



Delft University of Technology

'Go Green'

Conceptualising a Worldwide Glossary and Taxonomy on Maritime Green Corridors

Akhavan, M.

Publication date

2024

Document Version

Final published version

Published in

Green Shipping Corridors

Citation (APA)

Akhavan, M. (2024). 'Go Green': Conceptualising a Worldwide Glossary and Taxonomy on Maritime Green Corridors. In *Green Shipping Corridors: Assessing port-city-industry coalitions for a decarbonized maritime future* (pp. 9-15). AIVP.

Important note

To cite this publication, please use the final published version (if applicable). Please check the document version above.

Copyright

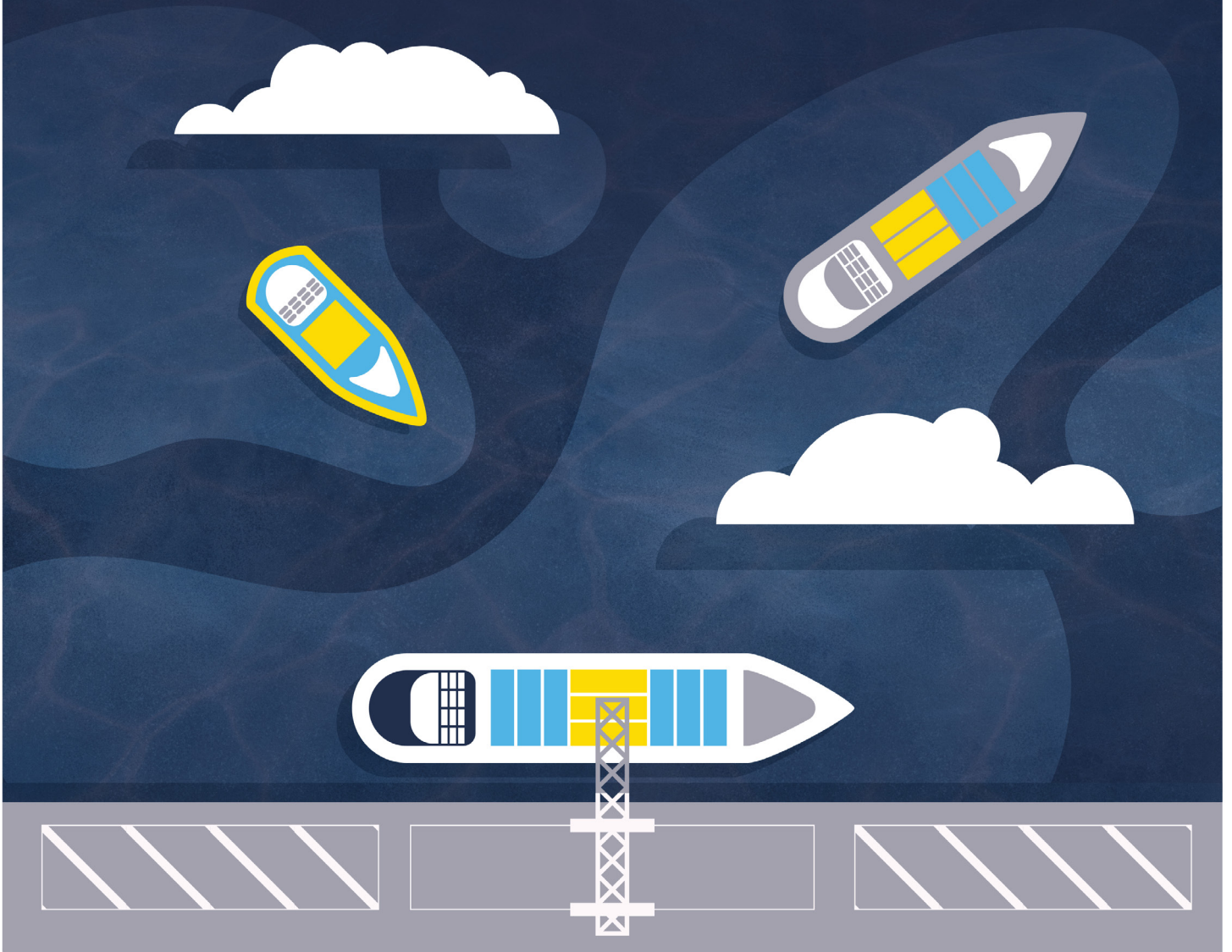
Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy

Please contact us and provide details if you believe this document breaches copyrights. We will remove access to the work immediately and investigate your claim.

