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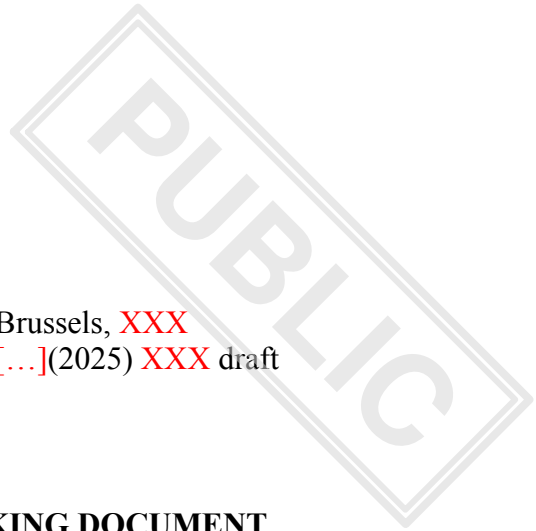
From:	General Secretariat of the Council
To:	Working Party on Shipping
Subject:	Preparation of IMO/SSE 12 (London, 9-13 March 2026) – Draft Union submission to the 12th session of the International Maritime Organization's Sub-Committee on Ship Systems and Equipment providing input to the work plan for development of Interim guidelines for the safety of ships using Battery Energy Storage Systems – Advance copy of a Commission Staff Working Document

Delegations will find attached an advance copy of a Commission Staff Working Document on the subject above.



EUROPEAN
COMMISSION

Brussels, XXX
[...] (2025) XXX draft



COMMISSION STAFF WORKING DOCUMENT

Union submission to the 12th session of the International Maritime Organization's Sub-Committee on Ship Systems and Equipment providing input to the work plan for development of Interim guidelines for the safety of ships using Battery Energy Storage Systems

Union submission to the 12th session of the International Maritime Organization's Sub-Committee on Ship Systems and Equipment providing input to the work plan for development of Interim guidelines for the safety of ships using Battery Energy Storage Systems

PURPOSE

This Staff Working Document contains a draft submission to the International Maritime Organization's (IMO) 12th session of the Sub-Committee on Ship Systems and Equipment (SSE 12). The IMO has scheduled SSE 12 from 9 to 13 March 2026.

This document provides information and proposes a way forward for the development of interim guidelines for the safety of battery energy storage systems as instructed by MSC 110 and organisation of work. This document builds on existing information, industry and national recommendations on the safety of lithium-ion battery energy storage systems to propose a scope and structure of the interim guidelines and a plan for the organisation of the work of the Sub-Committee on this topic.

Electric propulsion based on Battery Energy Storage Systems (BESS) is of key importance for passenger ships, especially ferries and roll-on roll-off passenger ships servicing EU ports in domestic and international routes, as the characteristics of this propulsion technology are especially suitable for the shorter distances covered by many of these trips.

Work is on-going at IMO to develop regulatory measures under SOLAS for new technologies and alternative fuels, which include electric propulsion with lithium-ion BESS.

EU RELEVANCE

Article 6(2)(a)(i) of Directive 2009/45/EC on safety rules and standards for passenger ships¹ provides that new passenger ships of Class A engaged in domestic voyages within the EU shall comply entirely with the requirements of the 1974 SOLAS Convention, as amended. Therefore, any changes to SOLAS regulations would affect Union common rules set out in that Directive.

As regards the sustainable development and use of alternative fuels, the Union has adopted the following legislative and policy initiatives:

