IMO Expert Workshop on the relationship between Energy Efficiency and Underwater Radiated Noise
Sept 18-19, 2023

KEY TAKEAWAYS

Acknowledging some proven technologies and growing evidence of co-benefits, now is the time to prioritize ship designs and operations that collectively increase energy efficiency, lower Greenhouse Gas (GHG) emissions, and reduce underwater radiated noise (URN).

To accelerate progress toward decarbonization and ship quieting, we need intentional and integrated ship designs that increase energy efficiency and reduce GHG and URN.

INTENTIONAL DESIGN AND TECHNOLOGY INTEGRATION ARE NEEDED TO OPTIMIZE GHG AND URN REDUCTION

1. The most promising opportunities for optimizing energy efficiency gains and achieving GHG and URN reductions are in the early design stage, taking a systems approach, and considering more holistic re-conception of propulsion and novel technologies, many of which are also suitable as retrofits.
2. We need to continue developing and promoting design work for variable operational parameters and conditions, including those that optimize for low GHG and URN.
3. Reduced speed is a well-documented approach for fixed propeller vessel types to achieve lower GHG and URN emissions. Further reduction can be realized when carefully integrated with ship design, engine tuning, and operational profile at such speed.
4. Efforts to reduce cavitation through alternative propulsion, wake and propeller inflow, and other solutions have significant potential to deliver GHG and URN reductions and improve energy efficiency. Energy efficiency measures that increase URN can be avoided.

GHG AND URN EMISSION MEASUREMENTS ARE NEEDED TO SUPPORT INNOVATION

5. Standardized in-air and in-water emission measurements should continue to be gathered to validate computational or equivalent GHG and URN estimates, including for combinations of treatments that have the potential to be synergistic and to validate opportunistic measurement systems.
6. Ship baseline measurement (i.e. no mitigation) should be conducted by appropriate and practical methods to provide validated benchmarks for demonstrating the efficacy of new operational, technology and design approaches that reduce GHG and URN. There is a need to increase access to URN measurement and data collection opportunities that are financially viable for all owners and operators to understand their ship/fleet URN baselines and make informed decisions.
7. Promising technologies for integrated GHG and URN reduction should undergo full scale trials, including evaluation of maintenance and reliability, suitability for classification society approval, in order to ensure fitness of purpose over the ship life cycle. Longevity datasets of EE, GHG, and URN performance (e.g., through one dry dock cycle) will add important information on full payback schedule and maintenance as well as supporting continuing evaluations of cost-benefits over time.

OPERATIONAL CONSIDERATIONS CAN SIGNIFICANTLY INFLUENCE GHG AND URN REDUCTION

8. Dynamic onboard tech/sensors (GHG, fuel burn, cavitation, proxy URN) allow for real-time, dedicated monitoring and optimization of ship operations to help the shipping industry achieve objectives for EE, GHG, and URN management.
9. Implementing and maintaining clean and drag-resistant surfaces is a highly effective and feasible means to realize efficient, low GHG and low URN.
10. Green Corridors are a prime opportunity to integrate ship quieting technologies with domestic and international EE and GHG reduction commitments and policies to improve climate and ocean health.

ONGOING INFORMATION SHARING, COLLABORATION AND STAKEHOLDER ENGAGEMENT ARE NECESSARY TO ELEVATE GHG AND URN REDUCTION EFFORTS

11. Keep a multistakeholder, rights-holders, cross-disciplinary dialogue open and work to integrate information gathering streams, including through regular workshops. Continue to promote ongoing collaboration and sharing of lessons learned from global pilot projects and include Indigenous and seafarer experience and knowledge to supporting the experience building phase for the IMO URN Guidelines[1] (3 years).
12. More incentive schemes and other mechanisms are needed to de-risk and encourage early adoption of integrated GHG and URN reduction technologies and measures for ships.
13. Shippers, charterers, ship managers and port authorities (just in time) can have significant influence over operation of the ship, including decisions that can affect realized EE, GHG and URN emission reductions, and should be taken into consideration as part of voyage planning and while underway.

DECISION SUPPORT TOOLS ARE NEEDED TO FOSTER INCREASED INTEGRATION OF GHG AND URN REDUCTION

14. Some tools are available or under development to support prediction of both GHG and URN baseline and scenario results for fleets, routes, regions and countries. They will continue to benefit from empirical validation to predict inter-related results when ship designs and operations change.
15. We need to promote continual adaptation of resources like the VARD report[2] to allow ship owners/operators to select EE and URN reduction measures that match performance goals and requirements for specific ship types and operational modes (eg., sub-menus of the best potential for that group), including Arctic operations and double-ended ships.

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[1] MEPC.1/Circ.906, *Revised Guidelines for the reduction of underwater noise from commercial shipping to address adverse impacts on marine life*, 2023

[2] Vard Marine Inc, *Ship Energy Efficiency and Underwater Radiated Noise Report and Technology Matrix*, 2023