction of a third country.

This Regulation does not apply to warships, naval auxiliaries, fish-catching or fish-processing ships, wooden ships of a primitive build, ships not propelled by mechanical means, or government ships used for non-commercial purposes.

Article 3

Definitions

For the purposes of this Regulation, the following definitions apply:

(a) 'greenhouse gas emissions' means the release of carbon dioxide (CO_2), methane (CH_4) and nitrous oxides (N_2O) into the atmosphere;

(b) ‘biofuels’ means biofuels as defined in Article 2, point (33), of Directive (EU) 2018/2001;

(c) ‘biogas’ means biogas as defined in Article 2, point (28), of Directive (EU) 2018/2001;

(d) ‘recycled carbon fuels’ means recycled carbon fuels as defined in Article 2, point (35), of Directive (EU) 2018/2001;

(e) ‘renewable fuels of non-biological origin’ means renewable fuels of non-biological origin as defined in Article 2, point (36), of Directive (EU) 2018/2001;

(f) ‘food and feed crops’ means food and feed crops as defined in Article 2, point (40), of Directive (EU) 2018/2001;

(g) ‘zero-emission technology’ means a technology fulfilling the requirements of Annex III that does not imply the release of the following greenhouse gases and air pollutants into the atmosphere by ships: carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), sulphur oxides (SO_x), nitrogen oxides (NO_x) and particulate matter (PM);

(h) ‘substitute sources of energy’ means renewable wind or solar energy generated on-board or electricity supplied from on-shore power supply;

(i) ‘port of call’ means a port of call as defined in Article 3, poin (b) of Regulation (EU) 2015/757;

(j) ‘voyage’ means voyage as defined in Article 3, point (c) of Regulation (EU) 2015/757;

(k) ‘company’ means company as defined in Article 3, point (d) of Regulation (EU) 2015/757;

(l) ‘gross tonnage’ (GT) means GT as defined in Article 3, point (e) of Regulation (EU) 2015/757;

(m) ‘ship at berth’ means ship at berth as defined in Article 3, point (n) of Regulation (EU) 2015/757;

(n) ‘energy use on-board’ means the amount of energy, expressed in mega joules (MJ), used by a ship for propulsion and for the operation of any on-board equipment, at sea or at berth;

(o) ‘greenhouse gas intensity of the energy used on-board’ means the amount of greenhouse gas emissions, expressed in grams of CO_2 equivalent established on a well-to-wake basis, per MJ of energy used on-board;

(p) ‘well-to-wake’ means a method for calculating emissions that takes into account the greenhouse gas impact of energy production, transport, distribution and use on-board, including during combustion;

(q) ‘emission factor’ means the average emission rate of a greenhouse gas relative to the activity data of a source stream, assuming complete oxidation for combustion and complete conversion for all other chemical reactions;

(r) ‘on-shore power supply’ means the system to supply electricity to ships at berth, at low or high voltage, alternate or direct current, including ship side and shore side installations, when feeding directly the ship main distribution switchboard for powering hotel, service workloads or charging secondary batteries;

(s) ‘verifier’ means a legal entity carrying out verification activities, which is accredited by a national accreditation body pursuant to Regulation (EC) No 765/2008 and this Regulation;

(t) ‘reporting period’ means reporting period as defined in Article 3, point (m) of Regulation (EU) 2015/757;

(u) ‘FuelEU certificate of compliance’ means a certificate specific to a ship, issued to a company by a verifier, which confirms that that ship has complied with this Regulation for a specific reporting period;

(v) ‘passenger ship’ means a ship that carries more than 12 passengers, including cruise ships, high speed passenger crafts, and ships with facilities to enable road or rail vehicles to roll on and roll off the vessel;

(w) ‘containership’ means a ship designed exclusively for the carriage of containers in holds and on deck;

(x) ‘non-compliant port call’ means a port call of during which the ship does not comply with the requirement of Article 5(1), and none of the exceptions provided for in Article 5(3) apply;

(y) ‘least favourable pathway’ means the most carbon-intensive production pathway used for any given fuel;

(z) ‘CO_2 equivalent’ means the metric measure used to compute the emissions from CO_2, CH_4 and N_2Oon the basis of their global-warming potential, by converting amounts of CH_4 and N_2O to the equivalent amount of carbon dioxide with the same global warming potential;

(aa) ‘compliance balance’ means the measure of a ship’s over- or under-compliance with regards to the limits to the yearly average greenhouse gas intensity of the energy used on-board by a ship, which is calculated in accordance with Annex V.

(bb) ‘compliance surplus’ means a compliance balance with a positive value.

(cc) ‘compliance deficit’ means a compliance balance with a negative value;

(dd) ‘total pool compliance balance’ means the sum of the compliance balances of all ships included in the pool.

(ee) ‘managing body of the port’ means any public or private body as defined in Article 2(5) of Regulation (EU) 2017/352 of the European Parliament and of the Council[28].

CHAPTER II

REQUIREMENTS ON ENERGY USED ON-BOARD BY SHIPS

Article 4

Greenhouse gas intensity limit of energy used on-board by a ship

[28] Regulation (EU) 2017/352 of the European Parliament and of the Council of 15 February 2017 establishing a framework for the provision of port services and common rules on the financial transparency of ports (OJ L 57, 3.3.2017, p. 1).

1. The yearly average greenhouse gas intensity of the energy used on-board by a ship during a reporting period shall not exceed the limit set out in paragraph 2.

2. The limit referred to in paragraph 1 shall be calculated by reducing the reference value of [X grams of CO_2 equivalent per MJ]* by the following percentage:

   – -2% from 1 January 2025;

   – -6% from 1 January 2030;

   – -13% from 1 January 2035;

   – -26% from 1 January 2040;

   – -59% from 1 January 2045;

   – -75% from 1 January 2050.

   [Asterix: The reference value, which calculation will be carried out at a later stage of the legislative procedure, corresponds to the fleet average greenhouse gas intensity of the energy used on-board by ships in 2020 determined on the basis data monitored and reported in the framework of Regulation (EU) 2015/757 and using the methodology and default values laid down in Annex I to that Regulation.]

3. The greenhouse gas intensity of the energy used on-board by a ship shall be calculated as the amount of greenhouse gas emissions per unit of energy according to the methodology specified in Annex I.

4. The Commission is empowered to adopt delegated acts in accordance with Article 26 to amend Annex II in order to include the well-to-wake emission factors related to any new sources of energy or to adapt the existing emission factors to ensure consistency with future international standards or the legislation of the Union in the field of energy.

Article 5

Additional zero-emission requirements of energy used at berth

1. From 1 January 2030, a ship at berth in a port of call under the jurisdiction of a Member State shall connect to on-shore power supply and use it for all energy needs while at berth.

