

# Green Corridors

## The Spanish Opportunity

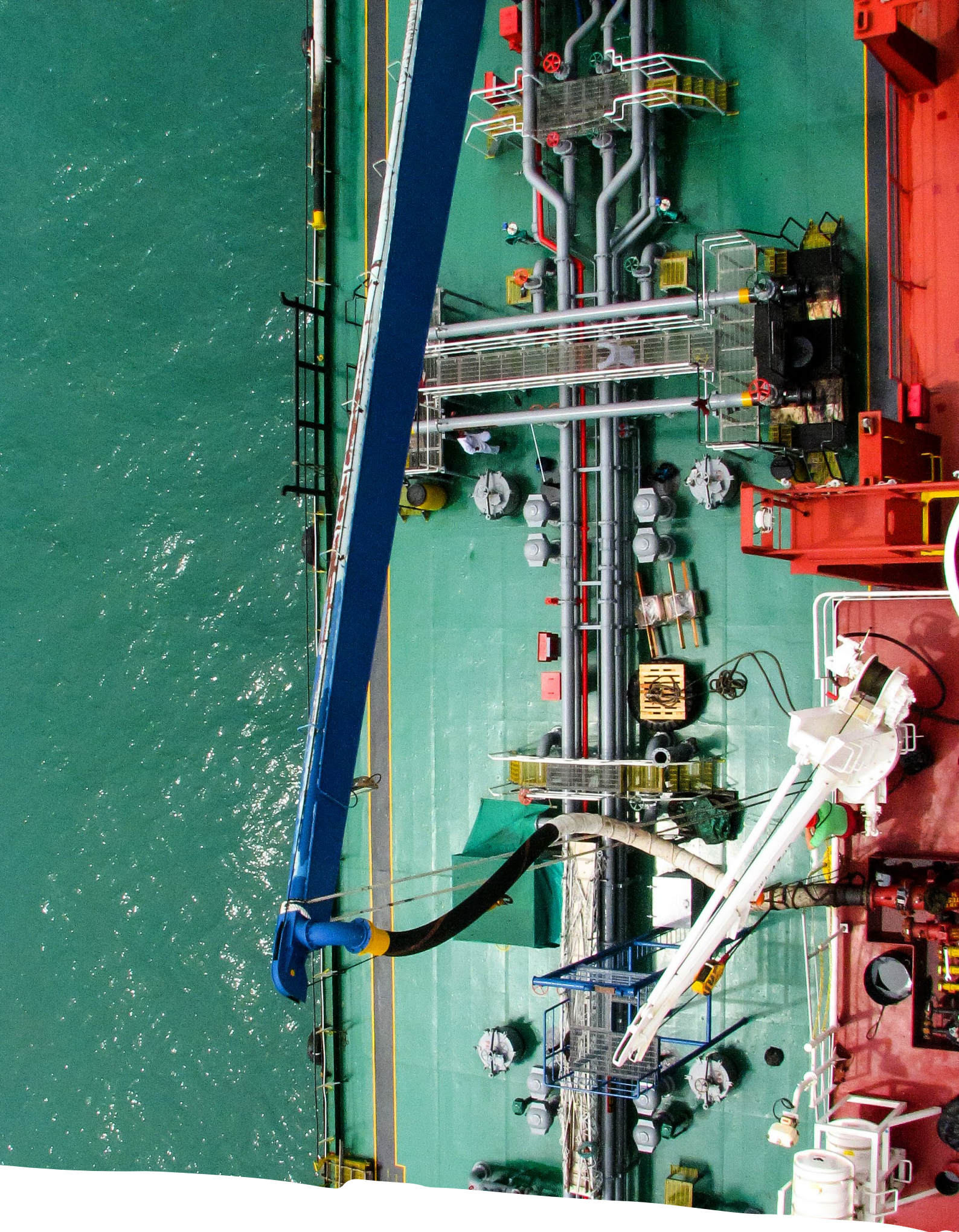
A discussion paper from the Global Maritime Forum  
and the Energy Transitions Commission

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The views and analysis presented in this paper are the authors' own, and do not represent the views of Her Majesty's Government of the United Kingdom.

This discussion paper has been developed by the Global Maritime Forum (GMF) and the Energy Transition Commission (ETC),<sup>i</sup> in collaboration with the United Kingdom's COP26 Presidency and the British Embassy in Madrid.

The objective is to explore the concept of "Green Corridors" for shipping decarbonisation, building on the GMF and ETC report *The Next Wave*,<sup>1</sup> launched in 2021, and applying its insights to Spain, in light of the country signing the [Clydebank Declaration for Green Shipping Corridors](#) to support the establishment of such Green Corridors.

This discussion paper presents a preliminary analysis by the GMF and ETC, and does not seek to propose specific routes or ports that could be involved in a Spanish Green Corridors effort, nor suggest which countries, regions, or ports should be considered potential international partners. Identifying high-potential routes and partnerships will require a separate assessment of options and feasibility.

This work was financially supported by the UK Government and is presented as a discussion paper for an workshop on green shipping corridors held at the British Embassy in Madrid in March 2022 as part of the UK's COP26 Presidency. It is intended as a contribution to the framing of the discussion and the engagement of industry and the public sector in Spain around Green Corridors for zero-emission shipping.

**Figure 1: Shipping traffic density map for Spain**



Source: CLIT International

The thesis of this paper is about Spain: that the development of Green Corridors anchored in Spain is not only feasible but represents a significant industrial and economic opportunity for the country. Given what is known about the necessary building blocks for such corridors, Spain is well positioned to become a "first mover" nation and take on an even more significant role in the world of decarbonised shipping than the one it has in today's fossil-fuelled sector. As such, the focus of the discussion is Spain, the promising conditions for the implementation of the Clydebank Declaration, and some important considerations before taking the next steps.

<sup>i</sup> Supported by the Mission Possible Partnership

## The challenge

The shipping sector is responsible for approximately 80 percent of global trade, and the demand for shipping is expected to continue to grow in line with global economic growth over the next three decades.