- i) Directive 2009/28/EC (Renewable Energy Directive or RED), revised in 2018 (RED II - Directive 2018/2001/EU), on the promotion of the use of energy from renewable sources establishes a common framework for the promotion of energy from renewable sources. It sets a binding Union target for the overall share of energy from renewable sources in the Union's gross final consumption of energy in 2030. It also establishes sustainability and greenhouse gas emissions saving criteria for biofuels, bioliquids, and biomass fuels. The RED in its 2023 revision (RED III – Directive 2023/2413) contains an augmented binding target of at least 42.5% by 2030 but aiming for 45%. All the Member States of the EU must also ensure that at least 10% of their transport fuels come from renewable sources by 2020.
- ii) Regulation 2023/1805 (FuelEU Maritime) on the use of renewable and low-carbon fuels in maritime transport requires all vessels larger than 5000 GT used for commercial purposes, irrespective of their flag, to meet annual target reductions for greenhouse gas (GHG) intensity of the energy they use on board. It aims to increase consistent use of renewable and low-carbon fuels and substitute sources of energy in maritime transport across the Union.
- iii) Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure and repealing Directive 2014/94/EU establishes mandatory national targets leading to the deployment of sufficient alternative fuels infrastructure in the Union for road vehicles, trains, vessels, and stationary aircraft. It lays down common technical specifications and requirements on user information, data provision and payment requirements for alternative fuels infrastructure.
- iv) Regulation (EU) 2015/757 (MRV Regulation) on the monitoring, reporting and

¹ OJ L 163, 25.6.2009, p. 1

verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC. The regulation aims to deliver robust and verify CO2 emissions data, inform policy makers, and stimulate the market up-take of energy efficient technologies and behaviours by addressing market barriers such as the lack of information.

- v) Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments.
- vi) The Smart and Sustainable Mobility Strategy of 9 December 2020 calls for the EU to strive at IMO for high standards, including in the field of safety, security, and environmental protection, notably climate change. Its accompanying Action Plan includes actions to foster energy efficiency and alternative fuel measures at IMO and to put forward market-based measures for shipping at IMO.
- vii) The 'Fit for 55' on delivering the EU's 2030 Climate Target on the way to climate neutrality (COM(2021) 550 final).
- viii) The Communication from the Commission of 24 January 2013 entitled 'Clean Power for Transport: A European alternative fuels strategy
- ix) The development and implementation of safety management systems for alternative fuels under the ISM Code would apply to domestic ships under the scope of Regulation (EC) No 336/2006 of the European Parliament and of the Council of 15 February 2006.'

Therefore, the reduction of GHG emissions from ships touches upon an area which is largely covered by Union legislation, which thus risk being affected or its scope altered by future commitments taken at the IMO in this regard; hence the competence of the Union is exclusive.

In view of the importance of Battery Energy Storage Systems for the EU, this Staff Working Document is presented to establish an EU position on the matter and to transmit the document to the IMO prior to the required deadline of 5 December 2025.

**DEVELOPMENT OF A SAFETY REGULATORY FRAMEWORK TO SUPPORT THE
REDUCTION OF GHG EMISSIONS FROM SHIPS USING NEW TECHNOLOGIES AND
ALTERNATIVE FUELS**

**Input to the work plan for development of Interim guidelines for the safety of ships
using Battery Energy Storage Systems**

**Submitted by Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia,
Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania,
Luxembourg, Malta, Netherlands (Kingdom of the), Poland, Portugal, Romania,
Slovakia, Slovenia, Spain, Sweden and the European Commission, acting jointly in the
interest of the European Union**

SUMMARY

Executive summary: This document provides information and proposes a way forward for the development of interim guidelines for the safety of battery energy storage systems as instructed by MSC 110 and organisation of work.

Strategic direction, if applicable: 3

Output: 3.8

Action to be taken: Paragraph 32, 33, 34 and 38

Related documents: FP 55/8/4 (IACS), MSC 97/INF.8 (Denmark), HTW 10-6-7 (China), HTW 11-7-3 (China and Singapore), MSC 109/INF.7, MSC 109/6/2 (China), MSC 109/WP.9, MSC 109/WP.9/Add.1, MSC 110/6/5 (China), MSC 110/WP.1-Rev.1, MSC 110/WP.9

Introduction

1 In the context of the development of a safety regulatory framework to support the reduction of GHG emissions from ships using new technologies and alternative fuels, at MSC 110, the Committee assigned the tasks listed in annex 4 to MSC 110/WP.9 to the SSE Sub-Committee. Priority was given to the development of interim guidelines for the safety of ships using battery energy storage systems and to updates to the FSS Code concerning alcohol fires.

2 In this context, the Committee agreed to invite interested Member States and International organizations to submit relevant documents for consideration at SSE 12 regarding the prioritized tasks.

