



Indian Ports Association

Dated: 16-03-2022

To
All Concerned Stakeholders (List attached as Annexure I)

Sub: Inviting Comments/Inputs from Stakeholders on Green Port Policy Document

Sir,

Ministry of Port, Shipping and Waterways vide Letter No. PD- 13/66/2020-PPP/e-341758 dated 08-12-2020 has constituted a committee under the Chairmanship of Chairman VOCPT for drafting a **Green Policy for Indian Ports**. Based on the discussions, detailed benchmarking study, and internal deliberation among the committee members, the draft **Green Port Policy** have been proposed.

Stakeholders are invited to offer their comments/inputs on the draft policy. The comments/inputs may kindly be sent to dhruv.gadh@pwc.com, haider.saikh@pwc.com, abhijitsingh.ipa@nic.in and psmd.ipa@nic.in , latest by 24.03.2022. The policy document also been uploaded on IPA website(www.ipa.nic.in).

Yours faithfully,

(Dr. Abhijit Singh)
Executive Director

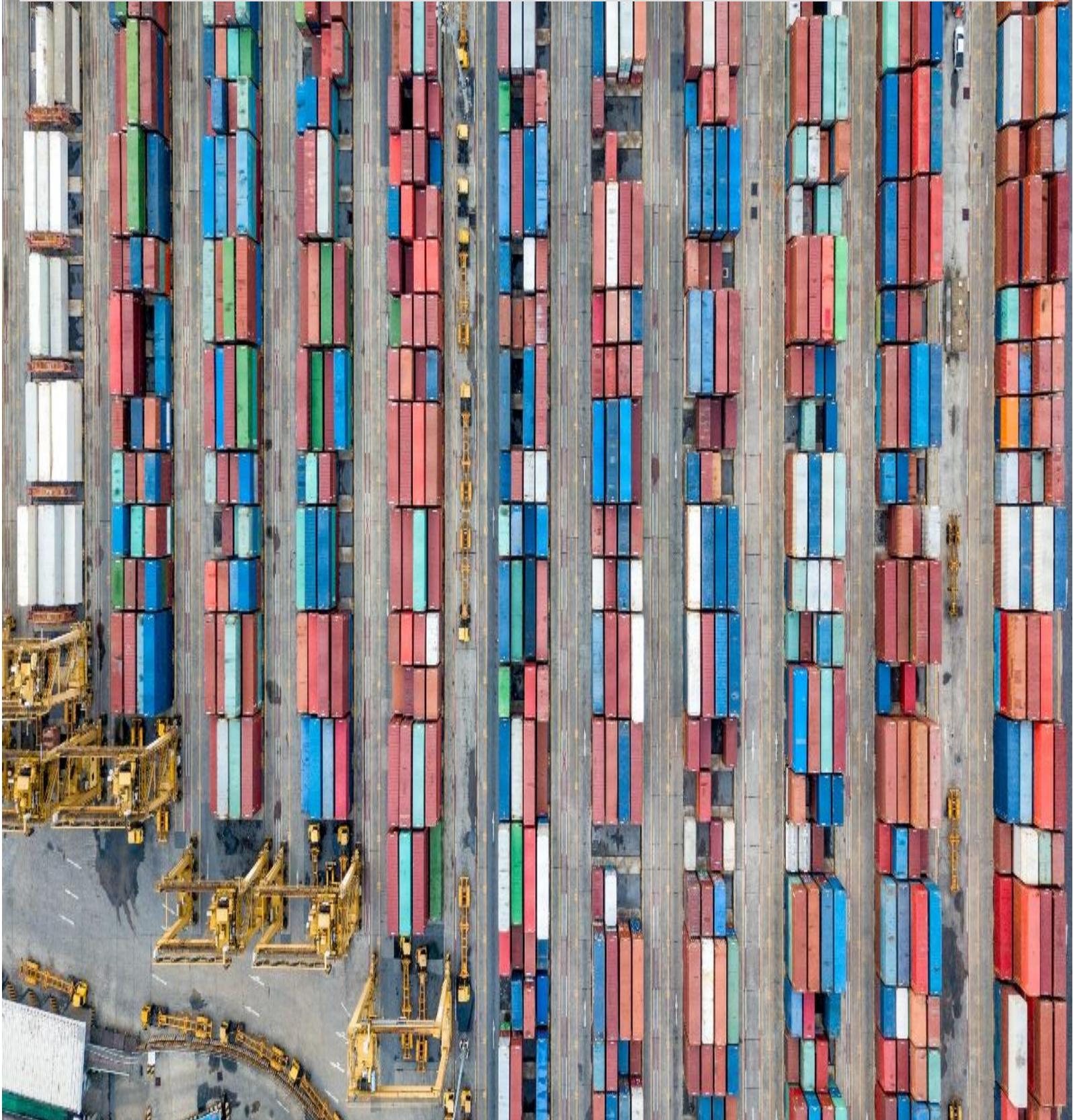
Encl: As above

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Draft Policy

Strategic Action Plan towards a Safe, Sustainable and Green Port sector as envisaged in MIV 2030



Ministry of Ports, Shipping and Waterways

Foreword

<Inclusion of Foreword by Hon'ble Union Minister>

Executive Summary

Government of India has developed the Maritime India Vision (MIV) 2030 and aims to strengthen the Ports, Shipping and Waterways sectors of India through concerted interventions. There are over 150 initiatives identified under the MIV 2030 to take forward the vision under each segment. 'Safe, Sustainable and Green Maritime Sector' is one of the focus areas under the MIV.

India has pledged to reduce the emissions intensity per unit GDP by 33-35% below 2005 level by 2030. Also, India has set the target to achieve 40% national energy through renewable sources by 2030. Country's maritime sector plays a crucial role in the overall trade and growth with 95% share in trade volume and 65% share in trade value. Therefore, Indian Ports need to undertake green initiatives in line with the broad vision of the Country. Also, Indian Ports need to be in adherence with International Marine Organization's alignment to 9 UN Sustainable Developmental Goals (SDG) which includes obligations on safe, efficient and sustainable ports.

MIV 2030 has identified key interventions like increasing usage of renewable energy, reducing air emissions, optimizing water usage, improving solid waste management, Zero accident safety program, and centralized monitoring system identified to further bolster India towards leading the world in Safe, Sustainable and Green ports.