Although it is less intensive than other freight transport modes in terms of CO<sub>2</sub> emissions per tonne-kilometre, shipping represents about three percent of total global CO<sub>2</sub> emissions – a share that is likely to increase as other sectors decarbonise. Without concerted collective effort, emissions from the sector could rise by as much as 50 percent by 2050.<sup>2</sup>

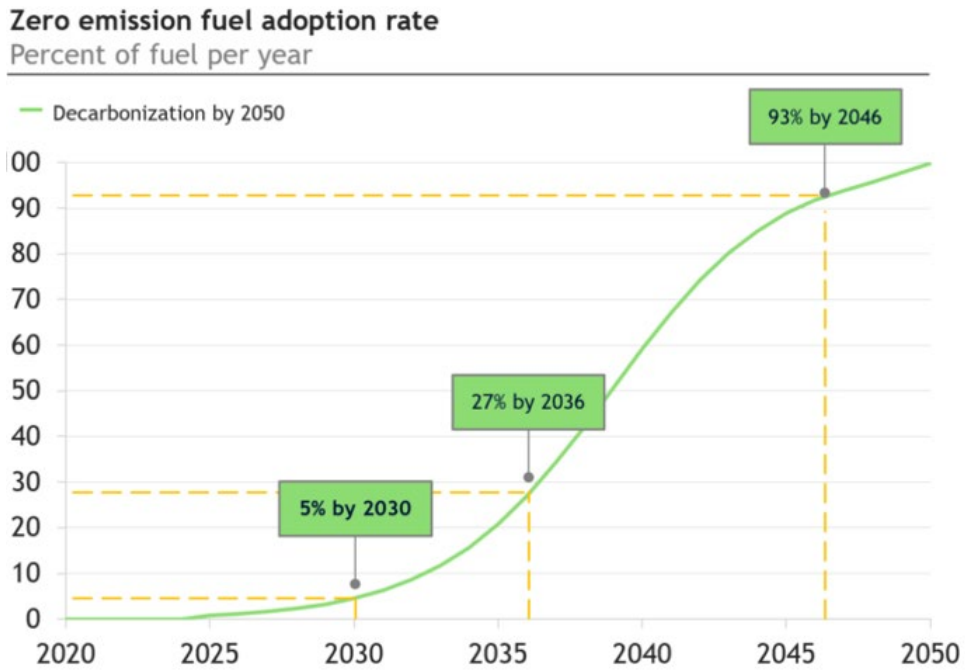
Demand-management levers, such as curtailing traffic volumes, together with improvements in optimising logistics, could reduce the sector's emissions by between four and five percent. A further opportunity to improve vessels' energy efficiency by upgrading ship design and propulsion systems could theoretically reduce emissions intensity by between 15 and 55 percent. However, a decarbonisation strategy focused on these levers alone would not be sufficient to meet the targets set by the International Maritime Organization (IMO) – much less the goal of full decarbonisation by 2050, set out in the Call to Action issued by 200 industry leaders in September 2021<sup>3</sup> and by more than half of the member countries who spoke at the 77<sup>th</sup> meeting of the IMO's Marine Environment Protection Committee.<sup>4</sup> To meet these goals, the maritime industry requires the deployment of vessels using zero greenhouse gas (GHG) emitting fuels.

Zero-emission fuels currently cost significantly more than conventional fuels, and fuel makes up a comparatively large portion of the overall costs of deep-sea shipping.<sup>5</sup> Actions to lower fuel costs are made more difficult by split incentives, such as shipowners paying for efficiency improvements and charterers paying fuel costs. As the sector faces the need to develop entirely new zero-emission value chains, it also faces a chicken and egg problem, with each party's investment decisions dependent on another party's choices.

Many technologies to achieve zero-emission shipping have reached or are approaching commercial availability, but they will need to be demonstrated, refined and deployed at scale to unlock cost reductions and to be adopted at a faster pace in the coming decade. Today, the sector is almost entirely fossil-fuelled, and technologies, systems, and business models for producing, distributing, bunkering, and using zero-emission marine fuels need to be developed, demonstrated, and deployed at scale.

As has been the case with other technologies, laying the groundwork for such a rapid transition will require a period of testing different options in practice, until dominant approaches emerge and are ready to be scaled up. An analysis by the Getting to Zero Coalition, University Maritime Advisory Services (UMAS) and the UN Climate Champions team suggests that rapid scaling will begin around the time that five percent of all shipping internationally is running on zero-emission options.<sup>6</sup> This will mean deploying hundreds of vessels, replacing 16 million tonnes of conventional fuel oil, and establishing multiple bunkering hubs around the world.<sup>7</sup>

Figure 2: Shipping traffic density map for Spain



Source: Cop26 Climate Champions, UMAS

This “emergence” phase of shipping’s transition is beginning, and the piloting and demonstration of these technologies and business models is underway. However, scaling these initial efforts into industry-wide solutions will be challenging, given the heterogeneous and complex nature of the global shipping industry. This is where Green Corridors to promote zero-emission shipping can and must play a role.



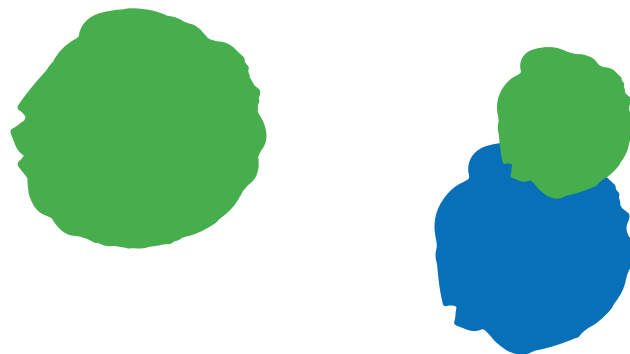
## Why Green Corridors matter

The creation of Green Corridors – defined as a shipping route between two or more port on which the technological, economic, and regulatory feasibility of the operation of zero-emission shipping is catalysed through public and private actions – offers the opportunity to accelerate the emergence phase of shipping's transition.

Shipping decarbonisation is difficult, but some routes do offer relative advantages, either because they are near potentially attractive fuel supply hubs, have advantageous economics, or have comparatively simple operational profiles. The idea behind establishing Green Corridors is to identify and leverage these advantageous routes for accelerated action. As they may with special economic zones, policymakers can target these routes to create an enabling ecosystem with fit-for-purpose regulatory measures, financial incentives, and safety regulations. At the same time, the industry can develop corridor-specific arrangements, such as joint ventures, demand-pooling initiatives, or a transparent and standardised emissions reduction crediting and tracknig, that lower the threshold for action throughout the value chain.

While corridors are focused enough to make decarbonisation manageable, they are also large enough to make it impactful. A Green Corridors offers scope for participation from all the essential value-chain actors needed to scale zero-emission shipping, including fuel producers, vessel operators, cargo owners, and regulatory authorities. Green corridors also provide offtake certainty to fuel producers, allowing for additional scaling of zero-emission fuel production concentrated in one location. And they can generate strong demand signals to vessel operators, shipyards, and engine manufacturers to scale and catalyse investments in zero-emission shipping.

Creating Green Corridors will lower the threshold for action by industry and policymakers, but these corridors are unlikely to emerge organically. Key stakeholders will need to commit to action and to contribute to the analysis, evaluation, and planning that could underpin corridor development.



## Spain, the Clydebank Declaration, and emerging action on Green Corridors

There has been increased recognition of Green Corridors as a catalyst for action, underlined by the UK's Clydebank Declaration for Green Shipping Corridors<sup>8</sup>, where 22 countries including Spain expressed their intent to support the establishment green shipping corridors as a means to decarbonise the maritime sector.

