Centre for Maritime Economy and Connectivity
A New Initiative of MoPS&W and RIS

Green Shipping Corridors: Charting Zero-Emission Maritime Trade

Background

Green shipping corridors represent a strategic approach to expedite the decarbonisation of the maritime industry. These designated trade routes prioritise the use of low or zero-emission fuels and technologies, fostering collaboration among stakeholders to create a sustainable and environmentally friendly shipping ecosystem.

Shipping is the cornerstone of global trade, yet due to its reliance on fossil fuels, the industry currently accounts for approximately 2.8 per cent of global greenhouse gas (GHG) emissions (IMO estimates, 2014). It is crucial to note that this percentage is expected to increase unless concerted efforts are made to decarbonise the sector. Without additional policy measures, GHG emissions from shipping are projected to increase by 16 per cent from 2018 levels by 2030 and potentially by up to 50 per cent by 2050.[1]

The first scheduled revision of the International Maritime Organisation's GHG strategy, led to member states agreeing on net-zero GHG emissions figures by around the year 2050. Member states also agreed on "indicative checkpoints" to reduce total GHG emissions by 20 per cent, with an aspiration for 30 per cent by 2030, and by 70 per cent, with an aspiration for 80 per cent by 2040, all relative to 2008 levels. This marks a significant improvement over the IMO's initial GHG strategy set in 2018, which aimed for only a 50 per cent reduction in GHG emissions by 2050 and lacked specific reduction targets for the interim period.

Drivers and Benefits of Green Shipping Corridors

The drivers behind countries' engagement in green shipping corridors can often extend beyond traditional shipping policy, encompassing broader national objectives and strategic considerations. While decarbonizing shipping may seem challenging, a collective effort involving numerous measures can facilitate achieving this objective.

- **Emission Reduction:** Significantly reduce greenhouse gas (GHG)

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emissions from the shipping sector, aligning with international climate goals.

- **Technology Acceleration:** The green corridors will also promote innovation and investment in clean energy technologies and drive the development and adoption of innovative zero-emission technologies, such as alternative fuels (hydrogen, ammonia, biofuels), electric propulsion, and wind-assisted propulsion.
- **Infrastructure Development:** Foster investment in the necessary infrastructure for producing, storing, and bunkering alternative fuels, as well as developing port facilities that support green shipping practices and transition to sustainable port practices.
- **Collaboration**: The initiative will also encourage collaboration between governments, ports, shipping companies, fuel producers, and technology providers to create a comprehensive green shipping ecosystem.
- **Economic Growth:** Stimulate economic growth and job creation in the maritime sector by fostering innovation. Investment in green technologies can create new economic opportunities, and position India as a leader in sustainable shipping practices.
- **Trade and Competitiveness:** Green corridors could also improve trade competitiveness by streamlining logistics, reducing costs, and meeting the growing demand for sustainable products and services.

International Initiatives

The Clydebank Declaration (2021), signed at COP26, marked a significant milestone in the global effort to establish GSCs. It brought together 20 countries committed to creating at least six zero-emission maritime routes by 2025. The declaration emphasizes the importance of collaboration, innovation, and policy support in achieving this goal. The Getting to Zero Coalition: A partnership between the Global Maritime Forum and the World Economic Forum, aiming to have commercially viable zero-emission vessels operating on deep-sea trade routes by 2030.

In recent years, the concept of green shipping has emerged as a beacon of hope amidst global environmental concerns and thus carries significant stake in shaping the global policy discourse in context of discussion on climate change on multilateral forums. At the forefront of this movement are green ports - key nodes in the international shipping network that have embraced environmentally sustainable practices. As discussed in the previous section, ports like Los Angeles in the United States and Rotterdam in the Netherlands have garnered international acclaim for their pioneering efforts in integrating green technologies and practices into their operations. These ports not only demonstrate a commitment to reducing their environmental footprint but also serve as inspirations for the wider maritime industry.