3 The Committee also requested the preparation of a work plan for that related with the assigned tasks, taking into consideration the Sub-Committee's existing work plan, and

recommended the SSE Sub-Committee to consider the establishment of a correspondence group, if deemed necessary.

4 This document builds on existing information, industry and national recommendations on the safety of lithium-ion battery energy storage systems to propose a scope and structure of the interim guidelines and a plan for the organisation of the work of the Sub-Committee on this topic.

Demand by stakeholders and fleet uptake

5 Based on the order books², the number of battery ships in operation is expected to increase by 40% within the next couple of years. An analysis of the market development from 2008 to 2022 and assuming that batteries will be part of the solution for the adoption of future fuels in the path to decarbonisation³, it is anticipated that by 2050, approximately 18.2% (in terms of the number of ships) of the global merchant fleet will be equipped with batteries, almost 39,000 ships. The current rate of battery installations shows an annual growth in installed capacity of 16%. Additionally, the annual global demand for maritime batteries in 2030 is forecasted to reach 916 MWh and 11,955 MWh by 2050.

6 In the absence of international regulatory framework, specific rules and guidance by the classification societies and industry, regional guidance and national recommendations, have become available, such as:

- .1 EMSA Guidance for Battery Energy Storage Systems.⁴
- .2 The Norwegian Maritime Authority's safety notices on battery fires with subsequent gas explosion (SM 3-2019 and SM 4-2021), protecting battery systems against humid, salty air and seawater intrusion (SM 2-2023), and the Guidelines on requirements for training in chemical storage (maritime battery systems) on board Norwegian ships (RSV 7-2023).
- .3 The Swedish Transport Agency (STA) guidelines for battery and hybrid electrically propelled ships published in 2018, titled: "Transportstyrelsens riktlinjer för batteri- och hybriddrivna fartyg" (TSG 2018-735, updated in 2023 TSG 2023-1338).
- .4 The Danish Maritime Authority's (DMA) guidelines on battery installations submitted for information to IMO in 2016 in document MSC 97/INF.8.
- .5 The requirements for battery installations published by the MCA (Maritime and Coastguard Agency, UK) in 2016: "Electrical Installations - Guidance for Safe Design, Installation and Operation of Li-ion Batteries" (MGN 550).
- .6 Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries.

7 This technology is already in use on board ships for main propulsion, auxiliary services or peak shaving purposes. According to the Alternative Fuels Insight (AFI) platform there are more than 1,000 battery-powered ships in operation worldwide, either domestically or in international waters. To put it in perspective, the number of battery-powered ships exceeds the combined number of LNG and methanol vessels. By application, 19% of the ships in operation are pure-electric and 81% operate in a hybrid configuration. Lithium-ion-based cell chemistries are used in 99% of ships in operation, with 76% of those using a lithium nickel manganese cobalt oxide (NMC) and 14% using lithium-iron phosphate (LFP).

Proposed scope of the interim guidelines

² [Alternative Fuels Insight \(AFI\) | Veracity by DNV](#) consulted on 17/07/2025

³ Current Status of Maritime Batteries and Future Outlook, Syb ten Cate Hoedemaker, Maritime Battery Forum, Rotterdam/Netherlands

⁴ [Ship Safety Standards - Battery Energy Storage Systems \(BESS\) - EMSA - European Maritime Safety Agency](#)

8 The statistics presented in 7, suggest that the primary focus of the work should address installations of Battery Energy Storage Systems (BESS) made of lithium-ion with liquid electrolyte technology, eventually identifying specific requirements for NMC and LFP as appropriate. Other batteries technologies, such as sodium based, or solid states solutions may be considered at a later stage. Furthermore, other energy storage technologies – such as supercapacitors – raise distinct safety considerations that, for clarity and accuracy, should be addressed in separate sections. Nevertheless, the co-sponsors support these to be included within the same set of guidelines for energy storage systems ensuring a comprehensive and unified resource on the subject as suggested in Annex 4 of MSC 110/WP.9.

