Green Corridors: Pre-Feasibility Phase Blueprint

Summary Report, November 2022

GREEN HYDROGEN CATAPULT

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Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping

Intro to the upcoming Green Corridor Pre-feasibility Blueprint

The Clydebank Declaration was launched at COP26 to facilitate rapid decarbonization of the shipping industry. Signatories of the declaration commit to support establishing "green shipping corridors – zero-emission maritime routes between two (or more) ports" and the aim is to establish at least six such green corridors by 2025 and "many more" by 2030.

There are many reasons why establishing green shipping corridors is a relevant way to accelerate the decarbonization of shipping:

- Once green corridors are operational, they contribute to the development of alternative fuel supply chain, offtake, and propose/develop measures to overcome cost gaps.
- Green Corridor projects unite first movers across the maritime value chain and consolidate individual first mover actions across sectors. This collaborative nature of green corridor projects help mitigate some of the uncertainties and risks faced by first movers
- The well-defined geographical scope of green corridor projects reduces complexity and sparks accelerated decarbonization processes.
- Planning, implementing, and operating Green Corridors builds valuable knowhow that can inform and accelerate development of effective regulation.
- Green corridors create a space for pre-competitive testing and commercial trials of technologies and market solutions.
- And furthermore, they can use a 'ring-fenced' partnership approach (e.g., consortium) that promotes collaboration across the supply chain, so risks, costs, and benefits are shared across all stakeholders in the private and public sectors.

In order to meet the high ambitions of the Clydebank Declaration, it is critical that green corridor projects are initiated and matured simultaneously by as many companies, and organizations as possible. This makes the pre-feasibility phase essential.

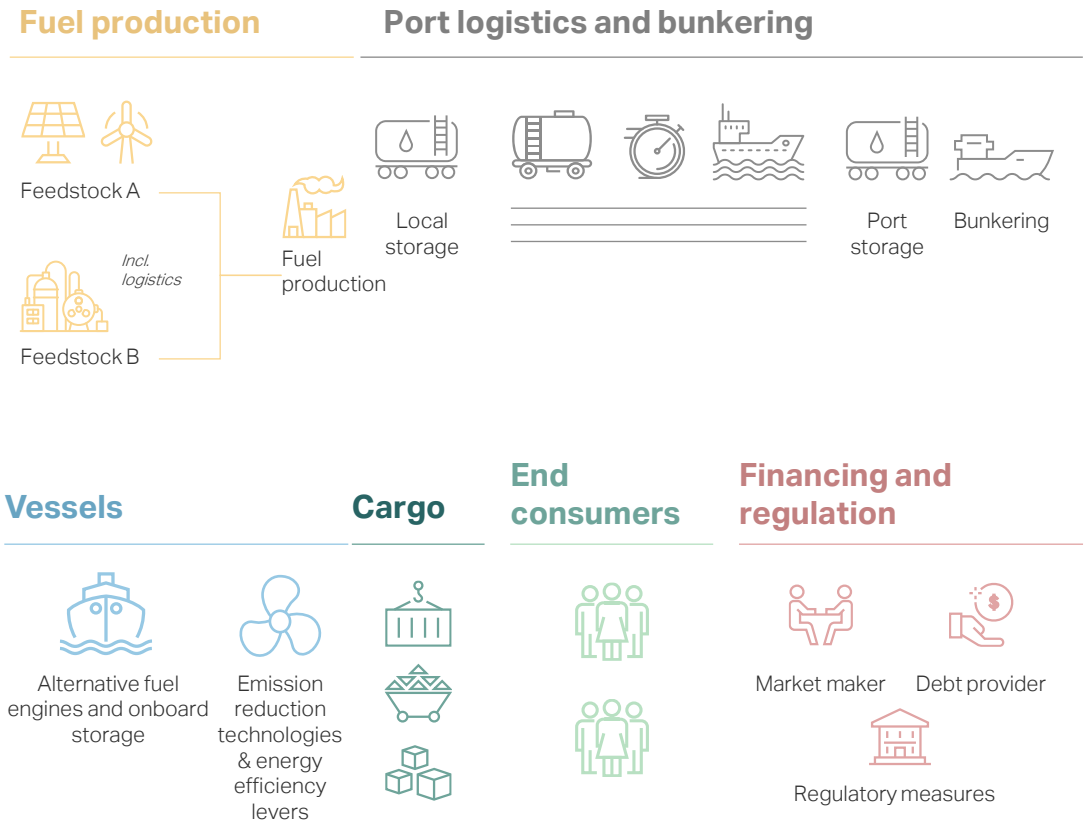
To accelerate the generation of green corridors, the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping is developing a series of blueprints for the different phases of the green corridor projects.

The blueprints serve as a ready-to-use guide for any stakeholder involved in green corridors for decarbonizing shipping.

First out was a feasibility blueprint, done in collaboration with McKinsey & Company and launched in September 2022 at the Global Clean Energy Action Forum in Pittsburgh. and includes 80+ off-the-shelf pages outlining methodology, analysis, and illustrative templates at each step of the value chain and across the ecosystem.

The upcoming Green Corridor Pre-Feasibility Blueprint is produced by the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping and Rocky Mountain Institute, under the Green Hydrogen Catapult. Released in December it will provide a similar ready-to-use guide for understanding early-stage green corridor options in a pre-defined area: port, region, country or sub-continental.