GREEN SHIPPING CORRIDORS

Assessing port-city-industry coalitions
for a decarbonized maritime future



'GO GREEN': CONCEPTUALISING A WORLDWIDE GLOSSARY AND TAXONOMY ON MARITIME GREEN CORRIDORS

DR. MINA AKHAVAN, TU DELFT

1. INTRODUCTION: THE NEED FOR ACTION IN GREENING THE SHIPPING INDUSTRY?

Maritime (or ocean) transport is the backbone of international trade and the global supply chain but also plays a crucial role in the tourism industry. Shipping and ports are also essential elements of the Blue Economy and play a vital function in maintaining blue growth across all sectors of the economy. Compared to bulk transportation, shipping is relatively energy efficient in terms of CO₂ emissions. Yet, maritime shipping, both for commodity and passenger flow, raises concerns about human health and environmental issues. Greenhouse gas (GHS) emissions from the maritime sector are significant: about 2.8% of global GHG emissions (Morante, 2022), which may rise to 17% by 2050¹. It is widely accepted that the shipping industry has five main environmental impacts: (i) air pollution, (ii) Noise pollution, (iii) Vessel discharges, (iv) Congestion (port and the port hinterland), and (v) Marine ecosystem (Jägerbrand et al., 2019). Several studies have pointed out the greening of ports and maritime logistics, highlighting the necessity for sustainable initiatives to decrease the environmental footprint of port operations (Davarzani et al., 2016; Parhamfar, 2023). Within the outlined framework, this short paper intends to make an overview of the 'Maritime Green Corridors' (MGCs) concept, launched officially in 2021, tracing the origins from environmental, transportation and planning studies, and discuss the potential impact on land and the sea. The aim is to understand the state-of-the-art studies and map a global glossary and taxonomy of the relatively new phenomenon of the MGCs, which can be used as a conceptual framework for future research lines in urban and regional studies.



Dr. Mina Akhavan,
Port City Futures, TU Delft.

2. GREEN CORRIDORS: ORIGINS, CONCEPTS AND DEFINITIONS

Although the emergence of the concept of 'Green Corridors' (GCs) in transportation and shipping is relatively new, the origins of green corridors in general can be traced back to the late 19th century in urban planning and design. Olmsted's "Parkways" in the US and Ebenezer Howard's "Garden City" in England are considered pioneering visions of GCs in early 20th-century town planning. Contemporary studies define such corridors as linear open spaces within or outside urban areas that play a

