Ship Energy Efficiency Management Plan (SEEMP)

Guidance Notes for Ship Owners and Ship Operators

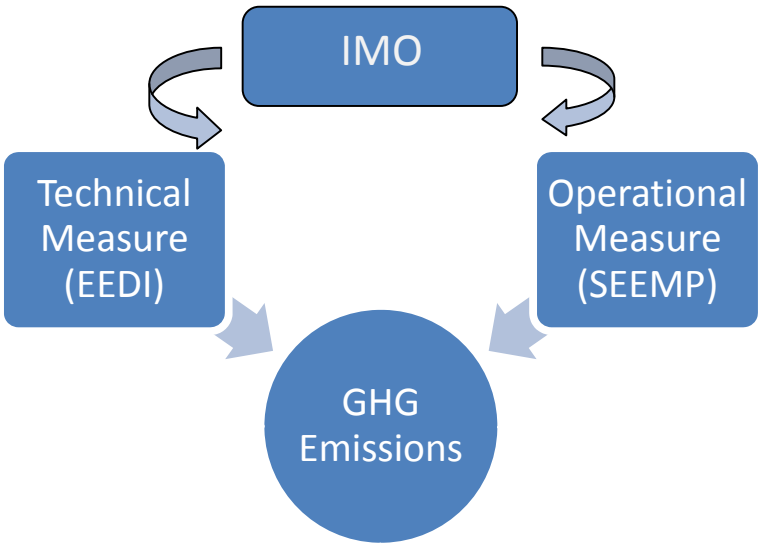
2012-2013

IRCLASS
Indian Register of Shipping

Greening Trend

- Recent developments at IMO in the form of mandating Energy Efficiency Design Index (EEDI) for all new ships, regulations for the control of CO_2 emissions from existing ships in the form of Ship Energy Efficiency Management Plan (SEEMP) & Energy Efficiency Operational Indicator (EEOI), all clearly indicate that the *greening trend* has picked up momentum in the maritime industry and has forced its way into the key priorities of the shipping sector.

- Although shipping has a very robust track-record as the most energy efficient mode of transport, owing to its bulk transportation nature, there is an increased scrutiny on the shipping industry to reduce its GHG emissions.



SEEMP – Why, What, How and When?

Why

- Regulating authorities worldwide have become more concerned about the global carbon emissions.
- Although shipping has a very robust track-record as the most energy efficient mode of transport, owing to its bulk transportation nature, there is an increased scrutiny on the shipping industry to reduce its GHG emissions.
- It has been widely recognized that if efficiency of ship operations were improved, then carbon emissions could be reduced significantly.
- The purpose of introducing SEEMP is to assist Ship Owners to use it as an energy management tool in managing energy efficiency of their ships.

What

- A Ship Energy Efficiency Management Plan (SEEMP), is a ship-specific document containing energy efficiency improvement measures identified by the Ship Owner, to be kept onboard each ship.
- A Ship Energy Efficiency Management Plan (SEEMP), being introduced as an operational measure, is a tool for monitoring ship and fleet energy efficiency performance over time and improving it with a PDCA (Plan-Do-Check-Act) cycle.
- It encourages the ship-owner, to incorporate new technologies and adopt best management practices to ensure an energy efficient ship operation.