The rise of green ports marks a pivotal shift in global shipping practices. No longer merely a trend, sustainable port operations have become a strategic imperative in the face of looming climate change. These ports play a crucial role in maintaining the efficiency of global supply chains while minimising adverse impacts on the environment. By promoting economic prosperity hand-in-hand with

[1] The International Council on Clean Transportation (https://theicct.org/sector/maritime-shipping/#:~:text=This%20is%20due%20to%20rapid,%2C%20and%2050%25%20by%202050)

Table 1: International Green Corridor initiatives

Route	Comments
Montreal to Antwerp	A memorandum of understanding (MOU) was signed in Nov 2021, with Green Field Biofuels being one of the known participants with the Port of Montreal and Port of Antwerp with liquid bulk as the main focus.
Los Angeles to Shanghai	A first of a kind transpacific green shipping corridor in one of the busiest container shipping route. Partnership was signed between the following stakeholders The City of Shanghai, the City of Los Angeles, the Port of Shanghai (through the Shanghai Municipal Transportation Commission), the Port of Los Angeles and C40 Cities initiating this Green Shipping Corridor partnership. Participating partners include A.P. Moller - Maersk, CMA CGM, Shanghai International Ports Group (SIPG), Cosco Shipping Lines, the Aspen Institute's Shipping Decarbonization Initiative, facilitators of Cargo Owners for Zero Emission Vessels (CoZEV) and the Maritime Technology Cooperation Centre - Asia.
Chile	Chile Ministry of Energy and Maersk Mc-Kinney Moller Center for Zero Carbon Shipping announced in Apr 2022 about the government funded Chilean Green Corridor Network
St. Lawrence waterway	Members of the Canadian chamber of Marine Commerce (CMC) are developing a green shipping corridor with collaboration from government for bulk cargo. CMC represents 100 clients including shippers, ports etc. and including transport Desgagné's, CLS Algoma central, Transport Canada
Port Hedland (Australia to Japan)	This initiative includes BHP, Rio Tinto, Oldendorff Carriers and Star Bulk Carriers The Consortium Global Maritime Forum (incl. Rio Tinto et al.) inked a letter of intent (LOI) between miners (charterers) and owners to evaluate fuels and routes
Ports Gdynia, Hamburg. Roenne, Tallinn and Rotterdam	Five European ports joined in Apr 2022, to form the European Green Corridor Network for Northern Europe and the Baltic region with the Maersk Mc-Kinney Meller Centre for Zero Carbon Shipping acting as a partner.
Port Halifax and Port of Hamburg	An MOU was signed between the Halifax Port Authority and the Hamburg Port authority in Sep 2022, to setup a green corridor with a focus on bunkering infrastructure and development of a green hydrogen pathway between the two ports and countries (Canada and Germany).

Table 1 continued...

Table 1 continued...

Pacific Northwest - Alaska Green Corridor	Ports of Seattle Vancouver and Juneau with three major cruise corporations and cruise industry trade associations supported by three maritime forums are together striving to set up the world's first cruise- led green corridor.
Singapore to Rotterdam	The port authorities of Singapore and Rotterdam have joined with others in the industry expand on the concept of green shipping corridors. Other partners include Global Centre for Maritime Decarbonization and the Maersk Mc-Kinney Meller Centre for Zero-Carbon Shipping. Other industry partners include BP, CMA-CGM, Digital Container Shipping Association Maersk MSC, Ocean Network Express, PSA International, and Shell.
Blue Sky Maritime Coalition Gulf of Mexico (GOM)	The Gulf of Mexico and Lower Mississippi River Corridor is one of the initiatives that is being developed by the Blue-Sky Maritime Coalition (BSMC).
Baltic Sea & North Sea	This initiative is focussed on using wind-assisted propulsion and other energy efficient technology.
Nordic Green Corridor	This project is aimed to establish a green corridor in Nordic region with necessary bunkering facilities for alternative fuel.
Singapore-Australia Green Digital Corridor	This corridor aims to pilot GSC and explore use of alternate fuel like ammonia and hydrogen.
Namibia Green Hydrogen project	This project aims to develop green hydrogen production facilities and establish GSC with Maersk, McKinney Moller Centre for zero carbon shipping.
US - South Korea Corridor	This project explores the use of Methanol to power ships on Busan – Seattle – Tacoma route and Ulsan – Masan – Seattle – Tacoma routes.

Source: Author's own based on secondary open sources.

environmental responsibility, green ports exemplify a pathway towards a sustainable future for international trade.