9 The size of the batteries in terms of amount of energy stored, is often used by class societies and in the existing safety recommendations to determine their applicability. In some cases, the intended use of the batteries is also a factor. The co-sponsors consider that the amount of energy stored onboard is the primary safety concern, not its intended use, therefore a lower energy content limit for a BESS to fall under the scope of this work should be established. The most commonly used capacity threshold lays at 20 kWh which is considered practical and appropriate to consider for SOLAS vessels. In operational practice, larger vessels likely require battery capacities above this threshold.

10 The interim guidelines should be made suitable to address fixed installations and swappable or containerized batteries. The co-sponsors consider the safety considerations are primarily common to the battery technology and amount of energy stored rather than configuration. Therefore, functional requirements can be adapted to containerized, distributed or stationary installations onboard.

11 There should be a discussion whether the capacity threshold is set for the energy installed in single segregated compartments or the total onboard installation.

12 The interim guidelines should, in principle, apply to newbuilds and to new installations of Battery Energy Storage Systems (BESS) in existing ships; however, the guidance should also include recommendations on whether, and if so how, BESS already installed in existing ships should be addressed.

13 The performance requirements and testing standards for the battery systems and, where suitable, existing industry standards for maritime batteries should be referenced. The International Electrotechnical Commission (IEC) is developing a new industry standard for maritime batteries that is planned to be published on 31st December 2026. A recent analysis by the European Commissions' Joint Research Centre⁵ provides a comparative analysis of safety tests in various existing standards for the safety of stationary battery energy storage systems that may be applicable to maritime batteries.

14 The Sub-Committee should consider if at this stage there is enough information to account for the distinct safety concerns related to aging, wear and tear and best practices for the safe and effective reuse of second-life batteries or if their safety should be left out of scope of the specific provisions in the guidelines.

Preliminary Technical Considerations

15 In this section few preliminary considerations are provided in the attempt to sketch some of the relevant elements around the installation of BESS on board of ships.

⁵ [Hildebrand, S., Eddarir, A. and Lebedeva, N., Overview of battery safety tests in standards for stationary battery energy storage systems, Publications Office of the European Union, Luxembourg, 2024, doi:10.2760/08079, JRC135870](https://publications.ec.europa.eu/publications-detail/-/publication/11111111-1111-1111-1111-111111111111)

16 In line with recent IMO regulatory development principles, the work should be inspired to goal-based principles as *per* MSC.1/Circ.1394/Rev.2

17 It should be considered the need for a specific section addressing the main technical and safety features of the BESS itself, firstly identifying the boundary of the system and then giving considerations to some of the most relevant and safety critical elements such as cells, modules, packs, Battery Management System (BMS), converters and inverters chargers, Uninterruptible Power Systems (UPS) and communication protocols.

18 Further considerations should be given to the integration of the BESS as a whole in the Energy Management System (EMS) and to its interaction with the crew (human element) in terms of information to be provided, alerts and alarms.

19 For fixed installations in ship spaces, consideration should be given to the energy content and whether systems other than the BESS are allowed in the space.

20 The relevant chapter of the fire safety should be carefully discussed in the light of the fact that BESS contains oxidant and oxidizers to sustain fire and pose re-ignition hazard. It has to be considered whether the fire safety strategy should be tailored to the service of the ship (ocean going or short sea passages).

21 Fire detection, containment and extinguishment requirements may be then considered in the light of service of the ship and of the overall fire safety strategy considering issues such as re-ignition suppression or denial, structural integrity and load bearing while distinguishing between fire safety systems built-in the BESS racks with those pertaining to the space of the ship.

22 The ventilation strategy of the battery space should be considered in normal and emergency situations in combination with the fire safety one, giving due considerations to elements such as the potential building-up of toxic atmosphere, the energy capability of the BESS, the built-in systems ventilation capabilities and other.

23 Consider the need for, at least, some high-level, functional requirements for electrical installation to address known electrical hazards such as short circuits, electromagnetic compatibility, harmonic distortion et al.

24 Thorough consideration should be given to the tests and acceptance criteria required for the BESS system (such as propagation test for the cells) as well as to those required on board jointly with a gas and explosion analysis

25 Consideration should be given to the minimal set of procedures needed to safely run the BESS during normal and emergency operations as well as during recharging.