How

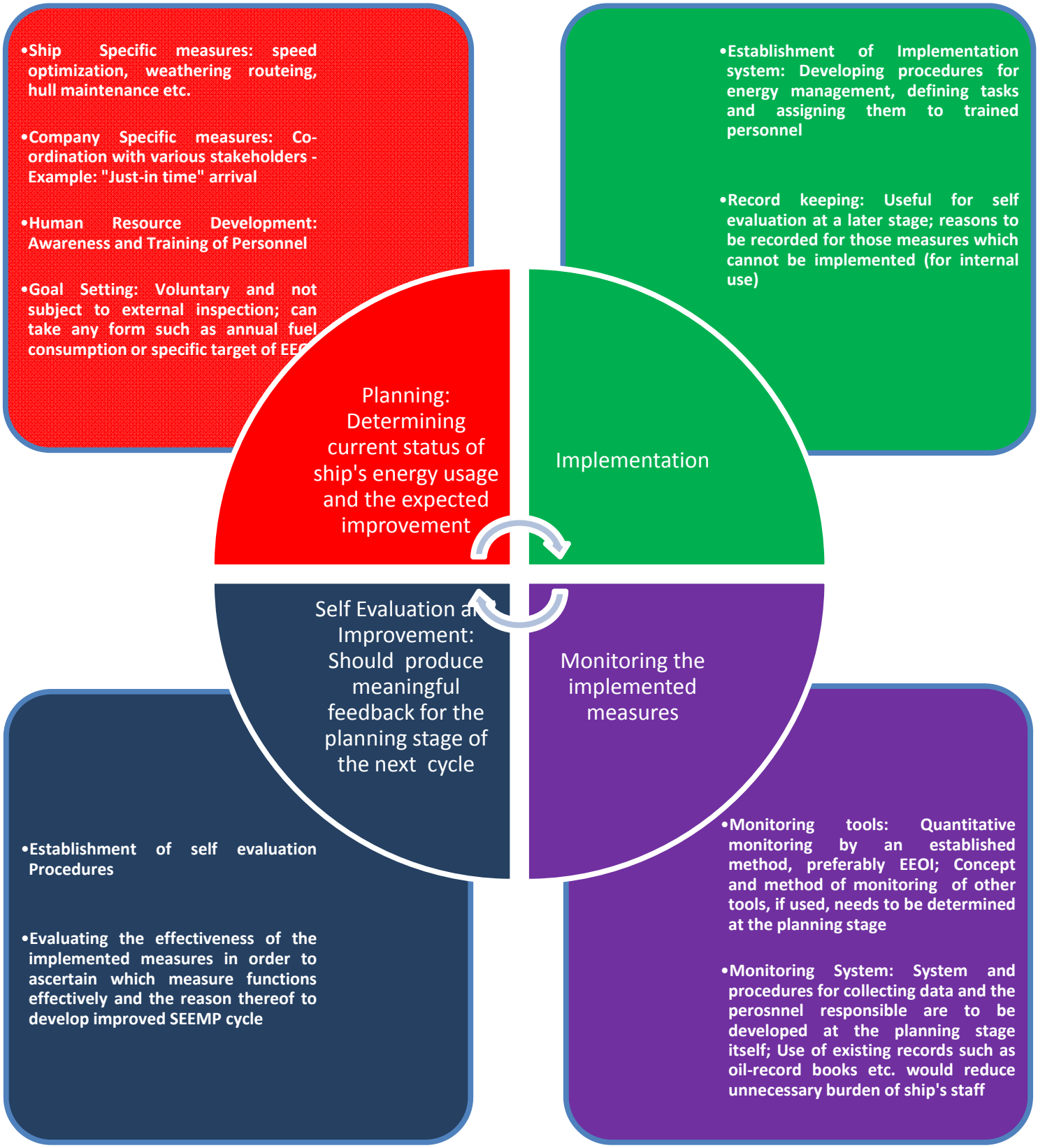
The SEEMP approach seeks to improve a ship's energy efficiency through four steps:

- Planning,
- Implementation,
- Monitoring,
- Self-evaluation and Improvement.