COP 26

Amidst growing concerns about climate change impacts on maritime infrastructure, stakeholders are increasingly focusing on adapting ports to withstand these challenges. The slow progress in implementing such adaptations underscores the urgency for concerted global action. Initiatives like the Clydebank Declaration[2], introduced at COP26 in Glasgow, underscore this urgency by setting ambitious goals such as establishing zero-emission green corridors by 2025. These corridors aim to create entirely decarbonised maritime routes between ports, further cementing the

[2] Policy paper - COP26: Clydebank Declaration for green shipping corridors (https://www.gov.uk/government/publications/cop-26-clydebank-declaration-for-green-shippingcorridors/cop-26-clydebank-declaration-for-green-shipping-corridors)

commitment of the maritime industry to combatting climate change.

In parallel, the launch of the Just Transition Maritime Task Force[3] at COP26 underscores a commitment to ensuring that the shift towards green shipping is inclusive and equitable. This task force seeks to prioritise the well-being of workers and communities affected by the transition, particularly in developing economies. By focusing on a people-centred approach, it aims to mitigate social impacts and ensure that no one is left behind in the pursuit of a sustainable maritime sector.

International Maritime Organisation (IMO)

The international maritime community, represented by bodies such as the International Maritime Organisation (IMO), is also stepping up efforts to address greenhouse gas emissions from shipping. The IMO's revised Greenhouse Gas Strategy[4] outlines mid-term measures including market-based mechanisms aimed at reducing emissions. Proposals for a mandatory GHG levy on international shipping and the establishment of an International Maritime Research and Development Board, highlight efforts to accelerate the development and adoption of zero-emission technologies.

European Union (EU)

On a regional level, the European Union has extended its Emission Trading Scheme[5] to maritime transport, a move that could have significant implications for global trade dynamics. Such regulatory advancements underline the growing integration of sustainability principles into policy frameworks governing maritime operations worldwide.[6]

Looking ahead, the establishment of green corridors between ports like Los Angeles and Shanghai, as well as Antwerp and Montreal, represents tangible progress towards a greener shipping industry. These initiatives not only reduce emissions but also foster collaboration among nations to promote sustainable development.

On platform of multilateral forums, the evolution of green ports and the broader green shipping movement signify a transformative moment for global maritime trade. By embracing sustainability as a core principle, ports are not only safeguarding the planet but also laying the groundwork for a resilient and prosperous future. As these initiatives gain momentum, they hold the potential to redefine international commerce, making sustainability a cornerstone of maritime operations worldwide.

International Consortium Initiatives

Several countries and regions are exploring green corridor partnerships, such as the Singapore-Rotterdam Green and Digital Corridor and the Green Shipping Corridor between Los Angeles and Shanghai. Notable projects on the anvil, are depicted in the Table 1.

Effectiveness of Green Shipping Corridor (GSC) Projects

In order to successfully evaluate the effectiveness of GSC, we also need to understand the motivations and priorities of different countries regarding green shipping corridor projects. This information can help policymakers, industry leaders, and investors make

[3] UNCTAD - Navigating Stormy Waters, Review of Maritime Transport 2022, United Nations Conference on Trade and Development (https://unctad.org/system/files/official-document/rmt2022_en.pdf)

[4] IMO - International Maritime Organization (IMO) adopts revised strategy to reduce greenhouse gas emissions from international shipping. (https://www.imo.org/en/MediaCentre/PressBriefings/pages/Revised-GHG-reduction-strategy-for-global-shipping-adopted-.aspx)

[5] EU extends its ETS to the maritime sector (https://icapcarbonaction.com/en/news/eu-extends-its-ets-maritime-sector)

[6] UNCTAD - Navigating Stormy Waters, Review of Maritime Transport 2022, United Nations Conference on Trade and Development (https://unctad.org/system/files/official-document/rmt2022_en.pdf)

informed decisions and develop effective strategies to accelerate the transition to a sustainable and decarbonized maritime sector. The effectiveness of green shipping corridors can be worked out using certain key parameters:

- **Partner and Stakeholder Engagement:** A larger number of partners and stakeholders involved indicates a broader commitment to decarbonization and greater potential for collaboration and resource sharing. Further, the type and extent of contributions from each participant also matters. This includes financial investments, technological expertise, infrastructure development, and policy support. A strong and demonstrable commitment from all stakeholders to reduce emissions and transition to cleaner fuels is crucial for the long-term success of a green corridor.
- **Viability of the Fuel Pathway:** The availability and suitability of different low- or zero-carbon fuels, such as biofuels, hydrogen, ammonia, etc. needs to be assessed for the specific corridor. The presence of adequate infrastructure for the production, storage, and bunkering of these fuels is essential for their widespread adoption. The chosen fuel pathway should be scalable to meet the growing demand for green shipping within the corridor.
- **Market demand:** The willingness of shippers and cargo owners to pay a premium for green shipping services is a key indicator of demand. Initiatives to aggregate demand from multiple customers can create economies of scale and make green shipping more financially viable.
- **Policy and Regulation:** Clear and robust safety standards for new fuels and technologies are essential to ensure the safe operation of green shipping corridors. Similarly, policies that reduce the cost gap between conventional and green shipping, such as carbon pricing or subsidies for clean fuels, can accelerate adoption.

Besides these, several other factors can be considered when analysing the effectiveness of green shipping corridors

- **Scalability and Replicability:** We also need to analyse the scalability of green corridor to include more ports, routes, and types of vessels. It also needs to accommodate increased traffic and cargo volumes in the future.
- **Emissions Reduction:** The assessment should also quantify the reduction in greenhouse gas emissions and other pollutants compared to conventional shipping routes. A comprehensive lifecycle assessment is therefore recommended to evaluate the environmental impact of the entire supply chain, including fuel production, transportation, and end-of-life disposal.
- **Job Creation:** The job creation aspect of the green corridor initiative and economic activity stimulation amongst the local communities, is another parameter of significance. Multiple studies[7] have evaluated the increase in creation of new jobs for various types of green initiatives and green shipping corridor is also, one such impactful activity.

[7] Tănasie, Anca & Năstase, Luiza & Vochița, Luminița & Manda, Andra & Boțoteanu, Geanina & Sitnikov, Catalina. (2022). Green Economy—Green Jobs in the Context of Sustainable Development. Sustainability. 14. 4796. 10.3390/su14084796.

Country Profiles and Motivations

Understanding country profiles in terms of specific initiatives can help assess the relevance of the above criteria and understand the motivations behind their engagement in green corridors.

- **Maritime Significance:** Countries with established maritime industries and significant shipping volumes like the USA, view green corridors as a means to maintain their competitive edge and leadership in the global market. They prioritize investments in green technologies and infrastructure to attract environmentally conscious customers and partners.
- **Emerging Maritime Nations:** Countries with growing maritime ambitions such as Chile, see green corridors as a way to leapfrog traditional shipping practices and establish themselves as pioneers in sustainable shipping. They may focus on developing expertise and infrastructure for green fuels and technologies, positioning themselves as attractive hubs for green shipping.
- **Landlocked Countries:** Even landlocked countries like Austria with access to major rivers, like the Danube, can benefit from green corridors by promoting inland waterway transportation powered by clean fuels. This can reduce their reliance on road transport, decrease emissions, and improve connectivity with neighbouring countries.
- **Leadership on Energy Fronts and Climate Targets:** Countries with significant investments in renewable energy production and infrastructure like Norway may be well-positioned to lead the development of green corridors. They can leverage their expertise in clean energy to produce and supply green fuels for ships, such as hydrogen, ammonia, or biofuels.
- **Ambitious Climate Goals:** Countries with ambitious climate targets are more likely to prioritize green corridors as a means to decarbonize their shipping sectors. They may incentivise the adoption of green technologies and fuels through regulations, subsidies, or tax benefits.
- **Energy Importers:** Countries heavily reliant on fossil fuel imports may see green corridors as a way to reduce their energy dependence and enhance energy security. By transitioning to domestically produced or regionally sourced green fuels, they can mitigate price volatility and geopolitical risks.
- Trade Partnerships, Value Chains, and Strategic Routes: Countries with extensive trade networks and significant cargo volumes like Singapore are prioritizing green corridors to strengthen their trade relationships and ensure the resilience of their supply chains. They may collaborate with partners to establish green shipping routes and harmonize regulations.
- **Economic Opportunities:** Countries seeking to expand their trade and integrate into global value chains like Namibia, see green corridors as a way to attract investments and create new economic opportunities. They are focussing on investments and developing ports and logistics infrastructure that cater to green shipping.
- **Geostrategic Importance:** Countries located along critical shipping routes

like South Korea and Japan, recognize the strategic importance of green corridors in maintaining their geopolitical influence and securing access to essential goods and resources. They invest in infrastructure and partnerships to become key players in the global green shipping network.