2. Paragraph 1 shall apply to:

   (a) containerships;

   (b) passenger ships.

3. Paragraph 1 shall not apply to ships:

   (a) that are at berth for less than two hours, calculated on the basis of hour of departure and arrival monitored in accordance with Article 14;

   (b) that use zero-emission technologies, as specified in Annex III;

   (c) that have to make an unscheduled port call for reasons of safety or saving life at sea;

   (d) that are unable to connect to on-shore power supply due to unavailable connection points in a port;

(e) that are unable to connect to on-shore power supply because the shore installation at the port is not compatible with the on-board on-shore power equipment;

(f) which, for a limited period of time, require the use of on-board energy generation, under emergency situations representing immediate risk to life, the ship, the environment or for other reasons of force majeure.

4. The Commission is empowered to adopt delegated acts in accordance with Article 26 to amend Annex III in order to insert references to new technologies in the list of applicable zero-emission technologies or criteria for their use, where these new technologies are found equivalent to the technologies listed in that Annex in the light of scientific and technical progress.

5. The managing body of the port of call shall determine whether the exceptions set in paragraph 3 apply and issue or refuse to issue the certificate in accordance with the requirements set out in Annex IV.

6. From 1 January 2035, the exceptions listed in paragraph 3, points (d) and (e), may not be applied to a given ship, in total, more than five times during one reporting year. A port call shall not be counted for the purpose of compliance with this provision where the company demonstrates that it could not have reasonably known that the ship will be unable to connect for reasons referred to in paragraph 3, points (d) and (e).

7. Emergency situations resulting in the need to use on-board generators, referred to in paragraph 3, point (f), shall be documented and reported by the ship to the managing body of the port.

CHAPTER III

COMMON PRINCIPLES AND CERTIFICATION

Article 6

Common principles for monitoring and reporting

1. In accordance with Articles 7 to 9, companies shall, for each of their ships, monitor and report on the relevant data during a reporting period. They shall carry out that monitoring and reporting within all ports under the jurisdiction of a Member State and for any voyages to or from a port under the jurisdiction of a Member State.

2. Monitoring and reporting shall be complete and cover the energy used on-board by ships, while the ships are at sea as well as at berth. Companies shall apply appropriate measures to prevent any data gaps within the reporting period.

3. Monitoring and reporting shall be consistent and comparable over time. To that end, companies shall use the same monitoring methodologies and data sets subject to modifications assessed by the verifier. Companies shall enable reasonable assurance of the integrity of the data to be monitored and reported.

4. Companies shall obtain, record, compile, analyse and document monitoring data, including assumptions, references, emission factors and activity data, in a transparent and accurate manner, so that the verifier can determine the greenhouse gas intensity of the energy used on-board by ships.

5. In undertaking the monitoring and reporting activities set out in Articles 7 to 9 and 14 of this Regulation, information and data collected for the purpose of Regulation (EU) 2015/757 shall be used where appropriate.

Article 7

Monitoring plan

1. By 31 August 2024, companies shall submit to the verifiers a monitoring plan for each of their ships indicating the method chosen from among those set out in Annex I to monitor and report the amount, type and emission factor of energy used on-board by ships and other relevant information.

2. For ships falling under the scope of this Regulation for the first time after 31 August 2024, companies shall submit a monitoring plan to the verifier without undue delay and no later than two months after each ship's first call in a port under the jurisdiction of a Member State.

3. The monitoring plan shall consist of a complete and transparent documentation and shall contain at least the following elements:

   (a) the identification and type of the ship, including its name, its IMO identification number, its port of registry or home port, and the name of the ship-owner;

   (b) the name of the company and the address, telephone and e-mail details of a contact person;

   (c) a description of the energy conversion systems installed on-board, and the related power capacity expressed in megawatt (MW);

   (d) a description that the ship has installed and certified equipment to allow connection to onshore power supply, at a specified voltage and frequency, including the gear specified in IEC/IEEE 80005-1 (High Voltage) and IEC/IEEE 80005-3 (Low Voltage) or is equipped with substitute sources of energy or a zero-emission technology as specified in Annex III;

   (e) a description of the intended source(s) of energy to be used on-board while in navigation and at berth to comply with the requirements set out in Articles 4 and 5;

   (f) a description of the procedures for monitoring the fuel consumption of the ship as well as the energy provided by substitute sources of energy or a zero-emission technology as specified in Annex III;

   (g) well-to-wake emission factors referred to in Annex II;

   (h) a description of the procedures used to monitor the completeness of the list of voyages;

   (i) a description of the procedures used for determining activity data per voyage, including the procedures, responsibilities, formulae and data sources for determining and recording the time spent at sea between the port of departure and the port of arrival and the time spent at berth;

   (j) a description of the procedures, systems and responsibilities used to update any of the data contained in the monitoring plan over the reporting period;

(k) a description of the method to be used to determine surrogate data for closing data gaps;

(l) a revision record sheet to record all the details of the revision history.

4. Companies shall use standardised monitoring plans based on templates. The Commission shall, by means of implementing acts, determine those templates, including the technical rules for their uniform application. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 27(3).

Article 8

Modifications to the monitoring plan

1. Companies shall check regularly, and at least annually, whether a ship's monitoring plan reflects the nature and functioning of the ship and whether any of the data it contains can be improved.

2. Companies shall modify the monitoring plan in any of the following situations:

(a) where a change of company occurs;

(b) where new energy conversion systems, new types of energy, including substitute sources of energy or a zero-emission technology as specified in Annex III are in use;

(c) where a change in availability of data, due to the use of new types of measuring equipment, new sampling methods or analysis methods, or for other reasons, may affect the accuracy of the data collected;

(d) data resulting from the monitoring method applied has been found to be incorrect;

(e) where any part of the monitoring plan is identified as not being in conformity with the requirements of this Regulation and the company is required by the verifier to revise it.

3. Companies shall notify to the verifiers without undue delay any proposals for modification of the monitoring plan.

4. Modifications of the monitoring plan referred to in paragraph 2, points (b), (c) and (d) of this Article shall be subject to assessment by the verifier. Following the assessment, the verifier shall notify the company concerned whether those modifications are in conformity with Article 6.