In general, the process of moving from the Clydebank Declaration to the implementation of a Green Corridors will likely involve several overlapping activities: pre-feasibility evaluations of different routes and potential partnerships; engagement of the value chain around key economic and technical issues; and the creation of one or more "route maps" to coordinate industry and public sector activity. Subsequent actions may include the creation of public-private programmes to fund and support innovation, training, and information sharing. If the objectives and timelines discussed above are to be met, these actions will need to get underway during 2022 and 2023.

Activity is beginning, including the development of industry-led consortia to explore technology, infrastructure, and business model implications of specific corridors in several different regions; the establishment of bilateral collaboration between important ports in international shipping (Los Angeles-Shanghai,<sup>9</sup> Antwerp-Montreal<sup>10</sup>); pre-feasibility evaluations of various routes led by national governments; as well as soon-to-be-announced regional collaborations involving ports and industry.

As this paper will argue, Spain has promising conditions for action on zero-emission shipping and Green Corridors. The analysis below is meant to provide a first basis for developing the necessary activities this year and beyond.

For signatories of the Clydebank Declaration, primary routes of interest for decarbonization initiatives may include domestic shipping such as ferry routes. Such routes may also be of interest for Spain. However, as this paper will argue, Spain has a unique opportunity related to the production and bunkering of zero-emission fuels for international shipping, and this paper focuses on the develop of Green Corridors as a means to seize this opportunity.

## The building blocks of Green Corridors for zero-emission shipping

There are four critical building blocks that need to be in place to establish a Green Corridors.

- 1. Cross-value-chain collaboration:** A Green Corridors requires stakeholders that are committed to decarbonisation and are willing to explore new forms of cross-value-chain collaboration to enable zero-emission shipping from both the demand and supply side.
- 2. A viable fuel pathway:** The availability of zero-emission fuels and bunkering infrastructure to service zero-emission vessels are essential factors.
- 3. Customer demand:** Conditions need to be in place to mobilise demand for green shipping and to scale zero-emission shipping via the corridor.
- 4. Policy and regulation:** Policy incentives and regulations will be necessary to narrow the cost gap and expedite safety measures.



**CROSS VALUE CHAIN  
COLLABORATION**



**DETERMINING THE FUEL  
PATHWAY**



**POLICY & REGULATORY  
ENVIRONMENT**



**MOBILISING  
DEMAND**





## Green corridors: Building blocks in Spain

A first assessment of the conditions in Spain suggests that the country has strengths related to each of these four building blocks.

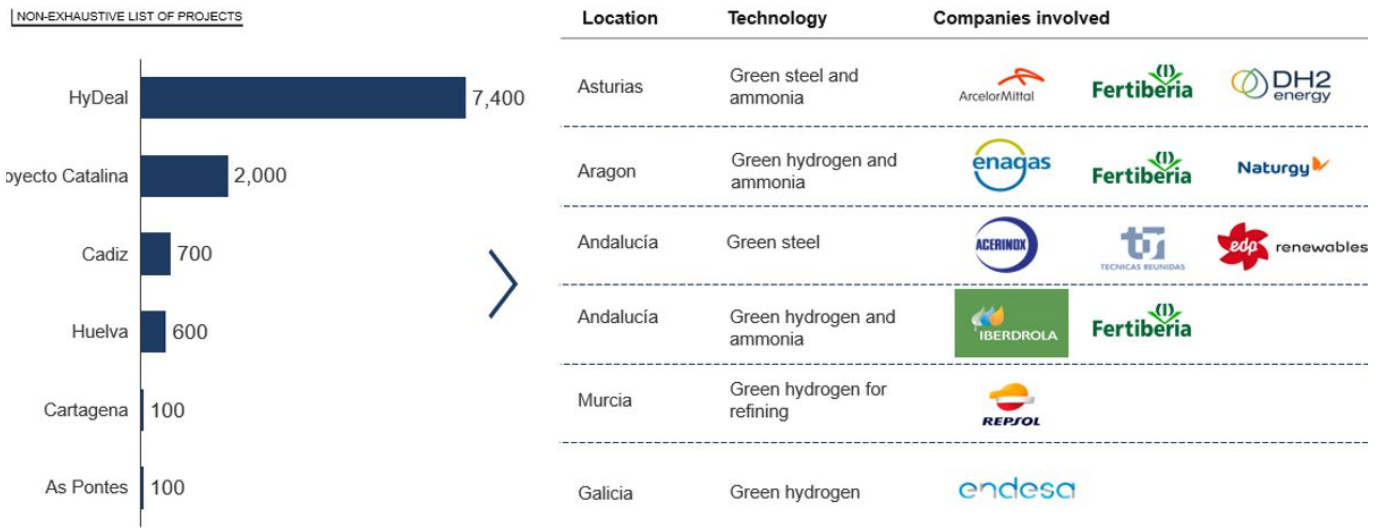
### 1. Cross-value-chain collaboration

The traditional maritime value chain has four core actors – cargo owners, ship operators, marine fuel producers, and regulatory authorities – all of whom need to be committed to decarbonisation and willing to collaborate to make Green Corridors a reality.

- 1.1. Cargo owners:** Approximately 70 percent of cargo handled in Spanish ports can be classified as either liquid bulk (e.g., the transportation of liquid or gas) or container trade (e.g., the transportation of manufactured goods in intermodal containers).<sup>11</sup> The latter category has been widely discussed in terms of its role in mobilising demand: Manufactured goods tend to be able to bear “green premia” and can, therefore, contribute to early action on supply chain decarbonisation. However, the liquid bulk segment also offers opportunities, particularly on the supply side, where existing vessel designs can be adapted to use zero-emission fuels at a comparatively lower cost, and relationships for supplies of future fuels are likely to be strong (or even in-house). There are several Spanish cargo owners that could be strong players in establishing Green Corridors. Fertiberia, Repsol, and Cepsa are important players in the liquid bulk category, while Inditex, Grifols, and CIE Automotive are major shippers in the container trade market. For the remaining 20 percent shipped as dry bulk, Spanish firms such as Acerinox and Ebro Foods could also play a role.
- 1.2. Vessel operators:** While there are limited Spanish vessel operators operating in the global market, several international players that service the Spanish market have made initial inroads to decarbonise their fleets. First movers include containership giant Maersk, which has already declared that it will have 12 zero-emission vessels operating by the middle of the decade.<sup>12</sup> Höegh Autoliners, a major automotive carrier player, has also signed contracts to have four zero-emission vessels operating by 2024-2025, with the option to increase that to 12.<sup>13</sup> Other progressive players in the tanker and bulk industry include Euronav and Star Bulk, both members of the Getting to Zero Coalition.
- 1.3 Fuel producers:** Any scalable zero-emission maritime fuel is likely to be a green hydrogen derivative and will require significant investment in green hydrogen infrastructure. Spanish industrials have been at the forefront of green hydrogen investment with major players such as Fertiberia investing in creating new green ammonia production capacity, while steel major ArcelorMittal has invested in a 250,000 tonne steel plant designed to utilise green hydrogen.<sup>14</sup> While there has not been any green hydrogen production dedicated to producing zero-emission shipping fuels, the announcement of more than 10 gigawatts of green hydrogen electrolyser capacity in Spain indicates the capacity to build out infrastructure for Green Corridors.