When

- SEEMP is to be available onboard during the first renewal or intermediate survey on or after 1st January 2013
- And is mandatory for all ships of 400 GT and above

SEEMP – Framework



Best Management Practices – An Outlook

I) Fuel-efficient Operations

Improved Voyage Planning -
Careful planning and execution of voyages;
IMO Res. A893(21) - Guidelines for voyage planning

Weather Routeing
High Potential for energy savings
Commercially available for all types of ships and for many trade areas

Just-in time arrival
Early communication with next port of call
to give maximum notice for berth availability

Speed Optimization

- Speed at which fuel used per tonne-mile is minimum for that voyage but does not mean minimum speed;Reference to engine manufacturer's power/fuel consumption curve and ship's propeller curve is to be made for achieving this speed

Optimized Shaft Power

- Operation at constant shaft RPM is always desirable; Use of electronic engine management systems will be beneficial from the optimisation point of view

II) Optimized Ship Handling

Optimum Trim

- Trim has a significant influence on the resistance of the ship through the water and optimizing trim can deliver significant fuel savings.

Optimum Ballast

- Ballast to be adjusted for optimum trim and speed conditions; Has a significant impact on steering conditions and auto pilot settings

III) Other Best Management Practices

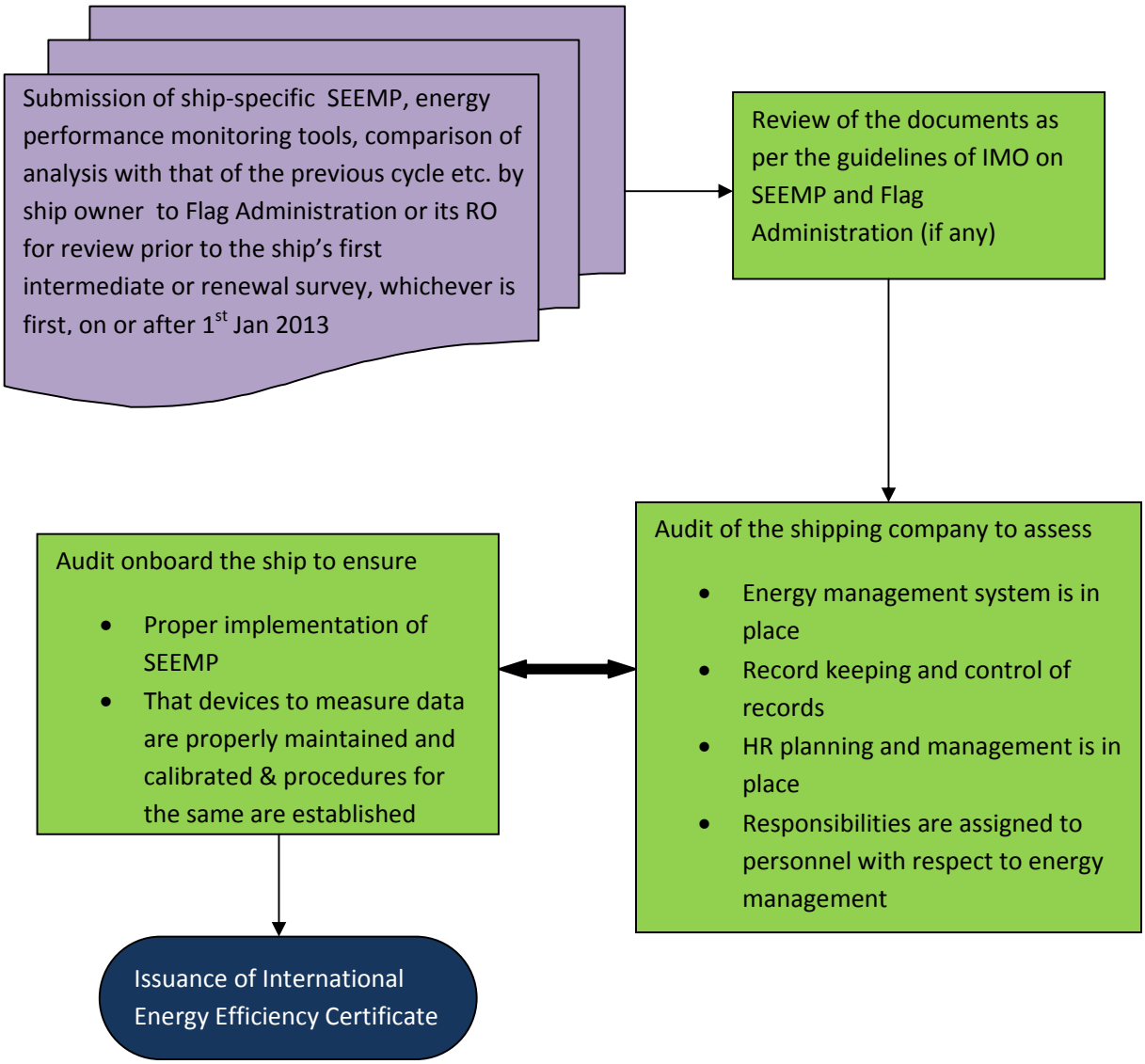
- Hull Maintenance: Hull resistance can be optimized by new technology-coating systems in combination with cleaning systems and regular in-water inspection of the condition of the hull
- Propulsion system maintenance: Systematic minimization of heat and mechanical loss
- Improved Fleet Management: Possible to avoid or reduce long ballast voyages through improved fleet planning; Maintenance-oriented data sharing within a company can be used to promote best practice among ships within a company
- Improved Cargo Handling: Cargo Handling to match ship and port requirements
- Energy Management: Thermal insulation, optimization of reefer container stowage locations, cargo tank heating, ventilation etc. are means of saving energy