26 In the light of the work that may be requested to other sub-committees, particularly the work concerning training and qualification should be considered.

27 Containerized batteries should, in general, apply the same principles as for the fixed installations. However, additional considerations would be needed such as securing to the ship structure, deck space for safe loading and unloading, maintenance free space, built-in detection, containment and fire-fighting system preventing outward expansions of the flames, interface with the systems of the ship, breaching for fire-fighting means, structural integrity and UPS protection for the BMS.

28 Should the sub-Committee decide to follow the GBS structure, it is suggested to consider that, at least, during the development of the regulatory framework each section is introduced by the list of the relevant hazards. Furthermore, it is suggested to specialize the risk-assessment section with the list of the minimal set of hazards to be addressed.

Proposed structure of the interim guidelines

29 Annex I includes a proposed structure of the interim guidelines for energy storage systems based on the above considerations.

30 The co-sponsors support the development of requirements using a goal-based approach that remains flexible to adjust to the technology as it evolves.

31 The interim guidelines should be drafted as supplementary to existing instruments.

Proposed considerations on the existing and future work plan

32 As suggested in MSC 110/WP.9, the co-sponsors would support to address the matter comprehensively under the same workstream (fixed on-board, containerized battery installations and supercapacitors) rather than splitting into parallel discussions.

33 The co-sponsors would support the establishment of a correspondence group at SSE 12 for the development of the interim guidelines and suggest the terms of reference as per Annex III.

34 The co-sponsors would consider 3 sessions necessary for the approval of the interim guidelines. Possible work plan below:

2026	2027	2028	2028	...	[2031]
SSE 12	SSE 13	SSE 14	MSC 115	...	MSC 11X
Output 3.8 BESS	Output 3.8 BESS	Output 3.8 BESS	Approval [of the Interim Guidelines]	Experience gaining	[Guidelines]/[Amendments] made mandatory

Other useful references

35 Annex II proposing a preliminary set of definitions⁶ for establishing a common understanding of basic concepts concerning BESS.

36 SEABAT project on the development of modular full electric maritime battery concept: [Homepage - SEABAT](#)

37 *Current Direct* project on the use of swappable containerized batteries: [Deliverables - Current Direct](#)

Action requested by the sub-Committee

38 The Sub-Committee is invited to consider the information provided for the development of the work plan under this output related to the technologies listed in Annex 4 to MSC 110/WP.4.

⁶ From the EMSA Guidance for Battery Energy Storage Systems.

ANNEX I

Proposal for structure:

INTERIM GUIDELINES FOR THE SAFETY OF SHIPS USING [BATTERY] ENERGY STORAGE SYSTEMS

1 INTRODUCTION

2 GENERAL

2.1 Scope of application

2.2 Definitions

2.3 Alternative Design

3 GOAL AND FUNCTIONAL REQUIREMENTS

3.1 Lithium-ion batteries

3.2 Supercapacitors

3.3 Others

3.4 Risk assessment

4 LITHIUM-ION BATTERIES

4.1 Battery Energy Storage System (BESS)

HAZARDS to address:

- Overall, BESS design does not provide sufficient protection to prevent injuries.
- Energy stored in BESS is not sufficient, not readily available for the intended use in relation to the task of the ship and the functions assigned to the BESS and/or does not consider the ageing of the equipment.
- The BESS does not provide for redundancy, continuity of power supply in normal and in emergency operations, when it is the sole source of power, or when its functions provide energy for the essential services foreseen in MSC.1/Circ.1572 Annex 5.
- BESS is not designed for interfacing with other ship's systems, nor for being maintained and operated in marine environment, taking in duly considerations electrical hazards.
- BESS is not able to sustain large amplitude ship motions.
- ...

4.1.1 Cells, modules, packs

HAZARDS to address:

- Internal cell failure causing thermal runaway.
- Temperature control for cells and modules is not adequate.
- Means to prevent or mitigate internal short circuits, mechanical and electrical hazards are not implemented.
- Means to manage the thermal runaway propagation are not provided.

- ...