To take forward this agenda of 'Safe, Sustainable and Green ports', Ministry of Ports, Shipping and Waterways has drafted 'Strategic Action Plan towards a Safe, Sustainable and Green Ports envisaged in MIV 2030'. This document will enable the ports to chalk out a roadmap in achieving the targets set out in the MIV 2030. This document contains details about the focus areas and their associated outcomes that a port shall endeavor to achieve to be labelled as 'green port'. The document tries to address the roles and responsibilities of each of the stakeholders in the process along the potential implementation roadmap. The document also talks about the proposed cost recovery and incentive mechanism for the stakeholders to ensure financial sustainability of the stakeholders. Also, indicative projects which can be undertaken by various ports have been proposed as a part of this strategic action plan. These projects will provide an impetus towards a greener maritime sector.

This document has taken cognizance of the fact that private sector investment along with government intervention would be the driving forces and may play a significant role in implementation of green initiatives. Therefore, it also captures some financing mechanism to enable the port in meeting the ambitious targets set out in the MIV 2030 document and subsequently assist Government of India in achieving the Nationally Determined Contributions (NDC).

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1. Introduction

Maritime India Vision (MIV) 2030 has identified, 'Safe, Sustainable and Green Maritime Sector' as a focus area to be a world leader in the maritime sector. MIV 2030 targets achievement of sustainability of port operations which can be achieved through an effective management system. The system while continuing with the operational activities, needs to focus on the safety, health and environmental aspects in the process.

To reduce, mitigate and manage environmental pollution, Indian ports have started multiple initiatives such as solar and wind energy adoption, Swachh Bharat Abhiyan, Swachh Sagar portal for waste management, etc. However, currently there are no guiding principles or policy framework for implementing initiatives/interventions carried out towards becoming sustainable. This Green Port Policy addresses this lacuna.