A Case Study of Chile's Green Corridors Network

The Chilean initiative[8] is a pioneering effort to establish green shipping corridors along its 6345 km coastline. It represents a proactive approach towards decarbonising the maritime sector and positioning Chile as a global leader in sustainable shipping practices.

- Launched in 2022, the Chilean Green Corridors Network is a collaborative effort involving the Chilean government, ports, shipping companies, fuel producers, and technology providers. The initiative aims to develop specific shipping routes where vessels can utilise low or zero-carbon fuels such as green hydrogen, ammonia, and biofuels.
- The initiative has already achieved some notable successes, such as identifying promising green corridor routes and potential fuel production hubs. The strong collaboration between stakeholders and the government's commitment bodes well for the project's success.
- However, significant challenges remain as scaling up the production of green fuels like hydrogen and ammonia requires substantial investments in renewable energy infrastructure. Developing the necessary infrastructure for storing and bunkering these fuels is also a complex and costly undertaking. Additionally, ensuring the commercial viability of green shipping routes and fuels will require addressing cost differentials and creating a supportive regulatory environment.
- Chile's Green Corridors Network is not only a significant step towards decarbonising the country's maritime sector but also serves as a model for other countries seeking to transition to greener shipping practices. The initiative's focus on collaboration, innovation, and sustainability can provide valuable lessons for the global shipping industry as it strives for a more environmentally friendly future.

Singapore Green and Digital Shipping Corridor (GDSC) Initiative

The Singapore Green and Digital Shipping Corridor (GDSC) initiative is a collaborative effort between Singapore and several partner countries aimed at decarbonising and digitalising shipping routes. This ambitious project focuses on developing and implementing green technologies, alternative fuels, and digital solutions to make maritime transportation more sustainable and efficient. Singapore has established several green and digital shipping corridors with different countries, as discussed below:

- **Netherlands:** This corridor focuses on developing low and zero-carbon fuels like biofuels and hydrogen, as well as implementing digital solutions for port operations and supply chain management.[9]
- **Australia:** This corridor aims to pilot green shipping technologies and

[8] Chilean Green Corridors Network Project (https://www.zerocarbonshipping.com/projects/chilean-green-corridors-network-project-2/)

[9] Singapore-Rotterdam Green & Digital Shipping Corridor Project (https://www.mpa.gov.sg/media-centre/details/singapore-rotterdam-green--digital-shipping-corridor-accelerates-digitalisation-and-decarbonisation-with-new-global-value-chain-partners)

explore the use of alternative fuels like ammonia and hydrogen.[10]

- **Japan:** This collaboration focuses on developing green fuels like ammonia and hydrogen, as well as sharing knowledge and expertise on decarbonisation and digitalisation.

The Singapore GDSC initiative has made significant progress in its early stages and several pilot projects are underway to test the viability of green fuels and digital solutions in real-world shipping operations. Investments are being made in bunkering infrastructure for alternative fuels and digital platforms for data exchange and collaboration.

The Singapore Green and Digital Shipping Corridor initiative is a bold and ambitious effort to decarbonise and digitalise the maritime sector. While challenges remain, the initiative's collaborative approach, focus on innovation, and strong government support offer promising prospects for creating a more sustainable and efficient future for global shipping.

Indian Perspective

While the Amrit Kaal Vision 2047 (MAKV 2047) does not explicitly list specific green corridor routes in India, it outlines a clear vision and objectives for decarbonising the shipping sector, implicitly suggesting potential routes.[11] MAKV 2047 has also outlined Green shipping targets. The MAKV 2047 has also set green shipping targets and proposes the establishment of a 'Decarbonisation Cell' comprising members from major stakeholders such as CSL, IRS, DRDO, IMU, major ports, academic institutions, and industrial partners. This collaborative effort aims to strategize and facilitate the development of related technologies. The successful implementation of green shipping corridors requires a multi-faceted approach.