Other means to improve energy efficiency

Optimum propeller and propeller inflow considerations – Retrofitting of improved propeller designs with due consideration to the entire propulsion train and improving the water inflow to the propeller using fins and/or nozzles could bring down fuel consumption **Making use of the new breed of electronic controlled engines can provide efficiency gains**	**Optimum use of rudder and heading control systems (autopilots) – Automated heading and steering control system technology can achieve fuel savings by reducing the distance sailed "off track"; Improved rudder blade design (eg. "twist-flow" rudder) may also be considered** **Making use of the heat losses from the exhaust gas for either electricity generation or additional propulsion with a shaft motor**	**Use of emerging alternative fuels as a potential option** **Use of software to optimize operations and estimating emissions "footprint"; consideration of renewable energy sources for onboard application; making use of energy efficient shore power where available**

The above measures and management practices are potentially cost-effective. However they are not necessarily cumulative and are often dependent of area and trade. Utilization of some of the above measures would likely require support and coordination of different stakeholders to make use of them effectively. Clearly, the above options are heavily influenced by the remaining service life of a ship, cost of fuel, trade and sailing area.

Verification Process



Since SEEMP evolves on PDCA cycle, it follows an iterative process. The iteration cycle is to be not less than one year and not more than three years, to realize the effectiveness of the measures implemented. The iteration cycle adopted for a particular ship is to be mentioned in its SEEMP. Evaluation of energy performance through monitoring tools like EEOI is to be done to ascertain the effectiveness of the measures taken to develop an improved SEEMP cycle.

SEEMP Template

Name of Vessel:		GT:	
Vessel Type:		Capacity:	

Date of Development:		Developed by:	
Implementation Period:	From: Until:	Implemented by:	

Planned Date of Next Evaluation:	

1. ENERGY EFFICIENCY MEASURES/PRACTICES

Energy Efficiency Measures	**Implementation (Including the starting date)**	**Responsible Personnel**
Weather Routeing	[Example] Contracted with [Service providers] to use their weather routeing system and start using on-trial basis as of 1st July 2012	[Example] The master is responsible for selecting the optimum route based on the information provided by [Service providers]
Speed Optimization	While the design speed (85% MCR) is 19 knots, the maximum speed is set at 17 knots as of 1st July, 2012	The master is responsible for keeping the ship's speed. The log-book entry should be checked everyday.

2. MONITORING

Description of monitoring tools

3. GOALS SET

Measurable goals

4. SELF EVALUATION

Procedures of evaluation

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