2. Context

Owing to rising temperatures, Green House Gas (GHG) emissions and disruption of the natural ecosystem, "Climate change" has emerged as an existential threat to the planet. As a result, countries across the globe have adopted an international agreement at United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP) 21 in 2015, to act against climate change. India has played a prominent role in the climate change negotiations. Under the agreement, countries publicly announced their voluntary actions against climate change, known as "Intended Nationally Determined Contributions (INDCs)".

India has emerged as a leader in climate change and has declared its ambitious INDC targets. Some of these targets are as follows:

1. Reduce emissions intensity per unit GDP by 33-35% below 2005 levels by 2030;
2. Create additional carbon sink of 2.5-3.0 billion tonnes of carbon di-oxide through additional tree cover;
3. Increase share of non-fossil fuel-based power generation capacity to 40% by 2030.

Ports constitute a critical infrastructure sector and are responsible for around 95% external trade (by volume). Ports also are a source of air and water pollution, and GHGs.

Globally, targets have been set for the Shipping sector as well. These are as follows:

- International Maritime Organization (IMO) has set a target of 40% CO₂ reduction from shipping sector by 2030.
- 'CEOs of 11 major global ports participated in World Ports Climate Action Program (WPCAP) and pledged a series of 5 agreements to reduce carbon emissions in their ports.'

Owing to the INDC targets and global targets for shipping sector, the Indian ports sector has been striving to cut down pollutions and emissions. The MIV 2030 has created the foundation for coherent action. The MIV 2030 has laid down certain targets that ports may strive to achieve in a bid towards sustainable infrastructure and operations. These are as follows:

- Increase share of renewable energy to > 60% across major ports by 2030
- Air quality improvement
- Port equipment electrification
- LNG bunkering
- Water and solid waste management
- Safety program

India has ambitious climate goals, which will require initiatives across key industrial and infrastructure sectors and “Green Ports Policy” will become the port sector’s initiative against climate change.

3. Need of the Policy

The Green Ports Policy (GPP) aims to expand on the initiatives under the MIV 2030 and provide guidance on potential implementation model and incentive framework. This policy will aim to encourage stakeholders (port operators, port authorities) to implement initiatives that will reduce the impact of the sector on climate change.

This policy document has been drafted to address the sustainability and environmental concerns associated with the Indian Ports. This policy represents an important component of the Government of India’s broader sustainability strategy. The Green Ports Policy document captures the focused areas, measure outcomes, implementation roadmap, cost recovery mechanism, capacity building & monitoring mechanism for the port operators and port authorities. The proposed target outcomes will help India in achieving the INDC target, as well as the IMO 2030 target. The targets in this policy document are in line with the MIV 2030 document which has also laid down certain targets that ports may strive to achieve in a bid towards sustainable infrastructure and operations. This policy document will enable the ports to achieve the environmental objective of the MIV 2030 document.

The subsequent sections in the document cover multiple aspects of the green ports policy. Section 5 contains details about the focus areas and their associated outcomes that a port must achieve to be labelled as ‘green port’. Section 6 addresses the roles and responsibilities of each of the stakeholders, Section 7 covers the implementation roadmap for the green initiatives/interventions to ensure transparency and standardized approach for the ports followed by Section 8 which captures the proposed cost recovery and incentive mechanism for the stakeholders. The list of indicative projects which may be undertaken by various ports are attached in the Annexure 1 of this document.

This Green Port Policy is applicable to both major and non-major ports in India.

4. Definitions

“**Capital Intensive Project**” means any green project interventions which has a payback period of more than 10 years and the investment requirement is more than 10% of the yearly revenue share

“**Concession period**” means the period of the Concession specified in Article 2.2 of Model Concession Agreement 2021

“**Cost recovery mechanism**” means proposed framework to recover the cost to be incurred for any green initiatives

“**Detailed project report**” means a final, detailed appraisal report on the project and a blueprint for its execution and eventual operation

“**Focused areas**” means the globally accepted primary parameters which are part of any green initiatives

“**Green initiatives**” means any initiative/initiatives directed towards the targeted outcomes defined in the Section 5 of this policy document

“**Green port**” means a port which has achieved all the targets given in the Section 5 of this document

“**Green taxonomies**” means the activities that deliver on environmental objectives, helping drive capital more efficiently toward priority environmentally sustainable projects

“**Greenhouse gas**” means any one of the gases that cause the greenhouse effect

“Impact assessment report” means a report containing the likely environmental and financial impacts of a proposed project or development

“Intended Nationally Determined Contributions (INDCs)” means the publicly disclosed post-2020 climate actions countries intended to take under a new international agreement

“Major port” or “Major port authority” (MPA) means the Major Port as defined in clause (8) of section 3 of the Indian Ports Act 1908 as may be amended

“Measured outcomes” means the ports being managed at the State level by the department in charge of ports or the State Maritime Board, if created

“Non-major port” means a port other than a major port declared as such by the State Government by notification in the official Gazette.