Figure 3: Announced green hydrogen projects in Spain since 2020

Announced projects in Spain based on planned capacity, gigawatt (GW)



Source: El Comercio [2022]; Arcelor Mittal [2022]

**1.4. Regulators:** Regulatory bodies have a crucial role to play in creating the enabling ecosystem required to create Green Corridors. Spain has a robust regulatory framework in place, led by the Ministry of Ecological Transition and the Demographic Challenge, which has put together a green hydrogen roadmap that will be key in upscaling fuel production infrastructure.<sup>15</sup> Additional key regulatory bodies include the Ministry of Transportation and regional port authorities, who will be essential in ensuring safety standards for fuel handling are put in place.

This first review of relevant value chain actors in Spain suggests the potential for collaboration on a Green Corridors is high. There is likely to be significant interest from both demand-side and supply-side actors, and the policy infrastructure needed to shape those interests is robust.

## 2. Determining the fuel pathway

In terms of economic opportunity, it is the development of zero-emission fuel supply that lies at the heart of the Spanish opportunity. Recent studies have argued that the most important scalable, zero-emission shipping fuels will need zero-emission hydrogen as an input.<sup>16</sup> Zero or near-zero emission ammonia and methanol are the leading candidates for the deep-sea fuel of the future, with methanol having advantages in the short-term and ammonia possibly having advantages in the long-term. Regardless, production of both will rely on a stable, comparatively low-cost supply of zero-emission hydrogen.

Figure 4: Likely zero-emission fuel pathways for maritime sector

Technology <sup>1</sup>	Long term potential	TRL fuel prod.	TRL engine	TRL vessel	TCO 2030 <sup>2</sup> \$/year	TCO 2050 <sup>2</sup> \$/year
Green Ammonia	Zero emission fuel with existing infrastructure, possibility of hydrogen transport and <b>increasing price competitiveness</b> due to independence from carbon feedstock requirement	8	7	3	20	18
Green Methanol	Considered <b>most advanced fuel</b> with solutions already in use; <b>long term challenges</b> for carbon feedstock procurement from non-fossil sources	8	8	8	23	20
Green Hydrogen <sup>3</sup>	Technically challenging and <b>cost intensive storage</b> on ship due to fuel properties	9	7	2	24	22
Synthetic Diesel	<b>Scalability challenges</b> due to carbon feedstock procurement from non-fossil sources; <b>higher electricity demand</b> results in greater production costs	7	9	9	24	20

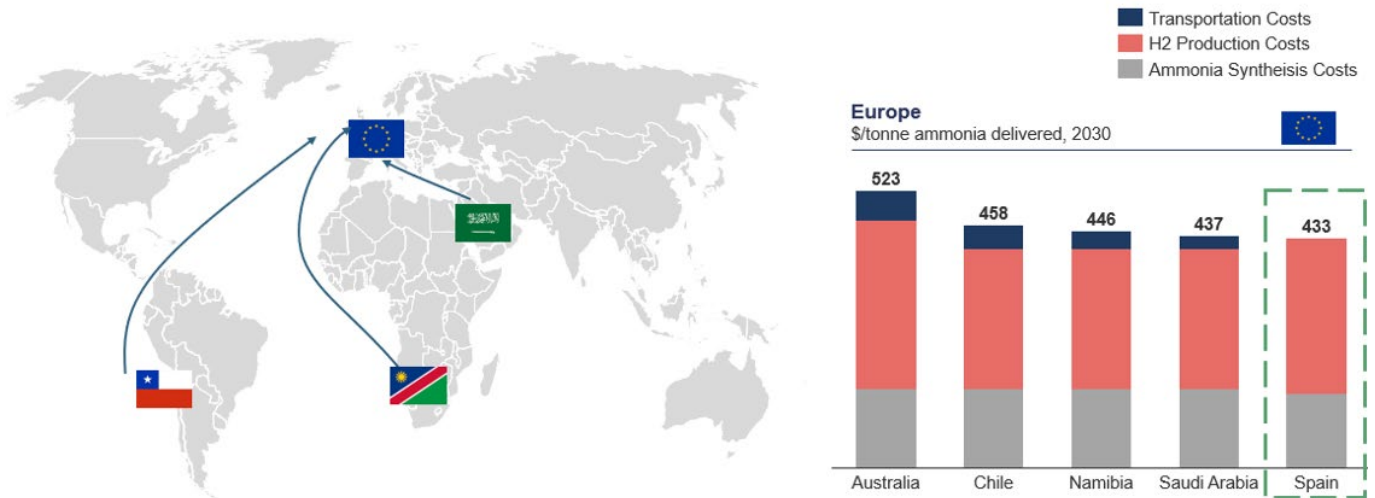
1. Numbers based on direct air capture technology (DAC) in this overview for green methanol, synthetic diesel  
 2. Based on 15,000 TEU container vessel with bunkering in Middle East; Typical speed of 18 knots and 8 annual canal transits; Green Ammonia with 95% Ammonia and 5% LSFO; Green Methanol with 97% Methanol and 3% LSFO

SOURCES: Getting to Zero Coalition (2020), TRL: Lloyd's Register and UMAS (2020), TCO: Maersk Mc-Kinney Moller Center for Zero Carbon Shipping NavigaTE model

**Spain has the potential to be among the cheapest production locations in the world and a hub for European production.** A key component to producing green hydrogen will be ensuring the availability of sufficient renewable resources. Spain is blessed with excellent solar and wind resources, as well as a strong industrial base for project development, making it among the most attractive locations in the world for green hydrogen production. For all scalable, zero-emission fuels, the production costs for zero-emission hydrogen will be the primary factor determining competitiveness.

The importance of zero-emission hydrogen to shipping's transition makes Spain an interesting option for the production of future fuels. However, Spain's geographical location in relation to major global demand centres and shipping lanes, and its existing role in bunkering for international shipping, create an additional advantage. Many of the other countries with strong potential to produce fuel (e.g., Chile, Australia, Saudi Arabia) do not enjoy the same advantageous location and/or access to bunkering demand as Spain. Figure 5 indicates the cost advantage Spain would be likely to enjoy in this competitive market, assuming it is able to produce hydrogen at its goal of \$1.5 per kilogramme.