Article 9

Certification of biofuels, biogas, renewable liquid and gaseous transport fuels of non-biological origin and recycled carbon fuels

1. Where biofuels, biogas, renewable fuels of non-biological origin and recycled carbon fuels, as defined in Directive (EU) 2018/2001, are to be taken into account for the purposes referred to in Articles 4(1) of this Regulation, the following rules apply:

(a) greenhouse gas emission factors of biofuels and biogas that comply with the sustainability and greenhouse gas saving criteria set out in Article 29 of

Directive (EU) 2018/2001 shall be determined according to the methodologies set out in that Directive;

(b) greenhouse gas emissions factors of renewable fuels of non-biological origin and recycled carbon fuel that comply with the greenhouse gas emission savings thresholds set out in Article 27(3) of Directive (EU) 2018/2001 shall be determined according to the methodologies set out in that Directive;

(c) biofuels and biogas that do not comply with point (a) or that are produced from food and feed crops shall be considered to have the same emission factors as the least favourable fossil fuel pathway for this type of fuel;

(d) renewable fuels of non-biological origin and recycled carbon fuels that do not comply with point (b) shall be considered to have the same emission factors as the least favourable fossil fuel pathway for this type of fuels.

2. Companies shall provide accurate and reliable data on the GHG emission intensity and the sustainability characteristics of biofuels, biogas, renewable fuels of non-biological origin and recycled carbon fuel, verified by a scheme that is recognised by the Commission in accordance with Article 30(5) and (6) of the Directive (EU) 2018/2001.

3. Companies shall be entitled to divert from the established default values for the tank-to-wake emission factors provided that actual values are certified by means of laboratory testing or direct emissions measurements. The Commission is empowered to adopt delegated acts in accordance with Article 26, in order to supplement this Regulation by establishing the rules on conducting the laboratory testing and direct emissions measurements.

CHAPTER IV

VERIFICATION AND ACCREDITATION

Article 10

Verification activities

1. The verifier shall assess the conformity of the monitoring plan with the requirements laid down in Articles 6 to 9. Where the verifier's assessment identifies non-conformities with those requirements, the company concerned shall revise its monitoring plan accordingly and submit the revised plan for a final assessment by the verifier before the reporting period starts. The company concerned shall agree with the verifier on the timeframe necessary to introduce those revisions. That timeframe shall in any event not extend beyond the beginning of the reporting period.

2. The verifier shall assess the conformity of the information reported with the requirements laid down in Articles 6 to 9 and Annexes I, II and III before performing the operations set out in Article 15(2).

3. Where the verification assessment identifies incorrect statements or non-conformities with this Regulation, the verifier shall inform the company concerned thereof in a timely manner. That company shall then amend the incorrect statements or non-conformities so as to enable the verification process to be completed in time.

Article 11

General obligations and principles for the verifiers

1. The verifier shall be independent from the company or from the operator of a ship and shall carry out the activities required under this Regulation in the public interest. For that purpose, neither the verifier nor any part of the same legal entity shall be a company or ship operator, the owner of a company, or be owned by them, nor shall the verifier have relations with the company that could affect its independence and impartiality.

2. The verifier shall assess the reliability, credibility and accuracy of the data and information relating to the amount, type and emission factor of the energy used on-board by ships, in particular:

   (a) the attribution of fuel consumption and the use of substitute sources of energy to voyages;

   (b) the reported fuel consumption data and related measurements and calculations;

   (c) the choice and the employment of emission factors;

   (d) the use of on-shore power supply or the presence of exceptions certified in accordance with Article 5(5).

3. The assessment referred to in paragraph 2 shall be based on the following considerations:

   (a) the reported data are coherent in relation to estimated data that are based on ship tracking data and characteristics such as the installed engine power;

   (b) the reported data are free of inconsistencies, in particular when comparing the total volume of fuel purchased annually by each ship and the aggregate fuel consumption during voyages;

   (c) the collection of the data has been carried out in accordance with the applicable rules; and

   (d) the relevant records of the ship are complete and consistent.

Article 12

Verification procedures

1. The verifier shall identify potential risks related to the monitoring and reporting process by comparing reported amount, type and emission factor of the energy used on-board by ships with estimated data based on ship tracking data and characteristics such as the installed engine power. Where significant deviations are found, the verifier shall carry out further analyses.

2. The verifier shall identify potential risks related to the different calculation steps by reviewing all data sources and methodologies used by the company.

3. The verifier shall take into consideration any effective risk control methods applied by the company concerned to reduce levels of uncertainty associated with the accuracy specific to the monitoring methods used.

4. The company concerned shall provide the verifier with any additional information that enables it to carry out the verification procedures. The verifier may conduct checks during the verification process to determine the reliability of reported data and information.

Article 13

Accreditation of verifiers

1. Verifiers shall be accredited for activities under the scope of this Regulation by a national accreditation body pursuant to Regulation (EC) No 765/2008.

2. Where no specific provisions concerning the accreditation of verifiers are laid down in this Regulation, the relevant provisions of Regulation (EC) No 765/2008 shall apply.

3. The Commission is empowered to adopt delegated acts in accordance with Article 26, in order to supplement this Regulation by establishing further methods and criteria of accreditation of verifiers. The methods specified in those delegated acts shall be based on the principles for verification provided for in Articles 10 and 11 and on relevant internationally accepted standards.

CHAPTER V

RECORDING, VERIFICATION, REPORTING AND ASSESMENT OF COMPLIANCE

Article 14

Monitoring and recording

1. Based on the monitoring plan referred to in Article 7, and following the assessment of that plan by the verifier, companies shall record, for each ship arriving in or departing from, and for each voyage to or from a port of call under the jurisdiction of a Member State, the following information:

   (a) port of departure and port of arrival including the date and hour of departure and arrival and time spent at berth;

   (b) for each ship that the requirement of Article 5(1) applies, the connection to and use of on-shore power or the existence of any of the exceptions listed in Article 5(3);

   (c) the amount of each type of fuel consumed at berth and at sea;

   (d) the well-to-wake emission factors for each type of fuel consumed at berth and at sea, broken down by well-to-tank, tank-to-wake and fugitive emissions, covering all relevant greenhouse gases;

   (e) the amount of each type of substitute source of energy consumed at berth and at sea.

2. Companies shall record the information and data listed in paragraph 1 on annual basis in a transparent manner, that enables the verification of compliance with this Regulation by the verifier.

3. By 30 March of each year, companies shall provide to the verifier the information referred to in paragraph 1.

Article 15

Verification and calculation

1. Following the verification laid down in Articles 10 to 12, the verifier shall assess the quality, completeness and accuracy of the information provided by the company in accordance with Article 14(3).

2. On the basis of the information verified according to paragraph 1, the verifier shall:

   (a) calculate, using the method specified in Annex I, the yearly average greenhouse gas intensity of the energy used on-board by the ship concerned;

   (b) calculate, using the formula specified in Annex V, the ship's compliance balance;

   (c) calculate the number of non-compliant port calls in the previous reporting period including the time spent at berth for each non-compliant port call.

   (d) calculate the amount of the penalties referred to in Article 20(1) and (2).