“Non-major port operators (NMPO)” means the state level agencies or the private operators which operate and manage the non-major ports

“PM 10” means particulate matter 10 micrometers or less in diameter

“PM 2.5” means particulate matter 2.5 micrometers or less in diameter

“PPP Port Operators” means the private operators involved in the operations and management of terminals or operations in the major ports based on a predetermined revenue sharing or royalty model. It will cover both existing PPP concessionaires and future PPP concessionaires in major ports.

“Renewable sources” means the clean energy which comes from natural sources or processes that are constantly replenished

“Scope 1 emission” means the direct emissions from owned or controlled sources either of the port authorities or port operators

“Scope 2 emission” means indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the port authorities or port operators

“Stakeholders” means port authorities and port operators (if applicable) of that specific port

“State Maritime Board” means the state board which administers conservancy, licensing of crafts, levying of fees, regulation and control of traffic for non-major ports

“Third Party Agencies” means who are not directly involved in the core operations of the ports

“Viability gap support” means a grant one-time or deferred, provided to support green projects/interventions that are economically justified but fall short of financial viability

5. Primary targets

The following focus areas and targeted outcomes have been identified for Indian ports to attain the ‘green’ port status:

S. No.	Focused Areas	Measured Outcomes
1	Green House Gas (GHG) emissions	<ul style="list-style-type: none"> Calculate the baseline level for GHG emissions (Scope 1, and 2) as of 2021.

S. No.	Focused Areas	Measured Outcomes																		
		<ul style="list-style-type: none"> Reduce the Scope 1, Scope 2 emissions by 20% by 2025 below from 2021 levels, and 40% by 2030 below from 2021 levels. Port authorities shall ensure that minimum 60% supplied power are sourced from renewable sources by 2025. Port authorities shall strive to provide 100% green power by 2030. 																		
2	Pollution control	<ul style="list-style-type: none"> Reduce the pollution levels over their 2021 levels <table border="1"> <thead> <tr> <th>Pollutants</th> <th>Targets to be achieved by 2025</th> <th>Targets to be achieved by 2030</th> </tr> </thead> <tbody> <tr> <td>NOx</td> <td>25%</td> <td>50%</td> </tr> <tr> <td>Non-methane volatile organic compounds</td> <td>15%</td> <td>30%</td> </tr> <tr> <td>PM₁₀</td> <td>25%</td> <td>50%</td> </tr> <tr> <td>PM_{2.5}</td> <td>25%</td> <td>50%</td> </tr> <tr> <td>Black Carbon</td> <td>40%</td> <td>80%</td> </tr> </tbody> </table> <ul style="list-style-type: none"> WHO Air quality guideline values for PM_{2.5} is 5 µg/m³, for PM₁₀ is 15 µg/m³, NO₂ is 10 µg/m³ and for SO₂ is 40 µg/m³. These targets may be considered as absolute target values for every ports. 	Pollutants	Targets to be achieved by 2025	Targets to be achieved by 2030	NOx	25%	50%	Non-methane volatile organic compounds	15%	30%	PM ₁₀	25%	50%	PM _{2.5}	25%	50%	Black Carbon	40%	80%
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NOx	25%	50%																		
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PM _{2.5}	25%	50%																		
Black Carbon	40%	80%																		
3	Biodiversity (if applicable)	<ul style="list-style-type: none"> Port operators to achieve 'Zero bio-diversity loss' by 2025 Port operators to achieve Zero waste, Zero Waste to Landfill, Zero Incineration, Zero Unauthorized Disposal, Zero Effluent Discharge by 2030 50% Reduction by 2025 and 100% by 2030 in Water Pollution by shipping companies or any related third party 																		
4	Resource utilization	<ul style="list-style-type: none"> Port operators to recycle and reuse 50% of their water consumption by 2025 Port operators to create provisions for rainwater harvesting within the port premises by 2025 Port Operators to implement Sewage Treatment Plant within the port Port operators to ensure at least 20% reduction in water consumption from its 2021 values by 2025. 																		
5	Productivity driven by automation	<ul style="list-style-type: none"> Port operators and authority will identify options and implement solutions to enhance levels of automation in select port activities that will enhance productivity and help achieve outcomes 1-4. 																		