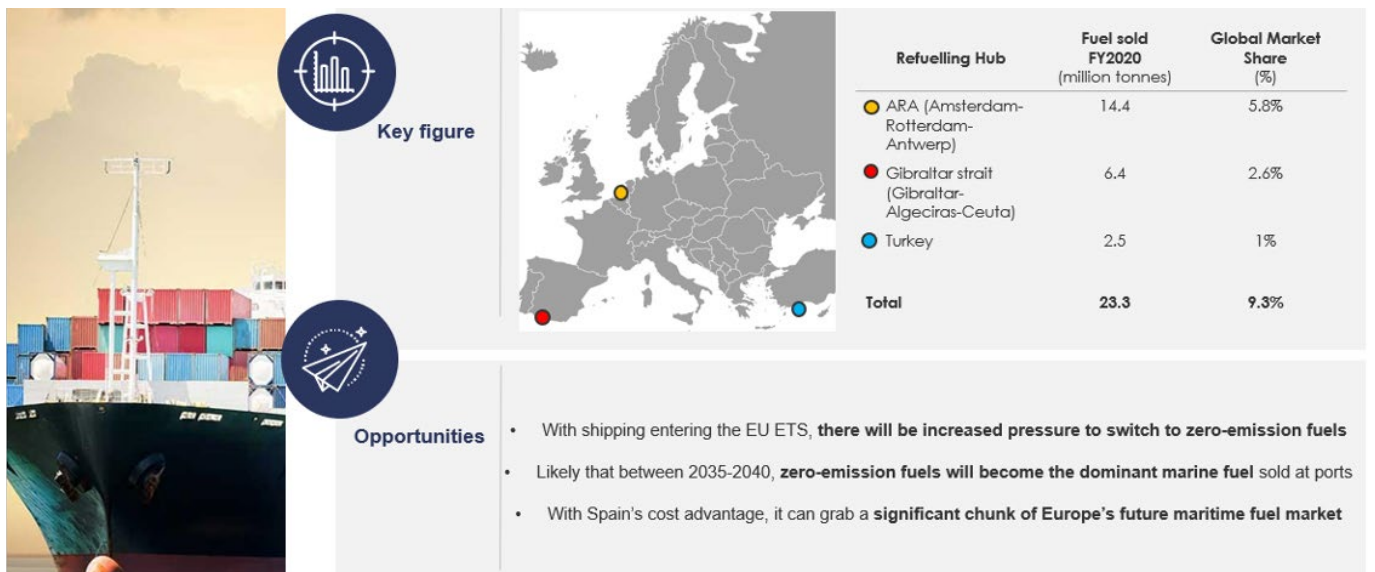
Figure 5: Delivered cost of green ammonia for select global locations



SOURCE: Hydrogen Europe (2021), Clean Hydrogen Monitor 2020, IEA (2021); ETC analysis – assumes \$1.5 kg h2 for Spain

**First mover advantage could help Spain gain a share in future maritime fuel markets.** Given these advantageous conditions, Spain has an opportunity to establish a foothold in the future market for zero-emission shipping. The opportunity to sell green fuels is significant on its own terms – the Spanish port of Algeciras is already among the top 10 bunkering ports globally.<sup>17</sup> Compared to its position today, Spain has the opportunity to expand its role in the future market for zero-emission fuels.

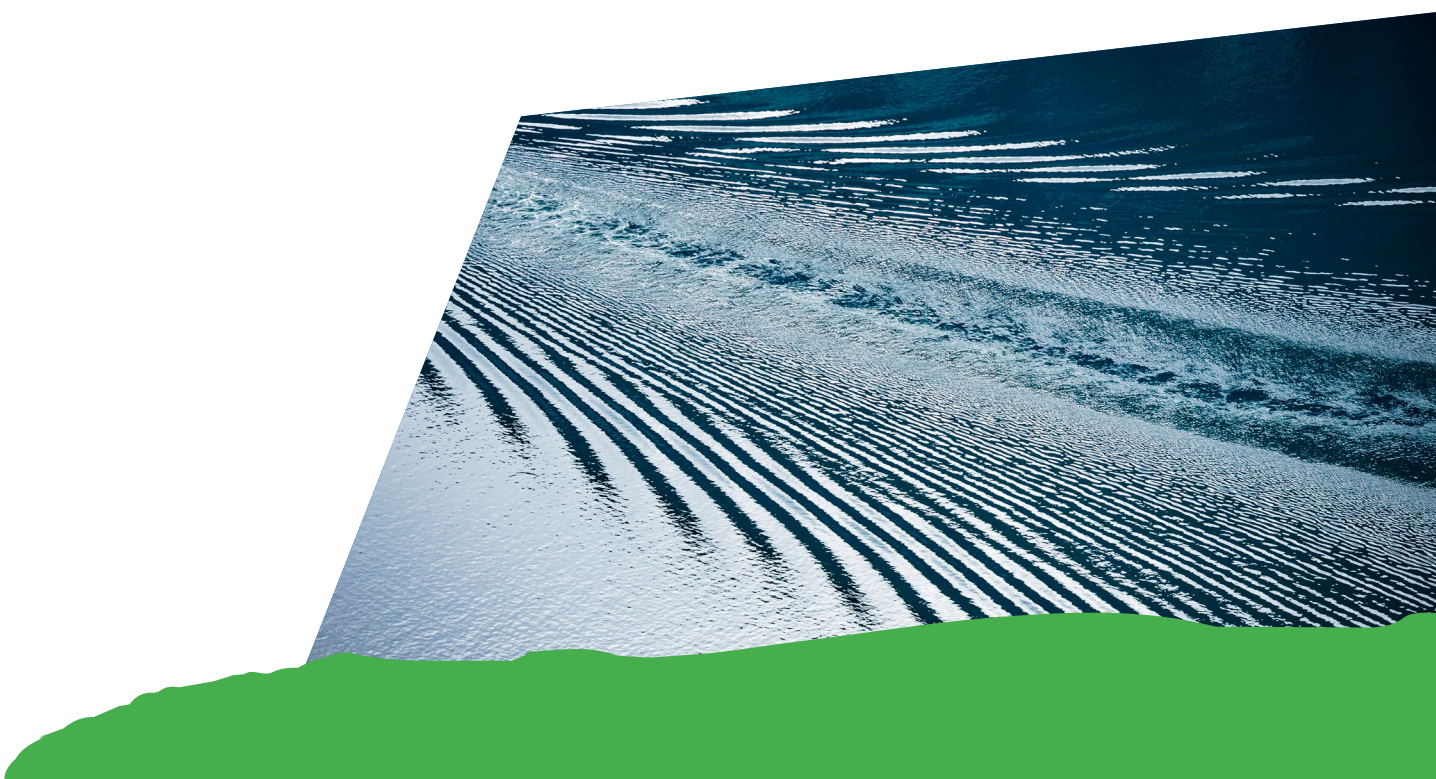
Figure 6: Major refuelling hubs in Eurasia



Source: Ship&Bunker

In addition to the green fuel opportunity, Green Corridors can generate opportunities for first movers throughout the value chain, including, for example, distributors and shippers looking to secure a green premium from customers. Moreover, the scale of hydrogen production could provide opportunities to significantly scale new industries such as electrolyser manufacturing – an area already being explored by Spanish power giant Iberdrola. Beyond the opportunities mentioned, there are further broad-based economic benefits that could emerge from Spain's comparative advantages.