4.1.2 Uninterruptible Power Supply (UPS)

HAZARDS to address:

- *Loss of BESS safety functions due to loss of power.*
- *Configuration and available uninterruptible power supply is not able to maintain the functioning of the BESS's safety functions.*
- ...

4.1.3 Battery Management System (BMS)

HAZARDS to address:

- *Overcharge and over discharge are uncontrolled.*
- *High temperature during charging and discharging operations is not monitored and no measures implemented in case of overtemperature.*
- *BMS is not protected from unscheduled power interruptions.*
- *Interaction between the BMS and EMS is faulty leading to non-report of alarms and alerts, incorrect assessment of power demand and others.*
- *Cyber resilience is not ensured*
- ...

4.1.4 Other Components

HAZARDS to address:

- *Communication protocol fails to deliver, where needed, alarms and alerts messages.*
- *Communication protocols are compromised for the failure of a single node of the network.*
- *Converters and inverters-chargers do not operate as an integrated system, not providing for electrical protection and parameters within the range and tolerances of the BESS.*
- *Use out of operational tolerances and consequent system failures are not reported.*
- ...

4.1.5

4.2 BESS on-board arrangements

4.2.1 BESS spaces

HAZARDS to address:

- *Mechanical impact damaging the battery space.*
- *Battery gassing, fire and/or explosion originating inside the battery space.*
- *Water ingress, leakages and condensation in the battery space.*
- *External factors to the BESS determining unsafe conditions inside the battery space (such as fires, outside temperature).*
- *Overall degradation of the system and its performances due to environmental conditions.*
- ...

4.2.2 Fire Safety

HAZARDS to address:

- *Fire from other sources inside the battery space reaches the battery.*
- *Battery generated fires due to thermal runaway are not detected at inception.*
- *Fire re-ignition.*
- *Extinguishing means generate explosive, toxic and/or corrosive chemical compounds.*
- *External factors to the BESS determining unsafe conditions inside the battery space (such as fires, outside temperature).*
- *....*

Detection:

- *Thermal runaway is not detected at early stage and no consequential fire safety measures are taken.*
- *Detection technology is not able to detect fire inception from the relevant active conditions (e.g. High air speed impairing detection capabilities).*
- *...*

Containment:

- *Smoke and fire from outside the battery space determines unsafe conditions inside the battery space.*
- *Structural integrity is endangered by loss of containment.*
- *...*

Extinguishment:

- *Re-ignition of the fire in the battery space.*
- *Extinguishing means are not able to reach the fire.*
- *Extinguishing means generate explosive, toxic and/or corrosive chemical compounds.*
- *...*

4.2.3 Ventilation / HVAC

HAZARDS to address:

- *Overtemperature.*
- *Accumulation of toxic and explosive battery off-gases.*
- *Accumulation of smoke due to a fire.*
- *High level of humidity and condensation.*
- *....*

4.2.4 Electrical safety

HAZARDS to address:

- *External short circuits (high temperature, high humidity, others).*
- *Arc-flash.*
- *Faulty electrical protection of the system (over current, over and under voltage) and network.*
- *Earth fault.*
- *Electromagnetic incompatibility.*
- *Harmonic distortion.*
- *Mechanical impact (vibration levels exceeded, others).*
- *...*

4.2.5 Protection of the battery system

HAZARDS to address:

- *Mechanical impact damaging the battery.*
- *Battery exposed to non-design environmental conditions (temperature, humidity, etc.).*
- *Battery exposed to hazardous external factors such as fire or flooding.*
- ...

4.3 Containerised battery systems

4.4 Monitoring and alarms

[4.5 Operations and training

4.5.1 Shore-side battery charging

4.5.2 Handling containerized batteries]

5 SUPERCAPACITORS

6 OTHER [SPECIFIC] PROVISIONS

ANNEX II

This Annex provides a preliminary set of definitions. These definitions are solely for establishing a common understanding at the beginning of our discussion. References for existing definitions include the documents listed in paragraph 6.

The final list of definitions will be established upon completion of the work.