The indicative list of projects / interventions to enable the ports in achieving the targeted outcomes laid down above is attached in the Annexure-1 of this policy.

6. Roles and Responsibilities

The roles and responsibilities of the various stakeholders in the entire process of shortlisting, evaluating, approving, implementing and finally measuring the outcomes for any initiatives have been outlined in this section of the policy.

PPP Port Operator (PO)-

- The PO needs to identify the interventions/projects based on the port's specific requirements to achieve the targeted outcomes for attaining 'green' status.
- The primary responsibility of base lining study, creating the project report and impact assessment report lie with the POs.
- POs shall submit all the relevant reports to the concerned Port Authority (MPA) for finalizing the projects/interventions.

Major Port Authority (MPA)-

- The MPA needs to finalize the interventions/projects identified by PO based on the port specific requirements to achieve the targeted outcomes.
- The MPA can explore options for projects/interventions being identified, financed and implemented by any third party to achieve the targeted outcomes within the port premises. However, these projects will not qualify for any cost recovery or incentive mechanism.
- MPA shall assess/evaluate the submissions made by the PO.
- For the self-operated berths, MPA needs to identify the interventions/projects based on the port's specific requirements to achieve the targeted outcomes for attaining 'green' status. In this case, the primary responsibility of base lining study, creating the project report and impact assessment lies with the MPAs.
- MPAs also need to identify green initiatives (i.e. purchase energy from renewable sources, bunkering facilities etc.) regarding aspects which are primarily managed by them.
- MPA shall submit the evaluated reports along with the selected interventions/projects to the Ministry and may seek their comments before providing approval for implementation.

Non-major port operators (NMPO)-

- The NMPO needs to identify and finalize the interventions/projects based on the port's specific requirements to achieve the targeted outcomes.
- NMPO shall submit the evaluated reports along with the selected interventions/projects to the State Maritime Board/State Port Departments and request for final approval for implementation.

State Maritime Board/State Port Departments (SMB) –

- SMB shall finalize the interventions/projects selected by NMPO based on the port's specific requirements to achieve the targeted outcomes.
- In case of capital-intensive projects, NMB will recommend the mode of financing for the projects to be implemented.

Ministry of Ports, Shipping and Waterways (MoPSW), Government of India-

- MoPSW will oversee the initiatives to be undertaken by various major ports to achieve the targeted outcomes.

7. Institutional Mechanism and Implementation Roadmap

The implementing agencies have to prepare a detailed action plan to identify the projects based on the port specific conditions, propose financing mechanisms and get approval from the concerned authority for implementation.

The implementation roadmap comprises of two major steps to achieve the targeted outcomes for various stakeholders.

- I. Finalizing the projects/interventions to achieve the targeted outcomes
 - II. Steps to implement the identified projects/interventions
- A. Steps to be followed for finalizing the projects/interventions to achieve the targeted outcomes
 - a. Conduct and finalize the base lining study for all the key parameters
 - b. The base lining study shall be vetted and approved by an independent third party.
 - c. Based on the base lining study, the port operator/authority shall submit an action plan proposing multiple projects/intervention to the concerned reporting authority for achieving the targeted outcomes.
 - d. The concerned higher authority will vet and approve the action plan along with the projects/interventions proposed to achieve the targeted outcomes or may send for further modification
 - B. Based on the projects/interventions approved by the concerned authority, the following steps need to be followed by the implementing agency to implement the identified projects/interventions
 - a. Port Operator/Authority (based on the implementing agency) to create a Detailed Project Report (DPR) for the identified green initiatives/ interventions to achieve the targeted outcomes
 - b. The Port Operator/Authority will prepare an impact assessment report, estimating the annual increase in operating cost, and adjustments required from the Ministry of Ports, Shipping and Waterways (MoPSW) for a revenue neutral scenario.
 - c. The DPR and the impact assessment report will be submitted to MoPSW for further comments if any
 - d. PAs to inform the MoSPW about the initiatives to be undertaken and the expected outcomes. Ministry if require may provide some guidance around the initiatives.
 - e. PAs may employ independent agencies to vet and approve the funding requirement, targeted outcomes of the proposed projects/ interventions with prior approval of its Board/ Competent Authority.
 - f. Post approval of the intervention/project, the selection of vendors will be done through an international competitive bidding process or applicable procurement guideline for the port. The execution of the projects can be under operating expenditure (Opex) model or capital expenditure (Capex) model.