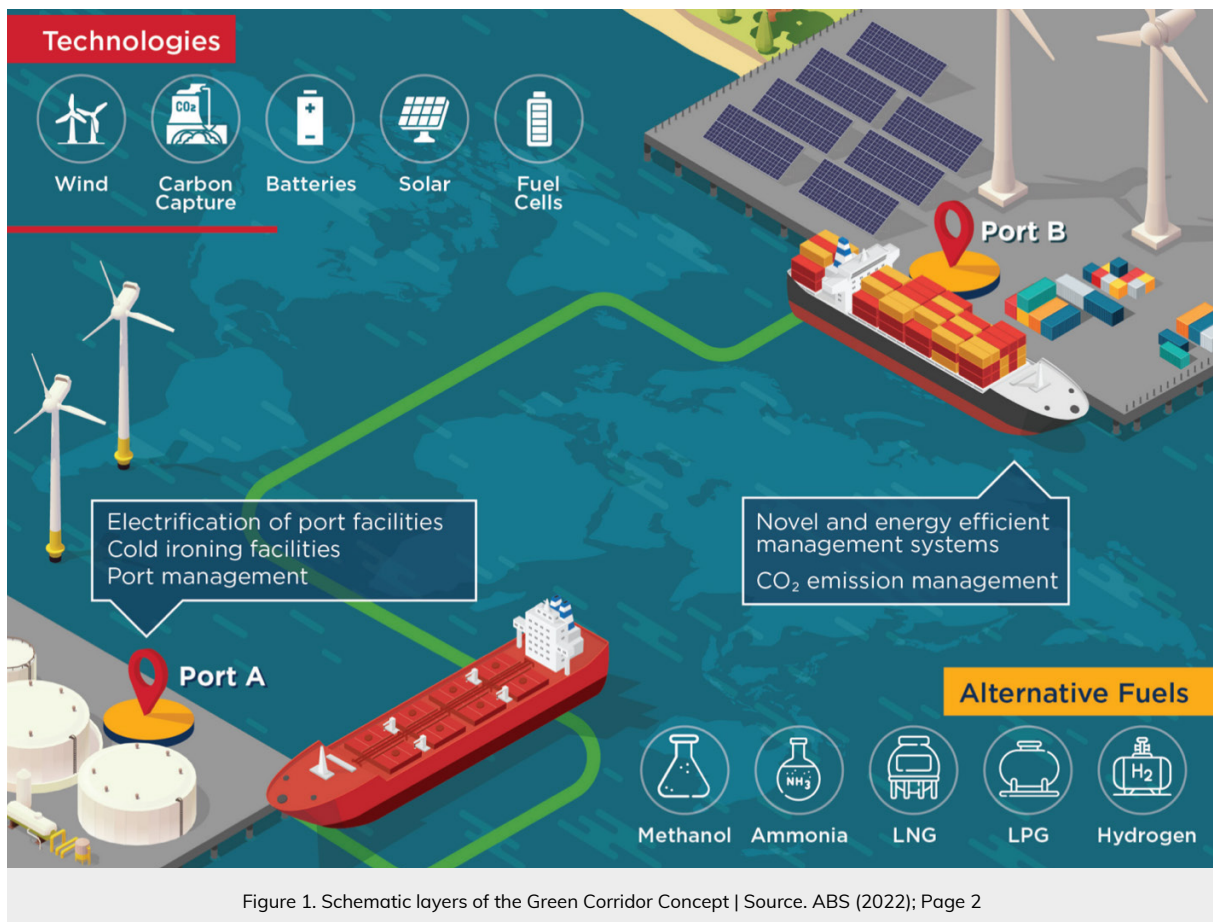
¹What Are Five Environmental Impacts Related To Shipping? (sinay.ai)

crucial role in environmental protection and landscape preservation while offering various benefits to citizens (Aman et al., 2022). The significance of urban and ecological GCs is well documented in the literature (see Korkou et al, 2023). For the purpose of this study, it is worth highlighting transportation-related green corridors. As a European concept, green transport corridors (GTCs) are defined as long-distance freight transport corridors where advanced technology and co-modality are used to achieve energy efficiency and reduce environmental impact (Carballo-Penela et al., 2012). Freight-based GTC in Europe was introduced as part of the EU's Freight Transport Logistics Action Plan in 2007: these integrated routes [GTCs] would enable freight to be transported with a reduced environmental impact via a combination of short sea journeys, rail, road and inland waterways, and of relevant technologies (such as ICT used in intelligent transport systems) (EU, 2007). GTCs have gained attention in recent years and can be characterised as European transshipment routes with a concentration of freight traffic between major hubs and relatively long distances marked by reduced environmental and climate impact (Prause & Schröder, 2015). Therefore, GTCs offer integrated multimodal, efficient, and sustainable freight transportation solutions (Schröder and Prause, 2015).

3. DECARBONIZING THE GLOBAL SHIPPING SECTOR: MARITIME GREEN CORRIDORS

Following long-term international efforts to reduce the environmental impact of maritime and shipping activities (e.g., since the 1970s, the International Convention for the Prevention of Pollution from Ships – MARPOL), the International Maritime Organization (IMO)'s Clydebank Declaration was launched in November 2021, within the framework of the COP26 (Saul and Piper, 2021). The Declaration aims to promote the creation of Maritime Green Corridors (MGCs) by fostering a coalition among ambitious governments, port(s) and operator(s) to reduce the greenhouse gas emissions of shipping routes (zero-carbo emissions ships) through public and private actions and policy measures.