**Despite significant reductions in zero-emission fuel costs, a gap of ~25-45 percent is forecast to remain by 2030.**<sup>18</sup> Production of zero-emission shipping fuels today would have a cost base between 200-300 percent of that of fossil fuels.<sup>19</sup> These costs are likely to come down as production scales up, renewable electricity prices continue to decline, and processes are optimised. Nonetheless, a significant cost disadvantage will remain in comparison with fossil fuels, especially as differences in fuel density will require double the quantity of ammonia and/or methanol (compared to fossil fuels) to travel the same distance. In the long run, a global carbon price, ideally developed via the IMO, will be the best tool for bridging this gap. However, in the medium term, perhaps even through 2030, first movers will need to find additional ways to bridge this cost gap. Again, Green Corridors offer a particular opportunity in this respect, as policy and demand-side tools can be developed in a targeted way to minimise overall costs.

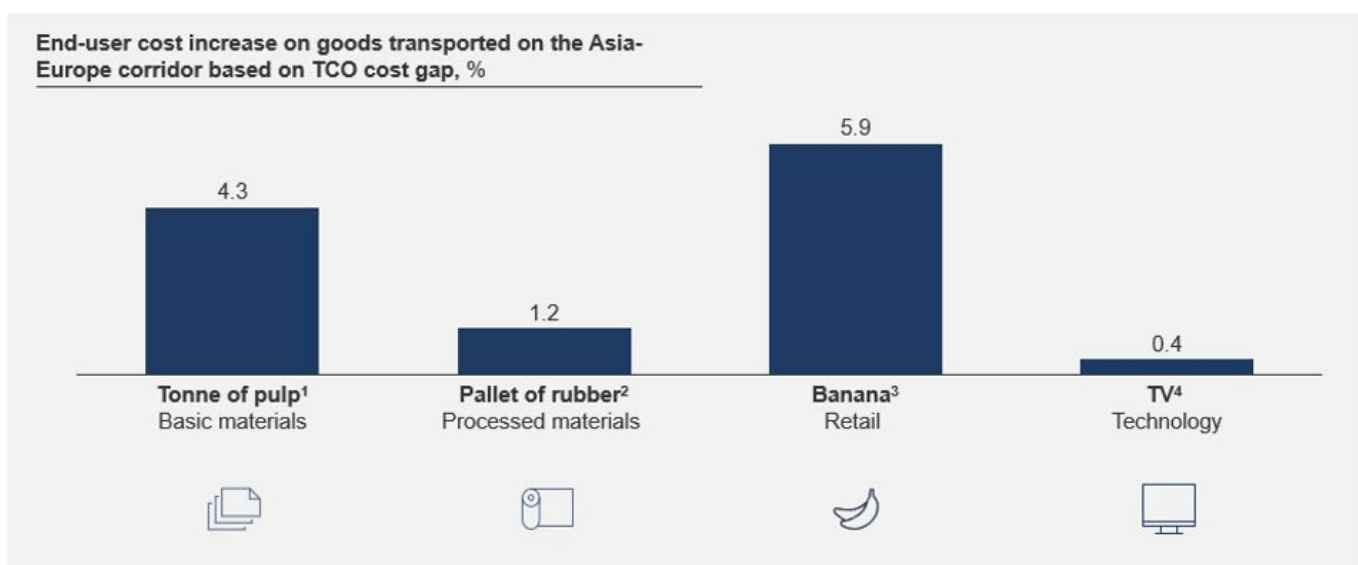


### 3. Mobilising demand

As noted, a cost gap exists between fossil fuels and zero-emission fuels, and will continue to exist for some time. This gap is meaningful for ship owners and operators, with fuel already accounting for between 25-40 percent of the costs of a given journey and expected to be even higher as zero-emission fuels are adopted.

Yet, viewed in light of the service delivered – that is, the provision of final goods to the economy – the cost impacts of zero-emission shipping are small: usually under 10 percent for most traded goods.

Figure 7: End-user cost increase on goods transported on the Asia-Europe containership route



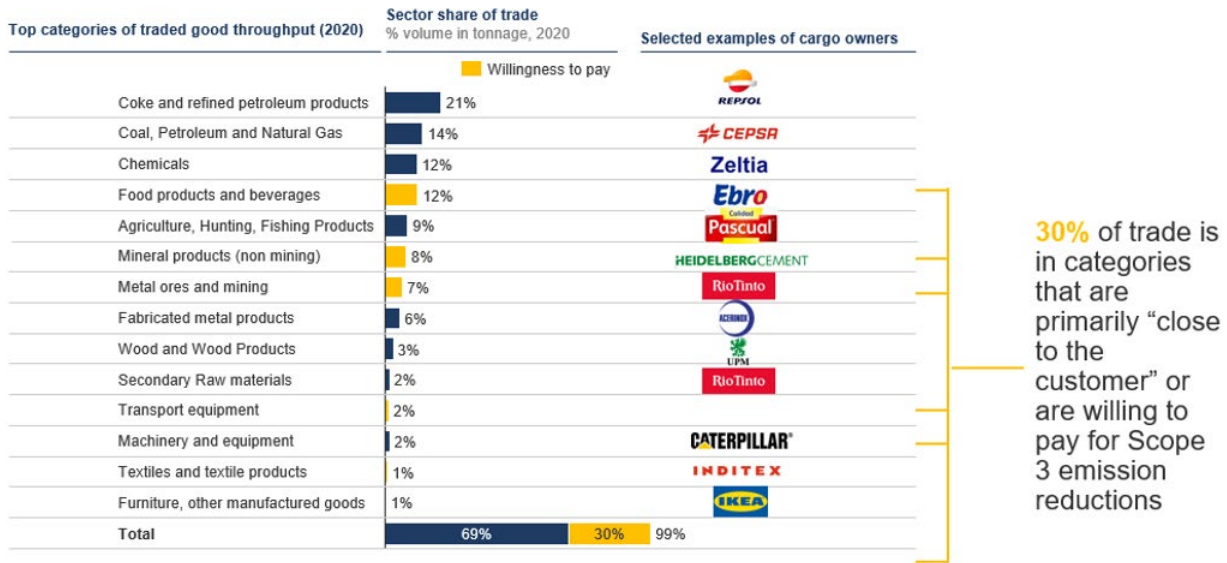
1. Retail price of \$968/tonne and 12 tonnes per TEU
2. Retail price of \$2110/tonne and 20 tonnes per TEU
3. Retail price of \$1.18 per banana and 46 items per TEU
4. Retail price of \$336 per TV and 400 items per TEU

SOURCE: Maersk Mc-Kinney Moller Center for Zero Carbon Shipping NavigaTE model

Many cargo owners – including the members of the Cargo Owners for Zero Emission Vessels (coZEV) initiative, who have committed to full decarbonisation of their sea freight by 2040 – see competitive advantages in decarbonising early.<sup>20</sup> Here again, a Green Corridors can create opportunities to leverage this interest by giving cargo owners an opportunity to test new business models and mechanisms for spreading costs and risks, while also allowing them to focus their efforts on routes where the fuel pathway is clear and they can be assured that any green premium is generating emissions reductions.