- g. Post completion of the project, PAs may employ independent agencies to vet and approve the closure of the project.

8. Proposed Cost Recovery and Incentive Structure

The cost recovery mechanism has been proposed to mitigate any material impact the green interventions/projects will have on various stakeholders. However, self-sustainable projects, which do not require substantial investment and have a shorter payback period (less than [5] years) will not be eligible for cost recovery mechanisms. The project specific (if eligible) cost recovery mechanism will be approved by MPAs for major ports and by SMB for non-major ports.

All the involved stakeholders will be eligible for cost recovery (if applicable) and incentive once a port implements any intervention/project related to the green initiatives or attains the complete “Green” status based on the outcomes defined in the Section 5.

8.1. Proposed cost recovery mechanism

The green initiatives will have financial impact on all the stakeholders. Therefore, to ensure that all the stakeholders are funding the initiatives in an equitable manner, the following cost recovery mechanism has been proposed.

Cost recovery for POs/MPAs

(i) **Adjustments to revenue share:** POs shall work out the percentage of the additional revenue sharing required for all the eligible projects proposed as a part of green initiatives. The total additional revenue sharing over the period of remaining concession period shall be limited to 1/3rd of the invested capital in the capital-intensive projects under green port policy by the POs and

(ii) **Increase in the ceiling of the tariff** – POs shall work out and propose the percentage of the additional tariff ceiling required for all the eligible projects proposed as a part of green initiatives. The total proceeds from additional tariff over the period of remaining concession period shall be limited to 1/3rd of the invested capital in the capital-intensive projects under green port policy by the POs.

The decision for cost recovery and quantum of recovery will be finalized by concerned MPA. However, in all cases, the overall financial impact shall be borne equally by all the stakeholders.

Cost recovery for MPAs

Viability gap support from Government of India: In case of capital-intensive projects as a part of green initiatives, POs/MPAs may work out the percentage of capital infusion required as cash subsidy or reduced taxation from the Government of India and submit to MoPSW. However, the decision of viability gap funding (if any) for any projects will be taken by the Ministry.

Cost recovery for NMPOs

Viability gap support from State Government: In case of capital-intensive projects as a part of green initiatives, NMPOs shall work out the percentage of capital infusion required as cash subsidy or any other mechanisms to the SMBs or State Governments.

8.2. Financing agencies

The Port Authorities may explore the option of project financing through Multi-lateral Development Banks/other financial institutions/any related third-party agencies/green financing agencies. MoPSW may aggregate the financing requirement for various green initiatives to be undertaken across major ports, shipping and inland waterways and issue Maritime Sovereign Green Bonds to raise capital which can be used to fund these initiatives.

8.3. Additional Incentive

Additional Incentives: Additional Incentive of INR /tonne of carbon reduction to be provided to authority by Government of India from a carbon fund. This incentive will be over and above the cost recovery. MPAs shall create a sharing mechanism between different operators to ensure that the total share in the additional incentive is restricted at 80% combining all the POs and MPAs (except self-operated berths) share is restricted at 20%.

8.4. Proposed penalties

Creation of Carbon Fund

The Government of India/ MoPSW may impose a carbon cess on port users/port operators/port authorities. The proceeds from this fund can be used for funding any green initiatives undertaken by the ports as part of the Green Port Policy.