For the Global Maritime Forum and Getting to Zero Coalition, MGCs are Specific shipping routes where the technological, economic and regulatory feasibility of the operation of zero-emission ships is catalysed by a combination of public and private actions (Global Maritime Forum, 2022). Others define such green corridors as innovative systems of creating coalitions of stakeholders – to leverage national interest in the transition to zero-emission shipping in a way that impacts international shipping (Getting to Zero Coalition, 2021). The Next Wave (2021) considers MGCs as specific trade routes between major port hubs where zero-emission solutions have been demonstrated and supported. Once fully developed, the shipping green corridor entails the different layers between two (major) ports as schematically drafted in Figure 1. Three main layers can be identified here: Ports as nodes (land), shipping corridors and connectors (sea) and technology (energy, shipping and land-based). The collaboration between stakeholders will then leverage this system by creating a multi-layer development plan where all the actors will follow a common objective(s) towards decarbonising maritime activities on land and sea.



To date, 24 countries have signed the Clydebank Declaration: Europe (Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Great Britain and Northern Ireland), North America (Canada, the USA), South America (Chile and Costa Rica), Oceania (Australia, Fiji, New Zealand, Palau and Republic of the Marshall Islands), North Africa (Morocco) and East Asia (Japan and Singapore). By November 2023, about 62 initiatives on green corridors have been introduced by public and private stakeholders worldwide (see Figure 2). The geography of the announced green corridors shows a concentration in North America, (North and Eastern) Europe and East Asia, which aligns with the region’s strategies to decarbonize their economy. Yet, there are huge gaps; being an international sector, maritime transport is regulated by the IMO at a global scale, so more countries should engage for a faster transition to the process of decarbonisation (PierNext, 2022).



Figure 2. Global initiatives on green shipping corridors (under development or established) | Source. Hervas (2023)

The world’s first GSC was announced in January 2022 between two major ports in the US (the Port of Los Angeles), China (Port of Shanghai), and C40 cities. Based on the ‘Green Shipping Corridor Implementation Plan Outline’, the participants of this Corridor strive to reduce carbon emissions from shipping and port activities and to address local community impacts (Figure 3). In this example, the corridor is ‘port-centric’ as it initiates from the port level, so the system priority settings and fuel choices are set based on the air quality issues and local community and environmental interests in both port cities (Global Maritime Forum, 2022). In contrast to the port-centric corridors are the ‘route-centric’ ones (for example, the West Australia-East Asia iron ore green corridor), which are not driven by the ports themselves but may originate from ambitious countries and their strategic interest, which vary from region to region.

