

Nuclear Propulsion

(Revision 0)

Our Position

IACS recognizes nuclear propulsion as an option for decarbonising maritime transport and improving operational efficiency.

Leveraging its expertise in maritime, IACS is committed to support the industry ensuring the safe, secure, and environmentally responsible integration of nuclear power into ship design and operations.

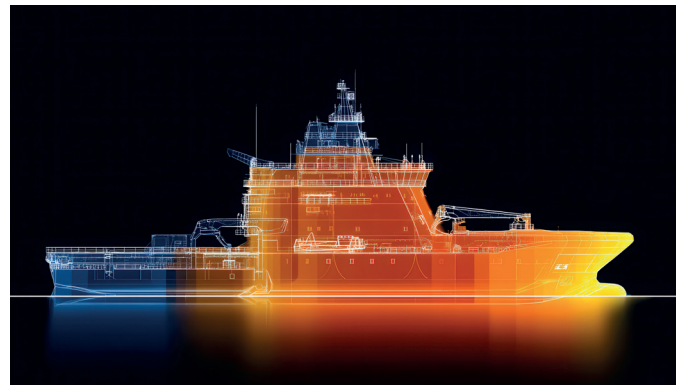
IACS will contribute to developing robust regulatory frameworks, technical international standards and guidelines through active collaboration with international regulators and industry stakeholders.

BACKGROUND

The maritime sector faces increasing pressure to reduce greenhouse gas emissions amid global competition for low-carbon energy solutions. Nuclear power, particularly through advancements like Small and Advanced Modular Reactors (SMR/AMR) and Floating Nuclear Power Plants (FNPPs), offers a high-capacity, low-emission option for marine power and port electrification. SMR/AMRs, with potential capacities up to 300MW(e) per unit and promising passive safety systems, are being considered suitable for maritime applications, while FNPPs enable transportable low carbon energy for remote or offshore operations.

Globally, onshore nuclear power generates approximately 10% of electricity, with 420 reactors operational and 63 under construction as of 2025 (IEA, 2025 “The Path to a New Era for Nuclear Energy”). Interest in nuclear energy is growing, with 5 countries adopting it anew, 23 considering it, 19 expanding fleets, and only 3 phasing out (IEA, 2024). At COP28 in December 2023, 22 countries initially signed the Declaration to Triple Nuclear Energy by 2050, a number that grew to 31 by March 2025, reflecting strong international momentum (World Nuclear Association, 2025).

Nuclear power has a proven service record in naval vessels since the 1950s and is now being developed for commercial shipping. Recent initiatives, such as the IAEA’s Atomic Technology Licensed for Applications at Sea (ATLAS) project ^[1], EMSA’s report on nuclear propulsion ^[2], and IMO Secretary-General Arsenio Dominguez’s statements at the 2024 Global Maritime Forum ^[3], underscore its potential. IACS members have



supported these initiatives through participation in IAEA symposia and industry association, focusing on safety and regulatory development.

Summary of key issues

IACS acknowledges that the deployment of nuclear propulsion in commercial shipping introduces significant technical, regulatory, and societal challenges. These include but are not limited to:

- Public and political perception of nuclear energy
- Insurance, liability, and port access considerations
- Emergency preparedness and international coordination
- Safe decommissioning and waste disposal

These issues require multi-stakeholder cooperation and alignment with international frameworks. IACS is committed to supporting safe and transparent solutions, aligned with IAEA guidance, IMO instruments, and flag State regulations.

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IACS POSITION

IACS defines nuclear-powered ships as self-propelled vessels with an onboard nuclear fission reactor providing power generation for propulsion and auxiliary services.

IACS will provide technical support to the IMO to revise SOLAS Chapter VIII and IMO Resolution A.491(XII), unchanged since 1981, to address SMR/AMR nuclear technologies.

IACS will collaborate with the IAEA, IMO, and flag states administrations to establish a comprehensive regulatory framework for nuclear propulsion.

IACS will at a later stage consider the opportunity of developing Technical Resolutions to ensure consistent safety and design requirements for nuclear-powered ships.

SUMMARY OF WORK CARRIED OUT BY IACS ON THIS ISSUE TO DATE

- Supported the IAEA Consulting Group on FNPPs since 2023.
- Participated as panellists at the IAEA Symposium on Floating Nuclear Power Plants, November 2023 ^[4].
- Contributed to the IAEA International Conference on SMRs and Their Applications, October 2024 ^[5].
- Engaged in Industry working groups on nuclear maritime regulations, safety, and insurance.



Footnotes:

[1] Mr Grossi, Director General of the International Atomic Energy Agency (IAEA), post on Twitter and X, 2024.

[2] EMSA, "3rd Workshop on Alternative Fuels," 2024, emsa.europa.eu/workshops-a-events.

[3] IMO Secretary-General statement, Global Maritime Forum, Japan, 2024.

[4] IAEA Symposium on FNPPs, November 2023, www.iaea.org.

[5] IAEA Conference on SMRs, October 2024, www.iaea.org.

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