3. The verifier shall notify to the company the information referred to in paragraph 2.

Article 16

Compliance database and reporting

1. The Commission shall develop, ensure functioning and update an electronic compliance database for the monitoring of compliance with Articles 4 and 5. The compliance database shall be used to keep a record of the compliance balance of the ships and the use of the flexibility mechanisms set out in Articles 17 and 18. It shall be accessible to the companies, the verifiers, the competent authorities and the Commission.

2. The Commission shall, by means of implementing acts, lay down the rules for access rights and the functional and technical specifications of the compliance database. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 27(3).

3. By 30 April of each year, the company shall record in the compliance database for each of its ships the information referred to in Article 15(2), as ascertained by the verifier, together with information allowing to identify the ship, the company, as well as the identity of the verifier that carried out the assessment.

Article 17

Banking and borrowing of compliance surplus between reporting periods

1. Where the ship has a compliance surplus for the reporting period, the company may bank it to the same ship's compliance balance for the following reporting period. The company shall record the banking of the compliance surplus to the following reporting period in the compliance database subject to approval by its verifier. The company may no longer bank the compliance surplus once the FuelEU certificate of compliance has been issued.

2. Where the ship has a compliance deficit for the reporting period, the company may borrow an advance compliance surplus of the corresponding amount from the following reporting period. The advance compliance surplus shall be added to the ship's balance in the reporting period and subtracted from the same ship's balance in the following reporting period. The amount to be subtracted in the following

reporting period shall be equal to the advance compliance surplus multiplied by 1.1. The advance compliance surplus may not be borrowed:

(a) for the amount exceeding by more than 2% the limit set out in Article 4(2), multiplied by the energy consumption of the ship calculated in accordance with Annex I;

(b) for two consecutive reporting periods.

3. By 30 April of the year following the reporting period, the company shall record the advance compliance surplus, following approval by its verifier, in the compliance database.

Article 18

Pooling of compliance

1. The compliance balances of two or more ships, which are verified by the same verifier, may be pooled for the purposes of fulfilling the requirements of Article 4. A ship's compliance balance may not be included in more than one pool in the same reporting period.

2. By 30 March of the year following the reporting period, the company shall notify to the verifier the intention of including the ship's compliance balance in a pool for the immediately preceding reporting period. In the case where the ships participating in the pool are controlled by two or more companies, the companies shall make a joint notification to the verifier.

3. By 30 April of the year following the reporting period, the pool shall be recorded in the compliance database by the verifier. The composition of the pool shall not change after that date.

4. In case of pooled compliance under paragraph 1 of this Article, and for the purposes of Article 15(2)(b), the company may decide how to allocate the total compliance balance of the pool to each individual ship, provided that the total pool compliance balance is respected. In case where the ships participating in the pool are controlled by two or more companies, the total compliance balance of the pool shall be allocated in accordance with the method specified in the joint notification.

5. If the pool average compliance balance results in the compliance surplus for an individual ship, Article 17(1) applies.

6. Article 17(2) does not apply to a ship participating in the pool.

7. The company may no longer include the ship's compliance balance in a pool once the FuelEU certificate of compliance has been issued.

Article 19

FuelEU certificate of compliance

1. By 30 June of the year following the reporting period, the verifier shall issue a FuelEU certificate of compliance for the ship concerned, provided that the ship does not have a compliance deficit, after possible application of Articles 17 and 18, and does not have non-compliant port calls.

2. The FuelEU certificate of compliance shall include the following information:

(a) identity of the ship (name, IMO identification number and port of registry or home port);

(b) name, address and principal place of business of the ship-owner;

(c) identity of the verifier;

(d) date of issue of this certificate, its period of validity and the reporting period it refers to.

3. The FuelEU certificate of compliance shall be valid for the period of 18 months after the end of the reporting period.

4. The verifier shall inform the Commission and the flag State, without delay, of the issuance of any FuelEU certificate of compliance.

5. The Commission shall adopt implementing acts establishing models for the FuelEU certificate of compliance, including electronic models. Those implementing acts shall be adopted in accordance with the advisory procedure referred to in Article 27(2).

Article 20

Penalties

1. Where on 1 May of the year following the reporting period the ship has a compliance deficit, the company shall pay a penalty. The verifier shall calculate the amount of the penalty on the basis of the formula specified Annex V.

2. The company shall pay a penalty for each non-compliant port call. The verifier shall calculate the amount of the penalty by multiplying the amount of EUR 250 by megawatts of power installed on-board and by the number of completed hours spent at berth.

3. Notwithstanding Article 19(1), the verifier shall issue a FuelEU certificate of compliance once the penalties referred to in paragraphs 1 and 2 of this Article have been paid. The actions referred to in this Article as well as the proof of the financial payments in accordance with Article 21 shall be recorded in the FuelEU certificate of compliance.

4. The Commission is empowered to adopt delegated acts in accordance with Article 26 to amend Annex V in order to adapt the formula referred to in paragraph 1 of this Article, and to amend the amount of the fixed penalty laid down in paragraph 2 of this Article, taking into account the developments in the cost of energy.

Article 21

Allocation of penalties to support renewable and low-carbon fuels in the maritime sector

1. The penalties referred to in Article 20(1) and 20(2) shall be allocated to support common projects aimed at the rapid deployment of renewable and low carbon fuels in the maritime sector. Projects financed by the funds collected from the penalties shall stimulate the production of greater quantities of renewable and low carbon fuels for the maritime sector, facilitate the construction of appropriate bunkering facilities or electric connection ports in ports, and support the development, testing and deployment of the most innovative European technologies in the fleet to achieve significant emission reductions.

2. The revenues generated from penalties referred to in paragraph 1 shall be allocated to the the Innovation Fund referred to in Article 10a(8) of Directive 2003/87/EC. These revenues shall constitute external assigned revenue in accordance with Article 21(5) of the Financial Regulation, and shall be implemented in accordance with the rules applicable to the Innovation Fund.

3. The Commission is empowered to adopt delegated acts in accordance with Article 26 to supplement this Regulation concerning the modalities for the payment of the penalties referred to in Article 20(1) and 20(2).

Article 22

Obligation to carry a valid FuelEU certificate of compliance on-board

1. The ships calling at a port under the jurisdiction of a Member State shall carry on-board a valid FuelEU certificate of compliance.

2. The Fuel EU certificate of compliance issued for the ship concerned in accordance with Article 19 shall constitute evidence of compliance with this Regulation.

Article 23

Enforcement

1. Member States shall lay down the rules on sanctions applicable to infringements of this Regulation and shall take all measures necessary to ensure that they are implemented. The sanctions provided for must be effective, proportionate and dissuasive. Member States shall notify those provisions to the Commission by [dd/mm/20xx], and shall notify to the Commission without delay any subsequent amendments.