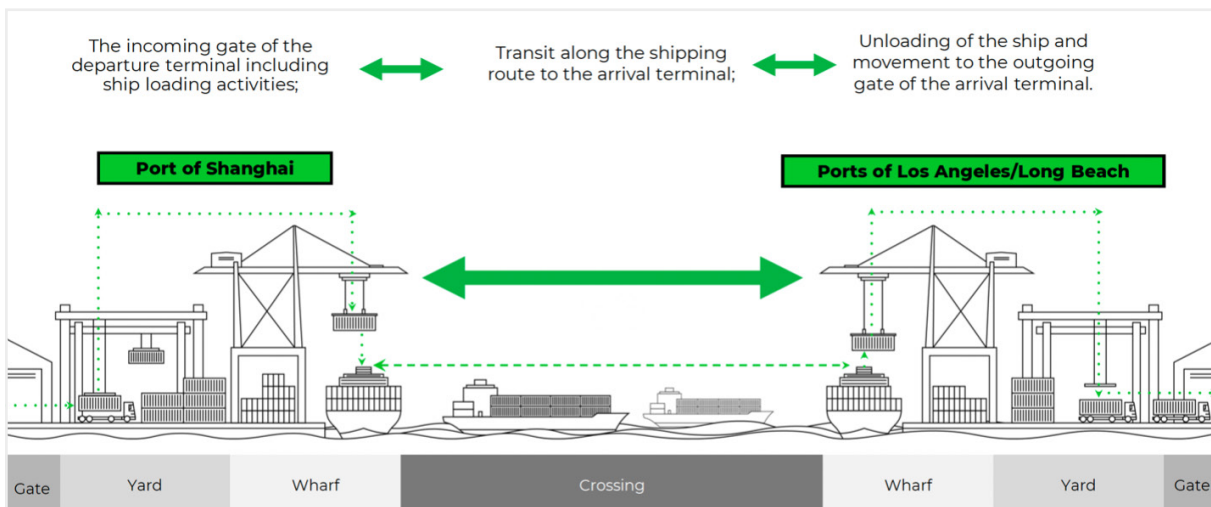
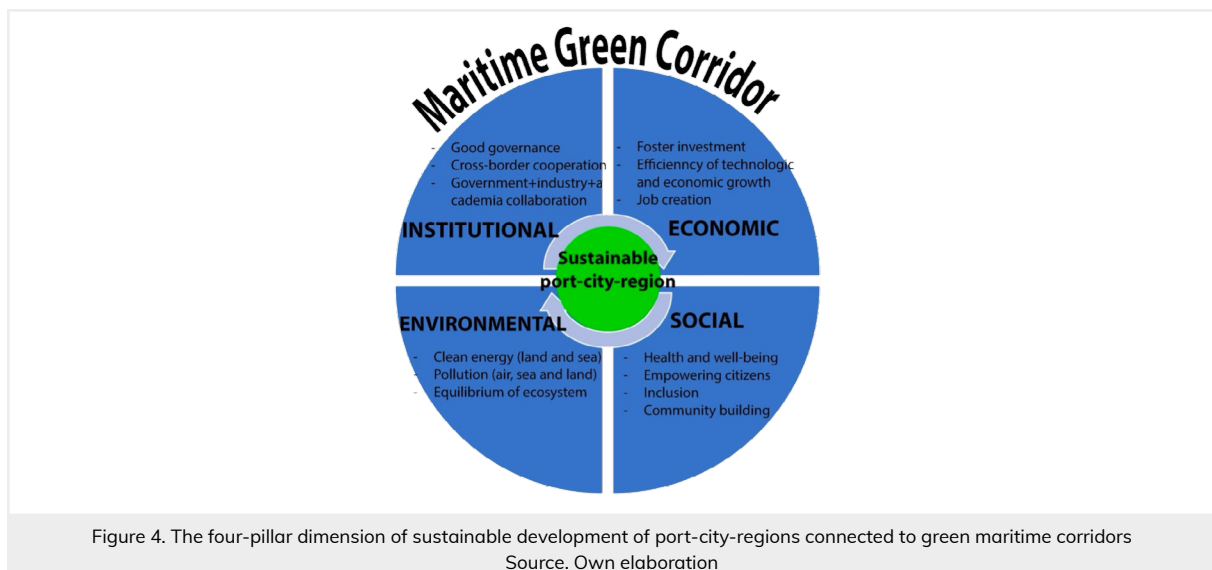


Figure 3. Schematic vision of the Port of Los Angeles–Port of Shanghai Green Shipping Corridor Source. Source: Port of Los Angeles - Port of Shanghai GSC Partnership Implementation Plan Outline. C40. P.5

4. CONCLUDING REMARKS: RETHINKING PORTS AND THEIR GREEN/BLUE CONNECTION WITH THE SEA

The concept of MGCs, energy transition in the maritime sector and its environmental impact is gradually gaining attention in different regions of the globe. Such corridors re-configure the international coalition of stakeholders, which already exists in a complex network of nodes (ports and port-cities) and links (shipping routes). Offering favourable conditions for accelerated actions in terms of environmental policy, energy production and shipping operation, MGCs can function as ‘special economic zones at sea’, which should be expanded and linked to the green ports on land. This will allow policymakers to enable an ecosystem with regulations and financial incentives to support the transition, for example, in lowering the cost of green fuel.

Furthermore, we should consider MGCs as a complementary effort for the complex and multidimensional concept of sustainability and sustainable development. Here, it is worth mentioning the three-pillar conception of sustainability (social, economic and environmental) – introduced by Barber in the mid-1980s, known today as a common view for a model of sustainable development (Purvis, et al. 2019). Conceptualising the MGCs, I suggest adding a fourth pillar to the sustainability concept: Institution (governmental and non-governmental). Therefore, a schematic diagram of the four intertwined pillars for sustainable development of port-city-regions connected to green maritime corridors and green ports is re-imagined, as illustrated in Figure 4.