9. Capacity Building and Monitoring Mechanism

Port Operators and Port Authorities shall create dedicated units for Safe, Sustainable and environmentally friendly port operations. This unit shall be responsible for identifying, evaluating and monitoring the initiatives to be undertaken as a part of the green initiatives. The Port Authority shall ensure capacity building and proper training for the members of this unit as well as all concerned stakeholders to enable them to discharge their duties. Port Authorities may recruit experts for this purpose.

Also, a comprehensive monitoring mechanism needs to be developed to track the progress of the initiatives to be undertaken under this policy across the ports. IT enabled MIS based monitoring will help the stakeholders to monitor the progress and intervene if required. Also, a robust result evaluation framework needs to be developed to capture the potential benefits of the initiatives undertaken across various ports.

10. Power to amend

Port Authorities can customize the policy related to implementation roadmap and cost recovery depending on their specific requirements, however any amendment shall be in line with the primary targets laid out in the Section 5 of this document. If any difficulty arises in giving effect to the Green Port Policy, the Ministry of Ports, Shipping and Waterways (MOPSW) in consultation with the Major Port Authorities and Non-Major Ports will issue amendment to it, not inconsistent with the basic features of the Green Port Policy, as may be necessary for removing such difficulty.

Annexure 1

1. Indicative list of initiatives

There are several ways available to implement the interventions aimed at achieving 'Green Port' status. The Committee has suggested the ones intended to reduce carbon emissions, mitigate air pollution, reduce and recycle waste, optimize resource management at the ports, preserve marine biodiversity and improve overall efficiency. However, the following list is indicative in nature, the ports can take up any projects which will eventually help to achieve the target set out in the draft GPP document.

1.1. Interventions to Reduce Carbon Emissions

1.1.1. Gradual shift of Energy Source: Transition towards renewable source of energy

Use of energy generated from the non-renewable sources leads to massive carbon emission. In this regard, Group Captive Renewable Energy Projects can be opted for which may replace 60% of Ports electricity consumption. The Port authority can procure 60%+ electricity via a tariff based competitive bidding process based on SECI's standard bidding formats, under the 'Captive Status' route. In order to qualify as a 'captive', the port authority needs to invest and own at least 26% of equity share (and voting share). Port Authorities may explore any of the following options for renewable power projects:

- Implement renewable energy projects in the land owned by the Port on an EPC model
- Through PPPs where investment is by the concessionaire
- Through participation in JVs with Central/State PSUs with the port land being considered as equity
- Providing concessional land, wherever available, to the renewable power developer on lease basis for setting up RE projects

The Port Authorities may also opt for other feasible options to make a transition towards renewable source of energy. For instance, Port Authorities may purchase green power from the power exchanges based on their consumption.

Example: The Jurong Port in Singapore has commenced operations of the world's largest port based 9.5-megawatt peak solar energy generation facility since 2016.

1.1.2. Energy demand optimization: Switch to energy efficient equipment for reducing energy demand

The Port Authority and Port operators may liaise with Bureau of Energy Efficiency (BEE) to introduce Perform, Achieve and Trade (PAT) scheme for all ports. Conducting annual energy audits of the port and implementing energy conservation practices such as installation of 5-star rated electrical equipment and switching to LED lights in the port premises, to achieve the PAT targets set by BEE can be implemented by the MPA and PO.

The option for trading of PAT may be allowed for the MPA and POs, which will eventually incentivize them to opt for more energy efficient electrical instruments.

Example: The EU ports have taken multiple initiatives to reduce energy consumption i.e., energy audit systems, improve operational efficiency, etc. 11 sectors (i.e. Aluminum, Cement, Chlor- Alkali, Fertilizer, Iron & Steel, Paper & Pulp, Thermal Power Plant and Textile) have saved around 1.46% of India's energy consumption and 2.5% of India's CO2 emissions.

1.1.3. Use of Non-conventional sources of fuels: Encourage usage of non-conventional sources of fuel for equipment, vehicles

Use of non-conventional sources of fuel for port equipment and vehicles adds to their carbon footprint. Certain interventions such as i) Electrification of berth cranes (Quay Gantry Cranes, Mobile Harbor Cranes) or retrofitting for use of LNG, ii) Electrification of Terminal Equipment (Cargo handling equipment and Yard equipment – forklifts, straddle, carriers, RTGs) or retrofitting for LNG, iii) Retrofitting of Intra-terminal trucks for LNG/ CNG/Hydrogen or Use of Electric Vehicles, iv) Creating EV charging infrastructure, v) Mandatorily providing shore power to ships, etc. may also be explored by the Port Operators to reduce carbon emissions.