2. Each Member State shall ensure that any inspection of a ship in a port under its jurisdiction carried out in accordance with Directive 2009/16/EC includes checking that a valid FuelEU certificate of compliance is carried on board.

3. Where a ship has failed to present a valid FuelEU certificate of compliance for two or more consecutive reporting periods and where other enforcement measures have failed to ensure compliance, the competent authority of the Member State of the port of call may, after giving the opportunity to the company concerned to submit its observations, issue an expulsion order. The competent authority of the Member State shall notify the expulsion order to the Commission, the other Member States and the flag State concerned. Every Member State, with the exception of any Member State whose flag the ship is flying, shall refuse entry of the ship which is subject to the expulsion order into any of its ports until the company fulfils its obligations. Where the ship flies the flag of a Member State, the Member State concerned shall, after giving the opportunity to the company concerned to submit its observations, order a flag detention until the company fulfils its obligations.

4. The fulfilment of those obligations shall be confirmed by the notification of a valid FuelEU certificate of compliance to the competent national authority which issued the expulsion order. This paragraph shall be without prejudice to the provisions of international law applicable in the case of ships in distress.

5. Sanctions against a specified ship by any Member State shall be notified to the Commission, to the other Member States and to the flag State concerned.

Article 24

Right to review

1. The companies shall be entitled to apply for a review of the calculations and measures addressed to them by the verifier under this Regulation, including the refusal to issue a FuelEU certificate of compliance pursuant to Article 19(1).
2. The application for review shall be lodged, within one month of the notification of the result of calculation or of the measure by the verifier, with the competent authority of the Member State in which the verifier has been accredited. The decision of the competent authority shall be subject to judicial review
3. The decisions taken under this Regulation by the managing body of the port shall be subject to judicial review.

Article 25

Competent authorities

Member States shall designate one or more competent authorities as responsible for the application and enforcement of this Regulation ('competent authorities'). They shall communicate their names and contact information to the Commission. The Commission shall publish on its website the list of competent authorities.

CHAPTER VI

DELEGATED AND IMPLEMENTING POWERS AND FINAL PROVISIONS

Article 26

Exercise of delegation

1. The power to adopt delegated acts is conferred on the Commission subject to the conditions laid down in this Article.
2. The power to adopt delegated acts referred to in Articles 4(6), 5(4), 9(3), 13(3), 20(4), and 21(3) shall be conferred on the Commission for an indeterminate period of time from [date of entry into force of this Regulation].
3. The delegation of power referred to in Articles 4(7), 5(4), 9(3), 13(3), 20(4), and 21(3) may be revoked at any time by the European Parliament or by the Council. A decision to revoke shall put an end to the delegation of the power specified in that decision. It shall take effect the day following the publication of the decision in the *Official Journal of the European Union* or at a later date specified therein. It shall not affect the validity of any delegated acts already in force.
4. Before adopting a delegated act, the Commission shall consult experts designated by each Member State in accordance with the principles laid down in the Interinstitutional Agreement on Better Law-Making of 13 April 2016.
5. As soon as it adopts a delegated act, the Commission shall notify it simultaneously to the European Parliament and to the Council.

6. A delegated act adopted pursuant to Articles 4(7), 5(4), 9(3), 13(3), 20(4), and 21(3) shall enter into force only if no objection has been expressed either by the European Parliament or by the Council within a period of two months of notification of that act to the European Parliament and the Council or if, before the expiry of that period, the European Parliament and the Council have both informed the Commission that they will not object. That period shall be extended by two months at the initiative of the European Parliament or of the Council.

Article 27

Committee procedure

1. The Commission shall be assisted by the Committee on Safe Seas and the Prevention of Pollution from ships (COSS) established by Regulation (EC) 2099/2002 of the European Parliament and of the Council[29]. That committee shall be a committee within the meaning of Regulation (EU) No 182/2011.

2. Where reference is made to this paragraph, Article 4 of Regulation (EU) No 182/2011 shall apply. Where the opinion of the Committee is to be obtained by written procedure, that procedure shall be terminated without result when, within the time-limit for delivery of the opinion, the chair of the committee so decides

3. Where reference is made to this paragraph, Article 5 of Regulation (EU) No 182/2011 shall apply. Where the committee delivers no opinion, the Commission shall not adopt the draft implementing act and the third subparagraph of Article 5(4) of Regulation (EU) No 182/2011 shall apply.

Article 28

Report and review

1. The Commission shall report to the European Parliament and the Council, by 1 January 2030, the results of an evaluation on the functioning of this Regulation and the evolution of the technologies and market for renewable and low-carbon fuels in maritime transport and its impact on the maritime sector in the Union. The Commission shall consider possible amendments to:

   (a) the limit referred to in Article 4(2);

   (b) the ship types to which Article 5(1) applies;

   (c) the exceptions listed in Article 5(3).

Article 29

Amendments to Directive 2009/16/EC

The following point shall be added to the list set out in Annex IV to Directive 2009/16/EC: ‘51. The FuelEU certificate of compliance issued under Regulation (EU) xxxx on the use of renewable and low-carbon fuels in maritime transport’.

[29] Regulation (EC) No 2099/2002 of the European Parliament and of the Council of 5 November 2002 establishing a Committee on Safe Seas and the Prevention of Pollution from Ships (COSS) and amending the Regulations on maritime safety and the prevention of pollution from ships (OJ L 324, 29.11.2002, p. 1).

Article 30

Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*. It shall apply from 1 January 2025.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels,

For the European Parliament	*For the Council*
The President	*The President*

EUROPEAN
COMMISSION

Brussels, 14.7.2021
COM(2021) 562 final

ANNEXES 1 to 5

ANNEXES

to the

Proposal for a Regulation of the European Parliament and of the Council

on the use of renewable and low-carbon fuels in maritime transport and amending Directive 2009/16/EC

{SEC(2021) 562 final} - {SWD(2021) 635 final} - {SWD(2021) 636 final}

ANNEX I

METHODOLOGY FOR ESTABLISHING THE GREENHOUSE GAS INTENSITY LIMIT ON THE ENERGY USED ON-BOARD BY A SHIP

For the purpose of calculating the greenhouse gas intensity limit of the energy used on-board a ship, the following formula, referred to as Equation (1) shall apply:

GHG intensity index	WtT	TtW
$GHG\ intensity\ index\ \left[\frac{gCO2eq}{MJ}\right] =$	$\frac{\sum_i^{n\ fuel} M_i \times CO_{2eq\ WtT,i} \times LCV_i + \sum_k^c E_k \times CO_{2eq\ electricity,k}}{\sum_i^{n\ fuel} M_i \times LCV_i + \sum_k^c E_k}$	$+\frac{\sum_i^{n\ fuel}\sum_j^{m\ engine} M_{i,j} \times [\left(1-\frac{1}{100}C_{engine\ slip\ j}\right)\times (CO_{2eq,TtW,j}) + (\frac{1}{100}C_{engine\ slip\ j} \times CO_{2eq\ TtW,slippage,j})]}{\sum_i^{n\ fuel} M_i \times LCV_i + \sum_k^l E_k}$