- **Identifying Suitable Routes:** Selecting routes with high traffic volumes, favourable regulatory environments, and proximity to potential fuel production hubs. The initial potential and appreciation for green corridor routes in India is captured below.
- **Developing Policy Frameworks:** Establishing supportive policies and regulations that incentivise the use of zero-emission fuels and technologies, such as carbon pricing mechanisms, subsidies, and tax incentives.
- **Monitoring and Evaluation:** Establishing robust monitoring and evaluation mechanisms to track progress, identify challenges, and ensure the effectiveness of the green corridor initiative.

Western Coast Corridors

- **Kandla-Cochin-Tuticorin :** This route connects major ports on the west coast, handling a significant volume of container traffic and crude oil imports. Utilising LNG or hydrogen-powered vessels on this route could significantly reduce emissions.
- **Mundra-JNPA**: As the two busiest ports in India, establishing a green corridor between them could have a substantial impact on reducing the overall carbon footprint of the shipping sector.

Eastern Coast Corridors

- **Paradip-Visakhapatnam-Chennai:** This route connects major ports on the east coast, handling various cargo types like coal, iron ore, and petroleum

[10] Singapore and Australia Green and Digital Shipping Corridor (https://www.dfat.gov.au/trade-and-investment/singapore-and-australia-green-and-digital-shipping-corridor)

[11] MoPSW - Maritime Amrit kaal Vision 2047 (https://shipmin.gov.in/sites/default/files/Maritime%20Amrit%20Kaal%20Vision%202047%20%28MAKV%202047%29_compressed_0.pdf)

products. Using alternative fuels like biofuels or ammonia could decarbonise this crucial route.

- **Kolkata-Haldia-Chennai:** This route serves the eastern and north-eastern regions of India. Implementing green shipping practices on this corridor could have both environmental and economic benefits for these regions.

India-International Corridors

- India-Norway: The MoPSW is already exploring the possibility of establishing a green corridor with Norway, focusing on using green ammonia as a fuel. This would be a significant step towards international collaboration on green shipping.
- India-Singapore: This route is a major trade route for India, connecting it to Southeast Asia and beyond. Establishing a green corridor on this route could have a substantial impact on reducing emissions from global trade.
- India-Sri Lanka : The proximity to Sri Lanka and large transshipment requirements can benefit from green fuel adoption. India-Sri Lanka bilateral trade can also be supported by alternate / green fuel corridors.

Recent Government Initiatives

India is aiming to transition all coastal and river ports in inland waterways to 'completely green' status within the next five years. As part of the Maritime Amrit Kaal Vision 2047, the government has set a target for all 'major ports' in the country to use green energy by 2047.

In February 2024, the Government of India, has issued guidelines for implementing green hydrogen pilot project as part of the National Green Hydrogen Mission. Two key focus areas have been designated for these pilot projects. The first involves retrofitting ships to operate on green hydrogen or its derivatives. The second focuses on establishing bunkering and refuelling facilities at ports along the international shipping routes for green hydrogen-based fuels. MoPSW has selected three ports - Kandla, Tuticorin, and Paradip - to serve as pilot ports for the green hydrogen production. The government has also allocated Rs. 80 crores to the Shipping Corporation of India (SCI)[12] to facilitate the use of methanol as fuel for older ships.

Pilot Projects - India's Green Maritime Shipping

In line with the above objectives, over the next decade, the Decarbonisation cell India[13] will develop cutting edge technology vessel development for pilot runs across the following categories:

- 1 Hydrogen fuel ferry
- 5 Electric water taxies
- 2 Hybrid electric Ro-Ro ferry
- 2 Hybrid LNG electric cargo carriers
- 1 Hybrid tug at JNPT
- 3 Dual-fuel container Ro-Ro ferry
- Green Hydrogen/ Ammonia tugs each at select 4 major ports
- 1 Green Hydrogen/Ammonia propelled Coastal cargo bulk carrier & 1 Green Hydrogen/ Ammonia propelled offshore vessel

[12] Govt aims to make all inland waterways ports 100% green in 5 yrs, Business Standard (https://www.business-standard.com/industry/news/govt-aims-to-make-all-inland-waterways-ports-100-green-says-official-124030700389_1.html)

[13] MoPSW - Maritime Amrit kaal Vision 2047 (https://shipmin.gov.in/sites/default/files/Maritime%20Amrit%20Kaal%20Vision%202047%20%28MAKV%202047%29_compressed_0.pdf)

South Asia Centre for Excellence for Sustainable Maritime Transport (SACE-SMarT)

Under the *Green and Digital Transition* segment, SACE-SmarT centre has been created under the Shipping Corporation of India. The centre's objective is to focus on the latest technologies and practices for reducing greenhouse gas emissions, fostering technical cooperation, capacity building, and facilitating the digital transition of the maritime sector.