The opportunity to mobilise demand for zero-emission shipping services passing through Spain is significant. While not necessarily associated with trade in high value-added consumer goods, seaborne trade passing through Spain includes a significant amount of intermediate and finished goods for which a green premium could be realistic.

Figure 8: Sector share of trade passing through Spanish ports in 2020



SOURCE: EUROSTAT (2022)

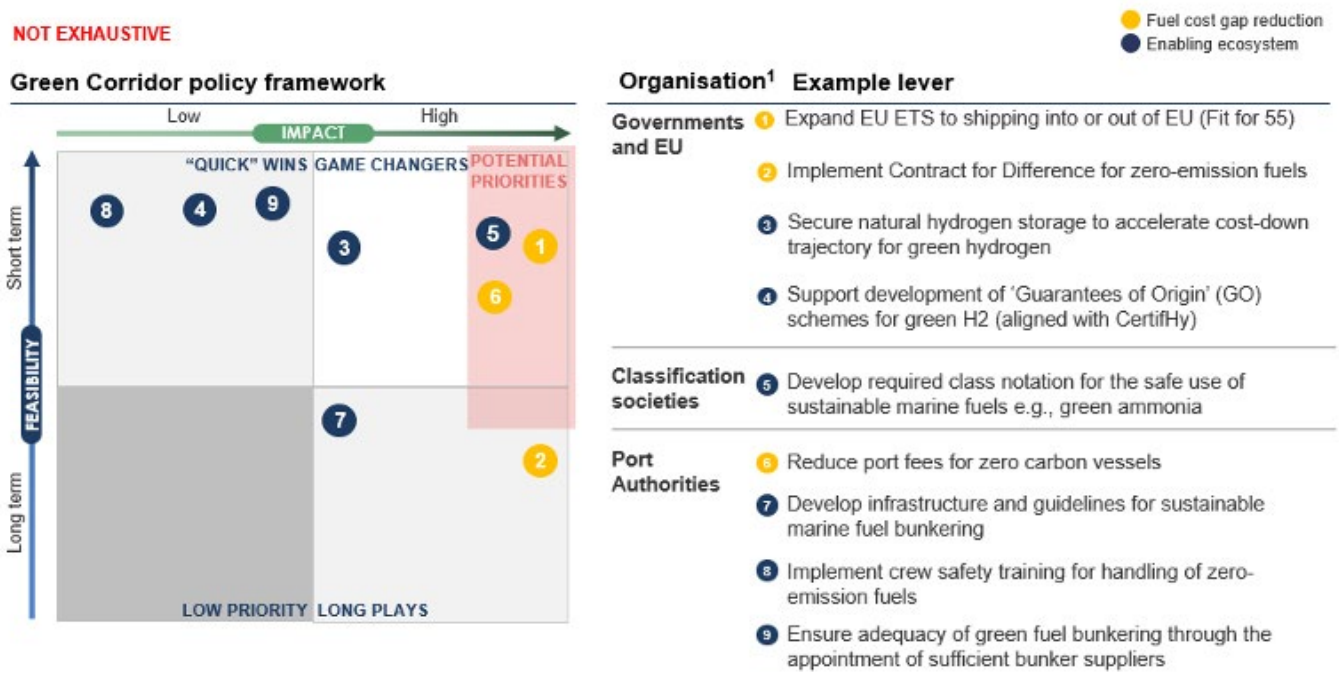
Nonetheless, today, this demand is disaggregated and individual companies are unlikely to be able to generate fuel demand at the scale needed to stimulate efficient production of zero-emission hydrogen. This points to the need to establish demand coalitions targeting zero-emission fuel supplies on routes in and out of Spain. A concerted public-private effort to develop Green Corridors could provide a context for such a demand coalition.

## 4. Policy and regulatory environment

Leveraging demand for zero-emission shipping services will likely be a necessary component of any successful Green Corridors, but it is unlikely to incentivise the full engagement of the value chain unless the cost gap is partially reduced.

Policy action will be essential to zero-emission shipping on many fronts: establishing and regulating safe operating procedures for the storage and handling of future fuels; regulating markets through Guarantees of Origin and green fuel certification; incentivising zero-emission fuel use; and, most importantly, reducing zero-emission fuel production costs. Figure 9 provides an overview of some of the most feasible and impactful options for enabling and stimulating zero-emission shipping via Green Corridors involving Spain.

Figure 9: Green corridor policy framework for Europe



<sup>1</sup> Not exhaustive: examples of key players, most policy actions require collaboration across governance levels  
 Source: Based on Transport & Environment (2021) and Maritime and Port Authority of Singapore (2021)



For many of these levers, Spanish regulatory bodies will be able to exert an influence over the value chain. However, as routes are prioritised, and partner countries and ports identified, there will be opportunities to increase the impact of policy measures by harmonising with those that are implemented at the “opposite end” of the corridor. This could entail working through and mutually recognizing standards, port fee exemptions, or even a shared incentive scheme for zero-emission fuel use, for example, through a contract for difference.<sup>21</sup>





Spain also has an opportunity to leverage European Union (EU) policy in support of such a corridor. The implementation of the EU’s Fit for 55 package will include shipping-specific measures.<sup>22</sup> As yet, it remains unclear whether these will be sufficient or appropriate for driving the development of zero-emission value chains. Spain, and any eventual partners in Green Corridors development, should seek ways to shape the implementation of these policies, for example, through revenue recycling that supports Green Corridors to Europe.



## 5. Potential next steps for Spain

This first assessment of Spain’s Green Corridors opportunity suggests that Spanish stakeholders, public and private, should move quickly to capitalise on significant advantages. Four overlapping efforts will likely be required:

Figure 10: Three step process Green Corridors process

 <p>Assessment of routes</p>	<p>An evaluation of which <b>routes</b> (cargo, ports, destination) are <b>most promising</b> will be needed to focus resources.</p>
 <p>Engagement of stakeholders</p>	<p>A <b>dialogue</b> between <b>industry, ports and key regulatory agencies</b> should be initiated</p>
 <p>Feasibility studies</p>	<p>Targeted <b>studies of supply/demand for new fuels, infrastructure and financing needs</b> for prioritised corridors should be undertaken</p>
 <p>"Route mapping" and programme development</p>	<p>A joint <b>public-private roadmap</b> for the corridor should be developed and <b>targeted support programmes</b> considered</p>