Equation (1)

where the following formula is referred to as Equation (2):

$$CO_{2eq,TtW,j} = \left(C_{f\ CO_2,j} \times GWP_{CO_2} + C_{f\ CH_4,j} \times GWP_{CH_4} + C_{f\ N_2O,j} \times GWP_{N_2O}\right)_i$$ Equation (2)

Term	Explanation
i	Index corresponding to the fuels delivered to the ship in the reference period
j	Index corresponding to the fuel combustion units on board the ship. For the purpose of this Regulation the units considered are the main engine(s), auxiliary engine(s) and fired oil boilers
k	Index corresponding to the connection points (c) where electricity is supplied per connection point.
c	Index corresponding to the number of electrical charging points
m	Index corresponding to the number of energy consumers
$M_{i,j}$	Mass of the specific fuel i oxidised in consumer j [gFuel]
E_k	Electricity delivered to the ship *per* connection point k if more than one [MJ]
$CO_{2eq\ WtT,i}$	WtT GHG emission factor of fuel i [gCO_{2eq}/MJ]
$CO_{2eq\ electricity,k}$	WtT GHG emission factor associated to the electricity delivered to the ship at berth *per* connection point k [gCO_{2eq}/MJ]
LCV_i	Lower Calorific Value of fuel i [MJ/gFuel]
$C_{engine\ slip\ j}$	Engine fuel slippage (non-combusted fuel) coefficient as a percentage of the mass of the fuel i used by combustion unit j [%]
$C_{f\ CO_2,j}, C_{f\ CH_4,j}, C_{f\ N_2O,j}$	TtW GHG emission factors by combusted fuel in combustion unit j [gGHG/gFuel]
$CO_{2eq,TtW,j}$	TtW CO_2 equivalent emissions of combusted fuel i in combustion unit j [gCO_2eq/gFuel] $CO_{2eq,TtW,j} = \left(C_{cf\ CO_2,j} \times GWP_{CO_2} + C_{cf\ CH_4,j} \times GWP_{CH_4} + C_{cf\ N_2O,j} \times GWP_{N_2O}\right)_i$
$C_{sf\ CO_2,j}, C_{sf\ CH_4,j}, C_{sf\ N_2O,j}$	TtW GHG emissions factors by slipped fuel towards combustion unit j [gGHG/gFuel]
$CO_{2eq,TtWslippage,j}$	TtW CO_2 equivalent emissions of slipped fuel i towards combustion unit j [gCO_2eq/gFuel] $CO_{2eq,TtW\ slippage,j} = \left(C_{sf\ CO_2,j} \times GWP_{CO_2} + C_{sf\ CH_4,j} \times GWP_{CH_4} + C_{sf\ N_2O,j} \times GWP_{N_2O}\right)_i$
$GWP_{CO_2}, GWP_{CH_4}, GWP_{N_2O}$	CO_2, CH_4, N_2O Global Warming Potential over 100 years

In the case of fossil fuels, the default values in Annex II shall be used.

For the purpose of this regulation the term $\sum_k^c E_k \times CO_{2eq\ electricity,k}$ in the numerator of Equation (1) shall be set to zero.

Method for determining [M_i]

The [M_i] mass of fuel shall be determined using the amount reported in accordance with the framework of the reporting under Regulation (EU) 2015/757 for voyages falling within the scope of this Regulation based on the chosen monitoring methodology by the company.

Method for determining WtT GHG factors

For non-fossil fuels, wherever values different from the default values in Annex II are used, these shall be based on relevant Bunker Delivery Notes (BDNs), for the fuels delivered to the ship in the reference period, for at least equal quantities of fuels as the one determined as being consumed in scope of the regulated journey in accordance with point A.

The WtT GHG ($CO_{2eq\ WtT,i}$) of the fuels (which are not fossils fuels) are established in Directive (EU) 2018/2001. The actual values, contained in the Directive that shall be used for the purpose of this Regulation, in accordance with the methodology, are those without combustion[1]. For those fuels for which pathways are not included in the Directive and for fossil fuels, the WtT GHG emission factors ($CO_{2eq\ WtT,i}$) default values are contained in Annex II.

Fuel Bunker Delivery Note (BDN)

For the purposes of this regulation, relevant BDNs of fuels used on board shall contain at least the following information:

– product identification

– fuel mass [t]

– fuel volume [m^3]

– fuel density [kg/m^3]

– WtT GHG emission factor for CO_2 (carbon factor) [$gCO_2/gFuel$] and for CO_{2eq} [$gCO_{2eq}/gFuel$] and related certificate[2]

– Lower Calorific Value [MJ/g]

BDN Electricity

For the purposes of this regulation, relevant BDNs for electricity delivered to the ship shall contain at least the following information:

– supplier: name, address, telephone, email, representative

– receiving ship: IMO number (MMSI), ship name, ship type, flag, ship representative

– port: name, location (LOCODE), terminal/ berth

– connection point: OPS-SSE connection point, connection point details

[1] Reference is made to Directive (EU) 2018/2001, Annex V.C.1.(a) to the term e_u 'emissions from the fuel in use'

[2] This value is not required in case of fossil fuels referred to in Annex II. For all other fuels, including blends of fossil fuels, this value should be made available together with a separate certificate identifying the fuel production pathway.

– connection time: date/time of commencement/finalisation

– energy supplied: power fraction allocated to supply point (if applicable) [kW], electricity consumption (kWh) for the billing period, peak power information (if available)

– metering

Method for determining TtW GHG factors

The TtW emissions are determined on the basis of the methodology contained in this Annex as provided in Equation (1) and Equation (2)

For the purpose of this Regulation, the TtW GHG emission factors ($CO_{2eq,TtW,j}$) that shall be used to determine the GHG emissions are contained in Annex II. The CO_2 C_f factors shall be the ones established in Regulation (EU) 2015/757 and are reported in the Table for easy reference. For fuels whose factors are not included in the said regulation, default factors as contained in Annex II shall be used.

In accordance with its compliance plan referred to in Article 6 and upon assessment by the verifier, other methods, such as direct CO_{2eq} measurement, laboratory testing, may be used if it enhances the overall accuracy of the calculation.