Example: Port of Marseille, Hamburg and few other EU ports have already electrified terminal transport and stacking equipment. California ports have taken multiple initiatives to reduce at-berth emissions from its vessels' auxiliary engines. California ports have mandated the use of shoreside power to ensure return on the investment.

1.2. Interventions to Mitigate Air Pollution

1.2.1. Reduce Air Pollutants

In order to reduce the air pollutants in the port premises, certain interventions such as Implementing dust suppression system with capability to recycle spraying water, use of spill proof conveyor for transfer of dry cargo, installation of sensors to ensure dust emission is within the permissible limit, 100% replacement of HFO with marine gas oil (MGO), etc. can be implemented by the PO.

Also, carbon offsetting projects like tree plantation in the port premises, increasing usage of recyclable/biodegradable products may also be undertaken to improve air pollution level around the port area.

Example: Vostochnaya Stevedoring Company (Russia) has launched two mobile dust suppression units, intended to reduce concentration of coal dust in the air at all stages of the operating cycle mainly during handling operations and storage of coal at the yard.

1.3. Interventions to Reduce and Recycle Waste

1.3.1. Waste-recycle and waste- management

In order to recycle waste to achieve zero waste system, the PO may opt for interventions (such as waste to energy or through use of bioremediation) aiming Zero Waste to Landfill, Zero Incineration, Zero Unauthorized Disposal, Zero Effluent Discharge. POs/MPAs/Non-major Ports may install Sewage Treatment Plant within the port owned area. Ports shall create adequate reception facilities to enable the ships to comply with the waste discharge requirement of MARPOL.

With an aim to reduce and recycle water usage, the POs/MPAs/Non-major Ports may develop site specific water management plan to treat and recycle at least 25-50% of wastewater.

Example: EU has come up with Waste Framework Directive 2019/883 to ensure that waste recycling, disposal, re-use, recovery, separation initiatives are being followed in every EU ports. Port of Kiel has recently constructed a wastewater treatment facility to boost the protection for Baltic sea.

1.4. Interventions in Resource Management

1.4.1. Usage of fresh water

With the intention of reducing the use of fresh water, the MPA may explore opportunities of setting up green desalination plant for water for port operations. POs may install rainwater harvesting system to restore the ground water and to reduce consumption of freshwater.

1.4.2. Usage of dredged material

The possibility of re-using of dredged material wherever possible and economically feasible shall also be explored.

Example: A new desalination plant to be built in the port of Antwerp will pump up brackish dock water and convert it into high-quality process water for the chemical sector in the area.

1.5. Interventions to Preserve Marine Biodiversity (if applicable)

In order to preserve the marine biodiversity (if applicable), the POs/MPAs/Non-major Ports may aim to achieve zero bio-diversity loss mandatorily. Also, in order to improve disaster resilience and response, the MPA may create an ocean-economy innovation networks such as Oil Spill Response facilities and Oily waste reception facilities.

Example: To protect and increase the amount of wildlife around the port of Cava, the Port Authority has taken an initiative to obstruct dragnet fishing. Global Ports follow MARPOL guidelines for providing reception facilities to ensure minimum impact on biodiversity.

1.6. Interventions to Improve Productivity to reduce GHG emissions

Improving productivity will definitely lead to reduction in GHG emissions. The MPA may make it mandatory to have i) Online port management system that will capture all information on port calls, nautical services, cargo, assets and provides operational decision support, and (ii) Digital asset management solution for ports to monitor asset health, and support predictive maintenance (e.g., smart quay walls) to improve the overall efficiency of the ports.

Example: Port of Rotterdam has implemented several digital solutions, such as Postmaster, PortXchange.

The PO may also ensure that 100% staff receive annual safety trainings, and at least 1 safety-audit is conducted per year leading to Zero accidents per year. The Ports shall follow strict guidelines related to health and safety aspect in the port premises in line with the global ports.