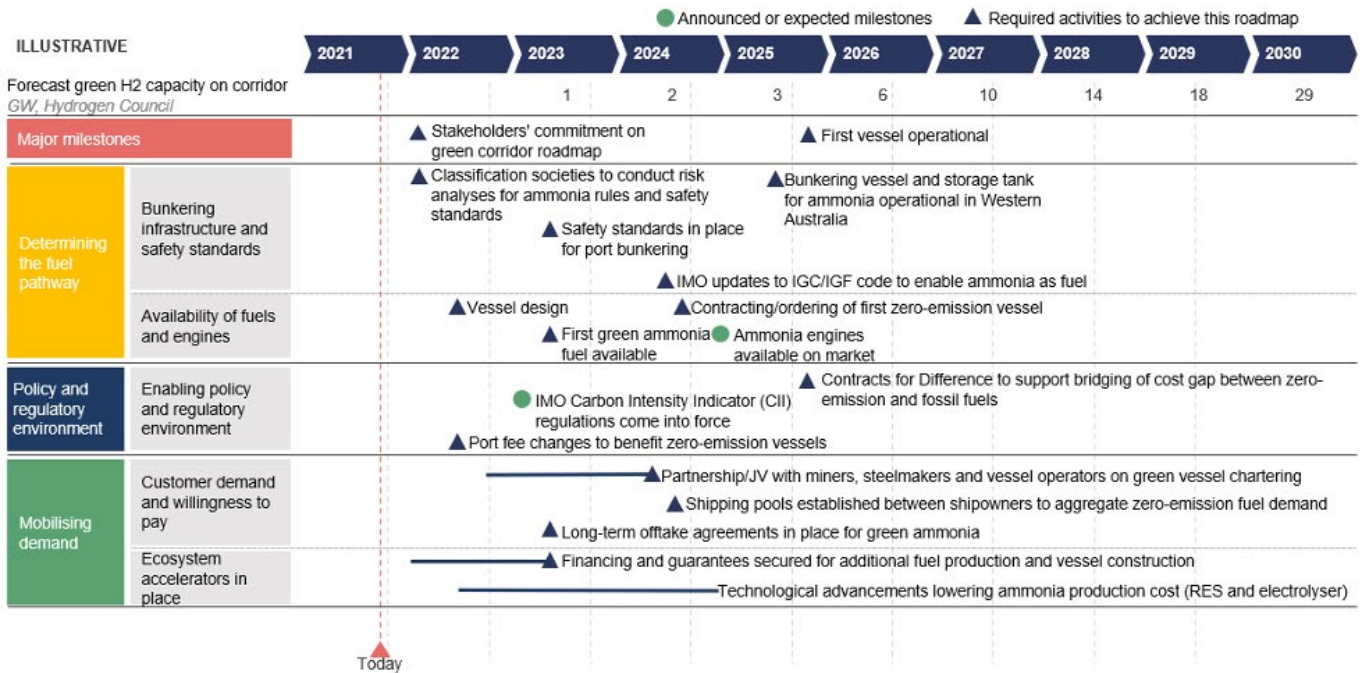
**Assessment of routes:** Green corridor concepts require the prioritisation of certain routes with advantageous conditions and the potential for international partnership. The assessment needed entails a pre-feasibility analysis looking at the key building blocks identified in this paper and the potential for impact in terms of the emissions reductions and value chain development likely to be associated with the route.

**Engagement of stakeholders:** Given the importance of cross-value-chain collaboration on both the supply and demand side, stakeholders will need to be activated early around a credible, sustained effort to develop Green Corridors. Some core stakeholders, especially in energy and international shipping, can be identified early, while engagement can be refined as routes are targeted.

**Feasibility studies:** For prioritised corridors, a more detailed analysis of, for example, shipping and port operational profiles, fuel production potential, infrastructure needs, and costs and financing requirements should be undertaken as an enabler of targeted action throughout the value chain, for example by providing knowledge inputs to demonstration projects or innovation support programmes.

**Route mapping and programme development:** A route map akin to roadmaps used in strategy, technology, and policy can be developed, based on the participation and input of stakeholders. An effective route map will show how key elements of corridor development need to interact with each other over time and will anchor expectations about the behaviour of different value chain actors, public and private. Route maps need not be official government documents, but they can be facilitated by independent actors and “owned” by all parties.

Figure 11: Indicative route map for Australia-Japan iron ore corridor



Source: The Next Wave [ETC, GMF]

## 6. Conclusion

Green corridors to promote zero-emission shipping are likely to be the essential arena for shipping's journey towards decarbonisation over the coming half-decade or more. As a signatory of the Clydebank Declaration, Spain has signaled its intent to support the development of Green Corridors. Perhaps more importantly, doing so could create significant opportunities for Spanish industry and the Spanish economy.

Spain has many advantages to bring to the creation of Green Corridors: strong companies throughout the value chain for international shipping; clear advantages in the production and distribution of future bunker fuels; potential demand for decarbonised freight; and a constructive arena for policy action.

Setting shipping on the necessary decarbonisation trajectory will mean taking action on Green Corridors urgently. The opportunity to leverage its comparative advantages means that the case for action from Spain is even stronger. The public and private sectors in Spain should begin to assess and prioritise immediately routes that could become Green Corridors, start stimulating stakeholder engagement, and subsequently look to develop route maps to guide the industry and policy actions to come.

# Endnotes

- 1 <https://www.globalmaritimeforum.org/content/2021/11/The-Next-Wave-Green-Corridors.pdf>
- 2 <https://www.imo.org/en/OurWork/Environment/Pages/Fourth-IMO-Greenhouse-Gas-Study-2020.aspx>
- 3 <https://www.globalmaritimeforum.org/getting-to-zero-coalition/call-to-action>
- 4 <https://www.globalmaritimeforum.org/news/transition-perspective-outcomes-and-implications-of-mepc-77>
- 5 <https://www.globalmaritimeforum.org/content/2020/11/The-First-Wave-%E2%80%93-A-blueprint-for-commercial-scale-zero-emission-shipping-pilots.pdf>
- 6 <https://www.globalmaritimeforum.org/news/five-percent-zero-emission-fuels-by-2030-needed-for-paris-aligned-shipping-decarbonization>
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- 9 <https://www.c40.org/news/la-shanghai-green-shipping-corridor/>
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- 14 <https://corporate.arcelormittal.com/media/press-releases/arcelormittal-signs-mou-with-the-spanish-government-supporting-1-billion-investment-in-decarbonisation-technologies>
- 15 <https://www.trade.gov/market-intelligence/spain-renewable-hydrogen-roadmap>
- 16 <https://www.globalmaritimeforum.org/content/2021/10/A-Strategy-for-the-Transition-to-Zero-Emission-Shipping.pdf>
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### **About the Getting to Zero Coalition**

The Getting to Zero Coalition is an industry-led platform for collaboration that brings together leading stakeholders from across the maritime and fuels value chains with the financial sector and other committed to making commercially viable zero emission vessels a scalable reality by 2030.

Learn more at:

[www.globalmaritimeforum.org/getting-to-zero-coalition](http://www.globalmaritimeforum.org/getting-to-zero-coalition)

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