Terms and Definition

Battery cell

The basic functional unit in a battery constituted by electrodes, electrolyte, active materials (such as lithium and cobalt), separators if applicable, container and terminals. A 'secondary battery cell' can receive, store, and deliver electrical energy through chemical energy storage within its internal components.

Battery Energy Storage System (BESS)

A rechargeable battery with internal storage specifically designed to store and deliver electric energy into the grid, which includes battery modules, packs, electrical interconnections, means of isolation, cooling system (as appropriate), battery management system and other safety features.

Battery Management System (BMS)

Electronic system that controls, manages, detects, calculates electric and thermal functions of the battery system and provides communication between the battery and upper-level control systems. It monitors the state of the battery and protects the battery from operating outside its safe operating area. (In EMSA battery Guidance and

Battery module

An assembly of battery cells electrically connected which includes a monitoring circuitry and may include protective devices.

Battery pack

An energy storage device comprising one or more electrically connected cells or modules. The battery pack can include protective housing, protective devices and control and monitoring systems in communication with the battery management system. A battery pack can be used as stand-alone unit when a battery management system is integrated in the pack.

Battery room

Dedicated space where the Battery Energy Storage System is installed.

Battery space

A ship's space not exclusively dedicated to Battery Energy Storage System.

Battery string

A number of cells or modules connected in series with the same voltage level as the battery system.

Battery Thermal Management System (BTMS)

System that regulates the temperature of the batteries within the range specified by the manufacturer. *Note:* for the purpose of these guidelines BTMS has to be understood as the system built-in the battery case or rack and it should not to be confused with the ship-board HVAC system.

Cell balancing

Passive and/or active techniques that redistribute charges between battery cells to maintain equivalent state-of-charge of every cell.

Energy Management System (EMS)

Integrated system that provides information and manages the flow of energy in a Power System looking to safety, function, and operating modes. It collects energy measurement data from the field and makes it available for information through graphics, online monitoring tools, and energy quality analysers.

Hazardous area

Means an area in which an explosive and/or toxic gas atmosphere is or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of equipment.

Lithium-ion cell

Cell where electrical energy is derived from the insertion/extraction reactions of lithium ions or oxidation/reduction reaction of lithium between the negative electrode and the positive electrode.

Off-gas

The gas released by the battery cells during an abnormal incident, constituted by thermal runaway exhaust gas such as vaporised electrolyte.

Power Management System (PMS)

An electronic system to control the power production, distribution and load calculations of the ship ensuring that power capacity is line with demand at any time. The PMS integrates all sources of energy production and consumption, and controls all associated sub-systems such as the electrical main distribution line, prime movers, energy storage systems, propulsion, and main consumers.

Rated capacity

The total number of ampere-hours (Ah) that can be withdrawn from a fully charged battery under reference conditions. Error! Bookmark not defined.

State of charge (SoC)

A measurement of the amount of energy left available in a battery pack or system in a specific point in time expressed as a percentage of rated capacity. It provides information on how long the battery can perform before it needs to be charged or replaced.

State of health (SoH)

A measure of the general condition, including state of safety, and performance of a rechargeable battery compared to its initial condition.

Thermal runaway

The condition of accelerated increase of temperature by self-heating, where the rate of heat generation within a battery component, typically larger than $>80\text{ }^{\circ}\text{C}$ or $1\text{ }^{\circ}\text{C/s}$, exceeding its heat dissipation capacity.

Venting

The operation of release of excessive internal pressure from a cell/battery as intended by design to prevent rupture of the case or explosions. or upon release of toxic gases or smoke.

ANNEX III

Suggested Terms of Reference for the correspondence group proposed to be established at SSE 12

.1 Agree on an initial structure of the interim guidelines suitable to address the relevant gaps and barriers to fixed on-board lithium-ion batteries, containerised batteries and supercapacitors as listed in MSC 110/WP.9 Annex 4.

.1 on the basis of MSC 109-WP.9 commence the work on the Interim Guidelines for battery energy storage systems and for supercapacitors for maritime applications

.2 advise the sub-Committee on the need to consult other relevant sub-Committee

.3 convene remote meetings using a suitable platform in order to consider any of the terms of reference, as necessary, for further progress the work; and

.4 submit a written report to SSE 13