Method for determining TtW fugitive emissions

Fugitive emissions are emissions caused by the amount of fuel that does not reach the combustion chamber of the combustion unit or that is not consumed by the energy converter because they are uncombusted, vented, or leaked from the system. For the purpose of this Regulation, fugitive emissions are taken into account as a percentage of the mass of the fuel used by the engine. The default values are contained in Annex II.

Methods for determining the reward factors linked to substitute sources of energy

In case substitute sources of energy are installed on board, a reward factor for substitute sources of energy can be applied. In case of wind power such reward factor is determined as follow:

Reward factor for substitute sources of energy- WIND (f_{wind})	$\frac{P_{Wind}}{P_{Tot}}$
0,99	0,1
0,97	0,2
0,95	$\geqslant$ 0,3

The ship GHG intensity index is then calculated by multiplying the result of Equation (1) by the reward factor.

Verification and Certification

Fuel Class	WtT	TtW
Fossil	Default values shall be used as provided in Table 1 of this Regulation	MRV Regulation CO_2 carbon factors shall be used for fuels for which such factor is provided

		For all other emissions factors, default values can be used as provided in Table 1 of this Regulation, alternatively Certified values by mean of laboratory testing or direct emissions measurements
Sustainable Renewable Fuels (Bio Liquids, Bio Gases, e-Fuels)	CO_{2eq} values as provided in RED II (without combustion) can be used for all fuels whose pathways are included in RED II, alternatively RED II approved certification scheme can be used	Emissions factors, default values can be used as provided in Table 1 of this Regulation, alternatively Certified values by mean of laboratory testing or direct emissions measurements.
Others (including electricity)	CO_{2eq} values as provided in RED II (without combustion) can be used for all fuels whose pathways are included in RED II, alternatively RED II approved certification scheme can be used	Emissions factors, default values can be used as provided in Table 1 of this Regulation, alternatively Certified values by mean of laboratory testing or direct emissions measurements.

ANNEX II

The emissions factors for fossils fuels contained in this Annex shall be used for the determination of the greenhouse gas intensity index referred to in Annex I of this Regulation.

The emissions factors of biofuels, biogas, renewable fuels of non-biological origin and recycled carbon fuels shall be determined according to the methodologies set out in Annex 5 part C of Directive (EU) 2018/2001.

In the table:

– TBM stands for To Be Measured

– N/A stands for Not Available

– The dash means not applicable

Table 1 – Default factors

1	2	3	4	5	6	7	8	9
	WtT			TtW				
Class / Feedstock	Pathway name	LCV $\left[\frac{MJ}{g}\right]$	$CO_{2eq\,WtT}$ $\left[\frac{gCO2eq}{MJ}\right]$	Energy Converter Class	$C_{f\,co_2}$ $\left[\frac{gCO2}{gFuel}\right]$	$C_{f\,CH_4}$ $\left[\frac{gCH_4}{gFuel}\right]$	$C_{f\,N_2O}$ $\left[\frac{gN_2O}{gFuel}\right]$	C_{slip} As % of the mass of the fuel used by the engine
Fossil	HFO ISO 8217 Grades RME to RMK	0,0405	13,5	ALL ICEs	3,114 MEPC245 (66) Regulation (EU) 2015/757	0,00005	0,00018	-
				Gas Turbine				
				Steam Turbines and Boilers				
				Aux Engines				
	LSFO	0,0405	13,2, crude 13,7 blend	ALL ICEs	3,114	0,00005	0,00018	-
				Gas Turbine				
				Steam Turbines and Boilers				
				Aux Engines				
	ULSFO	0,0405	13,2	ALL ICEs	3,114	0,00005	0,00018	-

1	2	3	4	5	6	7	8	9
	WtT			**TtW**				
	VLSFO	0,041	13,2	ALL ICEs	3,206 MEPC245 (66) MRV Regulation	0,00005	0,00018	-
	LFO ISO 8217 Grades RMA to RMD	0,041	13,2	ALL ICEs	3,151 MEPC245 (66) Regulation (EU) 2015/757	0,00005	0,00018	-
	MDO MGO ISO 8217 Grades DMX to DMB	0,0427	14,4	ALL ICEs	3,206 MEPC245 (66) Regulation (EU) 2015/757	0,00005	0,00018	-
	LNG	0,0491	18,5	LNG Otto (dual fuel medium speed)	2,755 MEPC245 (66) Regulation (EU) 2015/757	0	0,00011	3,1
				LNG Otto (dual fuel slow speed)				1,7
				LNG Diesel (dual fuel slow speed)				0.2
				LBSI				N/A
	LPG	0,046	7,8	All ICEs	3,03 Buthane 3,00 Propane MEPC245 (66) Regulation (EU) 2015/757	TBM	TBM	
	H2 (natural gas)	0,12	132	Fuel Cells	0	0	-	-
				ICE	0	0	TBM	
	NH3 (natural gas)	0,0186	121	No engine	0	0	TBM	-
	Methanol (natural gas)	0,0199	31,3	All ICEs	1,375 MEPC245 (66) Regulation (EU) 2015/757	TBM	TBM	-
Liquid biofuels	Ethanol E100	0,0268	Ref. to Directive (EU) 2018/2001	All ICEs	1,913 MEPC245 (66) Regulation (EU)	TBM	TBM	-

1	2	3	4	5	6	7	8	9
	WtT			**TtW**				
					2015/757			
	Bio-diesel Main products / wastes / Feedstock mix	0,0372	Ref. to Directive (EU) 2018/2001	ALL ICEs	2,834	0,00005 TBM	0,00018 TBM	-
	HVO Main products / wastes / Feedstock mix	0,044	Ref. to Directive (EU) 2018/2001	ALL ICEs	3,115	0,00005	0,00018	-
	Bio-LNG Main products / wastes / Feedstock mix	0,05	Ref. to Directive (EU) 2018/2001	LNG Otto (dual fuel medium speed)	2,755 MEPC245 (66), Regulation (EU) 2015/757	0,00005	0,00018	3,1
				LNG Otto (dual fuel slow speed)				1,7
				LNG Diesel (dual fuels)				0.2
				LBSI				N/A
Gas biofuels	Bio-H2 Main products / wastes / Feedstock mix	0,12	N/A	Fuel Cells	0	0	0	-
				ICE	0	0	TBM	
Renewable Fuels of non-Biological Origin (RFNBO) - (e- fuels)	e-diesel	0,0427	Ref. to Directive (EU) 2018/2001)	ALL ICEs	3,206 MEPC245 (66) Regulation (EU) 2015/757	0,00005	0,00018	-
	e-methanol	0,0199	Ref. to Directive (EU) 2018/2001	All ICEs	1,375 MEPC245 (66) Regulation (EU) 2015/757	0,00005	0,00018	-
	e-LNG	0,0491	Ref. to Directive (EU) 2018/2001	LNG Otto (dual fuel medium speed)	2,755 MEPC245 (66) Regulation (EU) 2015/757	0	0,00011	3.1
				LNG Otto (dual fuel slow speed)				1,7
				LNG Diesel (dual fuels)				0.2
				LBSI				N/A