NCoEGPS

India's first National Centre of Excellence for Green Port & Shipping (NCoEGPS) has also been established at TERI. The center is working towards developing a regulatory framework and alternate technology adoption road map for Green Shipping to foster carbon neutrality and circular economy (CE) in shipping sector in India. India intends to increase the share of renewable energy to 60 per cent of the total power demand of each of its major ports from a present share of less than 10 per cent. This will be through solar and wind-generated power.

Way Forward

To assess the effectiveness of green corridors, several key criteria are significant, with stakeholder integration being primary. Given the diversity of partners involved, their level of commitment, and the effectiveness of collaboration mechanisms are crucial for successful implementation. A broad coalition of stakeholders, including governments, ports, shipping companies, fuel producers, and technology providers, can ensure a comprehensive and coordinated approach.

Green Fuels : The choice of green fuels and the viability of their production, storage, and bunkering infrastructure are critical for the long-term sustainability of green corridors. Factors to consider include the scalability of fuel production, cost competitiveness, and the availability of bunkering facilities along the corridor.

Policy Support : Supportive policies and regulations, such as carbon pricing mechanisms, subsidies, tax incentives, and safety standards, can play a crucial role in narrowing the cost gap between conventional and green shipping, accelerating the adoption of green technologies, and ensuring a level playing field for all stakeholders.

Advanced Propulsion Systems: Advanced technologies in engine and propulsion systems are crucial for reducing greenhouse gas emissions and improving energy efficiency. These systems are required to be adopted for an environmentally friendly maritime sector, contributing to the SDG goals.

Innovation in Cargo Handling : Innovative cargo handling systems needs to be implemented to streamline the loading and unloading processes, reducing time and energy consumption. These systems are designed to be compatible with various modes of transport, ensuring seamless integration within green corridors.

Future Outlook

The deployment of sustainable fuels and energy sources is essential for achieving the GHG emission reduction targets set by

the IMO. These fuels and energy sources are thus required to be integrated into the transport systems within green corridors to enhance impact.

Therefore, commitment across the value chain is essential for the success of any green corridor. Essentially, a green corridor is a value chain decarbonization initiative that unites stakeholders with a common goal. For it to be effective, all value chain members must collaborate, especially at the points where their operations intersect. This collaboration will enhance interoperability and may initially blur boundaries, but over time, the entire corridor will function as a cohesive system. This system not only promotes maritime decarbonization but also creates economic opportunities for the sector and the initiative.

For India, with its vast coastline and maritime heritage, the establishment of GSCs is not just an environmental imperative but also an economic opportunity. By embracing GSCs, India can position itself as a front-runner in the sustainable maritime transport, contributing to global efforts to combat climate change while reaping the benefits of a cleaner, greener, and more prosperous maritime sector.

The journey towards establishing GSCs in India will undoubtedly be challenging, requiring concerted efforts from all stakeholders. However, with a clear vision, robust policies, and collaborative action, India can chart a sustainable course for its domestic coastal maritime sector, ensuring infrastructure build up, valuable experience and therefore faster integration with the international routes.

Green shipping corridors thus represent a promising pathway to decarbonize the maritime industry and contribute to global efforts to combat climate change. By fostering collaboration, innovation, and investment in green technologies, these corridors can create a more sustainable and environmentally friendly future for shipping. Incentive-based models for greening ports and vessels, along with corresponding rating systems, can pave the way for further progress.

About CMEC at RIS: The Centre for Maritime Economy and Connectivity (CMEC) has been established at RIS under the aegis of the Ministry of Ports, Shipping and Waterways (MoPS&W), Government of India. The Centre is a collaboration between Research and Information System for Developing Countries (RIS) and Indian Ports Association (IPA). CMEC at RIS has been mandated to act as an advisory/technological arm of MoPSW to provide the analytical support on policies and their implementation. CMEC at RIS seeks to integrate the stakeholders towards the realization of India's Maritime Amritkaal Vision (MAKV-2047) and the Maritime India Vision (MIV-2030) of the Government of India.

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