To conclude, here I have outlined some challenges that raise questions for the future implementation and success of green maritime corridors, which would also become future research lines:

- Political and governmental support and creating a transborder collaboration among different countries. *What is the role of regional policy and planning? Can the EU Regional framework, such as the MSP, facilitate cross-border cooperation for implementing green shipping corridors?*

- A collaborative framework for a joint action between various stakeholders. What tools and methods are needed to encourage cooperation among governments, industry and academia? what does it change for the private operators, how does it impact the worldwide competitiveness of ports and operators?
- Technological advancements and challenges. What is the role of the public sector in providing financial incentives and investing in R&I, start-ups and industry in green technology?
- Interaction between the green maritime corridors, land and local communities. How can community leaders be included in the implementation process for a just society?

REFERENCES

- ABS – American Bureau of Shipping (2022). Green Shipping Corridors: Leveraging Synergies. Retrieved from: https://mission-innovation.net/wp-content/uploads/2022/10/ABS_Sustainability_Green-Shipping-Corridors_Leveraging-Synergies.pdf
- Aman A, Rafiq M, Dastane O and Sabir AA (2022), Green corridor: A critical perspective and development of research agenda. *Front. Environ. Sci.* 10:982473. doi: 10.3389/fenvs.2022.982473
- Carballo-Penela, A., Mateo-Mantecón, I., Doménech, J. L., & Coto-Millán, P. (2012). From the motorways of the sea to the green corridors' carbon footprint: The case of a port in Spain. *Journal of Environmental Planning and Management*, 55(6), 765–782.
- Davarzani, H., Fahimnia, B., Bell, M., & Sarkis, J. (2016). Greening ports and maritime logistics: A review. *Transportation Research Part D: Transport and Environment*, 48, 473–487.
- European Commission (EU) (2007). Freight Transport Logistics Action Plan. <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex:52007DC0607>
- Getting to Zero Coalition. (2021). A Strategy for the transition to zero-emission shipping.
- Global Maritime Forum (2022). Green Corridors: Definitions and Approaches. Retrieved from: <https://www.globalmaritimeforum.org/news/green-corridors-definitions-and-approaches>
- Jägerbrand, A. K., Brutemark, A., Svedén, J. B., & Gren, I. (2019). A review on the environmental impacts of shipping on aquatic and nearshore ecosystems. *Science of the Total Environment*, 695, 133637.
- Hervas (2023). Green shipping corridors: all hands on deck for maritime sustainability. PierNext. Retrieved from: <https://piernext.portdebarcelona.cat/en/mobility/green-shipping-corridors-clyde-bank-declaration/>
- Korkou, M., Tarigan, A. K. M., & Hanslin, H. M. (2023). The multifunctionality concept in urban green infrastructure planning: A systematic literature review. *Urban Forestry & Urban Greening*, 85, 127975.
- Morante E. (2022). Roadmap to decarbonize the shipping sector: Technology development, consistent policies and investment in research, development and innovation. UNCTAD Transport and Trade Facilitation Newsletter N°96 - Fourth Quarter 2022. Retrieved from: <https://unctad.org/news/transport-newsletter-article-no-99-fourth-quarter-2022>
- Parhamfar, M., Sadeghkhan, I., & Adeli, A. M. (2023). Towards the application of renewable energy technologies in green ports: Technical and economic perspectives. *IET Renewable Power Generation*, 17(12), 3120–3132.

- PierNext (2022). Green shipping corridors: what does the Clydebank Declaration propose? Retrieved from: <https://piernext.portdebarcelona.cat/en/mobility/green-shipping-corridors-clydebank-declaration/>
- Prause, G., & Schröder, M. (2015). KPI Building Blocks For Successful Green Transport Corridor Implementation. *Transport and Telecommunication Journal*, 16(4), 277–287.
- Purvis, B., Mao, Y. & Robinson, D. Three pillars of sustainability: in search of conceptual origins. *Sustain Sci* 14, 681–695 (2019). <https://doi.org/10.1007/s11625-018-0627-5>
- Saul and Piper (2021). Countries at COP26 launch plan for net-zero shipping lanes. Reuters. Retrieved from: <https://www.reuters.com/business/cop/countries-agree-create-green-shipping-lanes-pursuit-zero-carbon-2021-11-10/>
- Schröder, M.; Prause, G. (2015) Risk Management for Green Transport Corridors. *J. Secur. Sustain. Issues* 5, 229–239.
- The Next Wave (2021). About the Getting to Zero Coalition. www.globalmaritimeforum.org/getting-to-zero-coalition



Tel: +33(0) 235 427 884 | **aivp@aivp.org**

AIVP.ORG