1	2	3	4	5	6	7	8	9
	WtT			**TtW**				
	e-H2	0,12	3,6	Fuel Cells	0	0	0	-
				ICE	0	0	TBM	
	e-NH3	0,0186	0	No engine	0	N/A	TBM	N/A
Others	Electricity	-	106,3 EU MIX 2020 72 EU MIX 2030	OPS	-	-	-	-

Column 1 identifies the class of the fuels namely Fossils, Liquid Biofuels, Gaseous Biofuels, e-Fuels;

Column 2 identifies the name or the pathway of the relevant fuels within the class. For the Liquid Biofuels, Gaseous Biofuels, RFNBO (e-Fuels) the values for the WtT section shall be taken from Directive (EU) 2018/2001 (without combustion[3]); for fossils fuels only the default values in the table shall be used.

Column 3 contains the Lower Calorific Value of the fuels expressed in [MJ/g].

Column 4 contains the CO_{2eq} emissions values in [gCO_{2eq}/MJ]. For fossils fuels only the default values in the table shall be used. For all other fuels, (except were expressly indicated), values shall be calculated by using the methodology or the default values as per in Directive (EU) 2018/2001 deducted of the combustion emissions considering full oxidation of the fuel[4].

Column 5 identifies the main types/classes of energy converters such as 2 and 4 strokes Internal Combustion Engines (ICE) Diesel or Otto cycle, gas turbines, fuels cells etc.

Column 6 contains the emission factor C_f for CO_2 in [gCO_2/gfuel]. Emissions factors values as specified in the Regulation (EU) 2015/757 (or IMO MEPC245 (66) as amended) shall be used. For all those fuels not contained in Regulation (EU) 2015/757, the default values contained in the table should be used. Values certified by a by a trusted certifier (under the relevant provisions made in Directive (EU) 2018/2001) can be used in place of the default values.

Column 7 contains the emission factor C_f for methane in [gCH_4/gfuel]. Default values as contained in the table shall be used. Values certified by mean of testing can be used in place of the default values. For LNG fuels C_f for methane are set to zero.

[3] Reference is made to Directive (EU) 2018/2001, Annex V.C.1.(a) to the term e_u 'emissions from the fuel in use'.

[4] Reference is made to Directive (EU) 2018/2001, Annex V.C.1.(a) to the term e_u 'emissions from the fuel in use'

Column 8 contains the emission factor C_f for nitrous oxide in [gN_2O/gfuel]. Default values as contained in the table shall be used. Values certified by mean of testing can be used in place of the default values.

Column 9 identifies the part of fuel lost as fugitive emissions (C_{slip}) measure as % of mass of fuel used by the specific energy converter. Default values as contained in the table shall be used. Values certified by mean of testing can be used in place of the default values. For fuels such as LNG for which the fugitive emissions (slip) exists, the amount of fugitive emissions as presented in Table 1 is expressed in % of the mass of fuel used (Column 9). The values contained in Column 9 shall be used, in accordance with equation (1). The values of C_{slip} in Table (1) are calculated at 50% of the engine load.

ANNEX III

CRITERIA FOR THE USE OF ZERO-EMISSION TECHNOLOGY AS REFERRED TO IN ARTICLES 5(3)(b) and 7(3), points (d) and (f)

The following table provides a list of zero-emission technologies as referred to in Article 5(3)(b), as well as, specific criteria for their use as applicable.

Zero-emission technology	Criteria for use
Fuel cells	Fuel cells used on board for power generation while at berth should be fully powered by renewable and low carbon fuels.
On-board Electricity Storage	The use of on-board electricity storage is allowed irrespective on the source of energy that produced the stored power (on-board generation or on-shore in case of battery swapping).
On-board Electricity production from wind and solar energy	Any ship that is capable to sustain energy needs at berth through the use of wind and solar energy.

The use of these zero-emission technologies shall continuously achieve emissions that are equivalent to the emissions reductions that would be achieved by using on-shore power supply.

ANNEX IV

CERTIFICATE TO BE ISSUED BY THE MANAGING BODY OF THE PORT OF CALL IN CASES WHERE SHIPS CANNOT MAKE USE OF OPS FOR JUSTIFIED REASONS (ARTICLE 5(5)) - MINIMUM ELEMENTS TO BE INCLUDED IN THE CERTIFICATE

For the purposes of this Regulation, the certificate referred to in Article 5(5) shall contain at least the following information:

(1) Ship identification

- (a) IMO number
- (b) Ship name
- (c) Call sign
- (d) Ship type
- (e) Flag

(2) Port of call

(3) Location/terminal name

(4) Arrival date and time (ATA)

(5) Departure date and time (ATD)

The confirmation from the managing body of the port that the ship was found among any of the following cases:

- the ship made an unscheduled port call for reasons of safety or saving life at sea (Article 5(2), point (c))
- the ship was unable to connect to on-shore power supply due to unavailable connection points in the port (Article 5(2), point (d))
- the on-shore power supply equipment on board was found to be incompatible with the shore installation at the port (Article 5(2), point (e))
- that the ship used, for a limited period of time on-board energy generation, under emergency situations representing immediate risk to life, the ship, or the environment (Article 5(2), point (f)).

(6) Details of the managing body of the port

- (a) Name
- (b) contact (phone, email)

(7) Date of issue

ANNEX V

FORMULAS FOR CALCULATING THE COMPLIANCE BALANCE AND PENALTY LAID DOWN IN ARTICLE 20(1)

Formula for calculating the ship's compliance balance

For the purpose of calculating the compliance balance of a ship the following formula shall apply:

Compliance balance [gCO_{2eq}/MJ] =	$(GHGIE_{target} - GHGIE_{actual}) \times [\sum_i^{n\ fuel} M_i \times LCV_i + \sum_i^{l} E_i]$

Where:

gCO_{2eq}	Grams of CO_2 equivalent
$GHGIE_{target}$	Greenhouse gas intensity limit of the energy used on-board a ship according to Article 4(2) of this Regulation
$GHGIE_{actual}$	Yearly average of the greenhouse gas intensity of the energy used on-board a ship calculated for the relevant reporting period

Formula for calculating the penalty laid down in Article 20(1)

The amount of the penalty laid down in Article 20(1) shall be calculated as follows:

Penalty =	*(Compliance balance / $GHGIE_{actual}$) x conversion factor from MJ to tonnes of VLSFO (41.0 MJ / kg) x EUR 2400*