Green corridors in short



Green corridors demonstrate and enable zero-carbon shipping by establishing shipping routes where commercial operating vessels realize emission reductions using **alternative fuels.**

A green corridor is defined as a **specific route** with a **specific vessel segment and cargo type.**

The main corridor types are **single point**, **point to point** or **network corridors.**

Green Corridors:

1. **Provide an approach and design** for industry players to gain confidence and embark on an accelerated decarbonization transition.

2. **Initiate end-to-end decarbonization** within a supply chain.

3. **Promote closer dialogue and collaboration** between public and private stakeholders involved in the overall ecosystem.

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Green corridor project development phases

Focus of blueprint

Go/no-go decision point

Pre-feasibility

- Create project baseline
- Map relevant value chain
- Perform high-level screening of potential corridors
- Engage with relevant regulatory bodies and government
- Consider stakeholder consortium
- No optimization

Letter of intent

Feasibility

- Establish consortium
- Assess technical, economic, regulatory feasibility assessment
- Create risk registry and mitigation plan
- Outline decisions and commitments required by stakeholders
- Create roadmap and milestones leading towards operation

Memorandum of understanding

Select

- Define criteria for final concept selection
- Deep dive on key elements from feasibility phase as relevant to ranking criteria and pre-FEED[1]
- Rank concepts based on criteria and selection of final concept outlined in the feasibility study

Heads of agreement

Define

- Perform FEED[1] and detailed engineering design (incl. technical specification)
- Estimate costs and timeline for projects
- Define contractual commitments between stakeholders, before final investment decisions (FID)

Final investment decision (FID) and consortium execution contract

Execute

- Finalize project details
- Commission and execute on the project
- Prepare for handover

Handover to operators

Operate

- Operate green corridor

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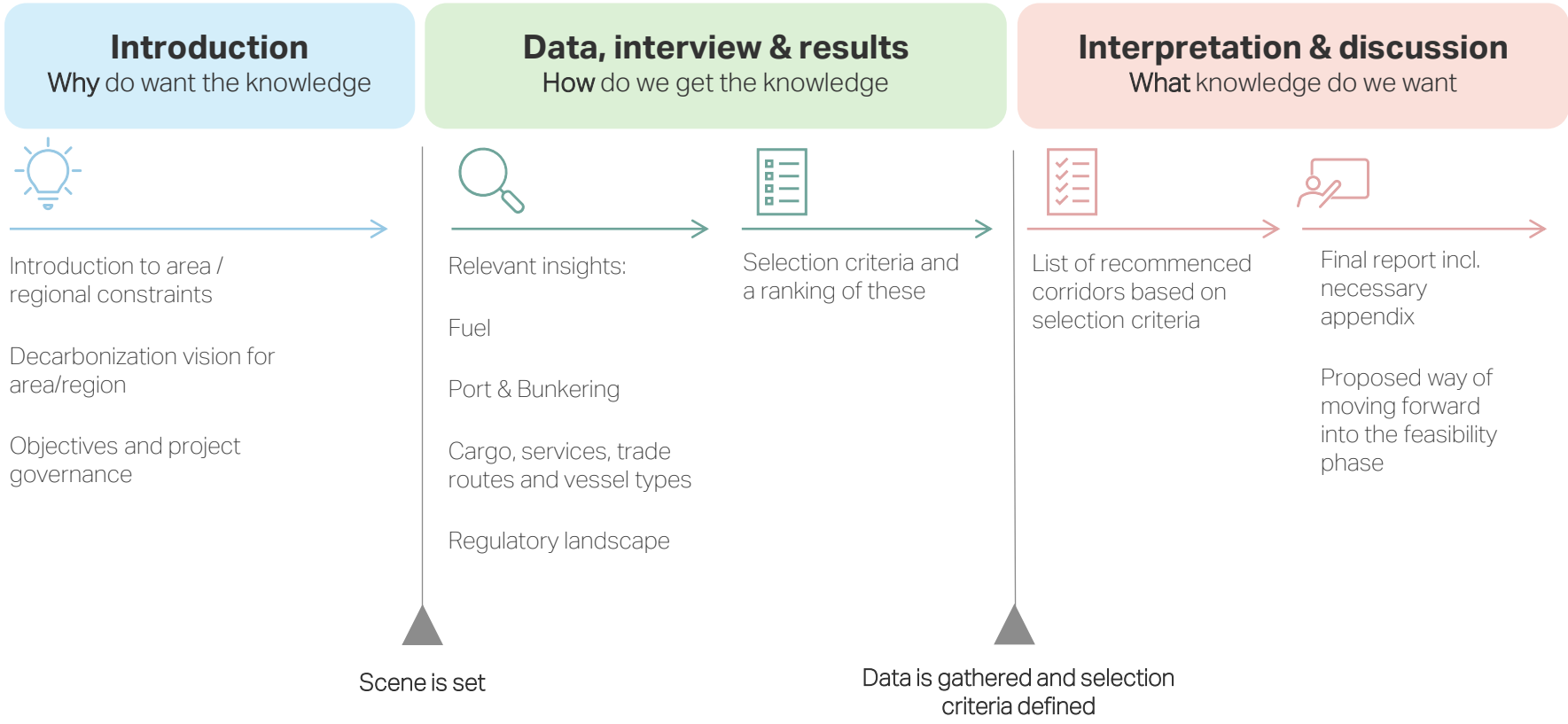
1. Front-end engineering and design

Pre-feasibility project methodology

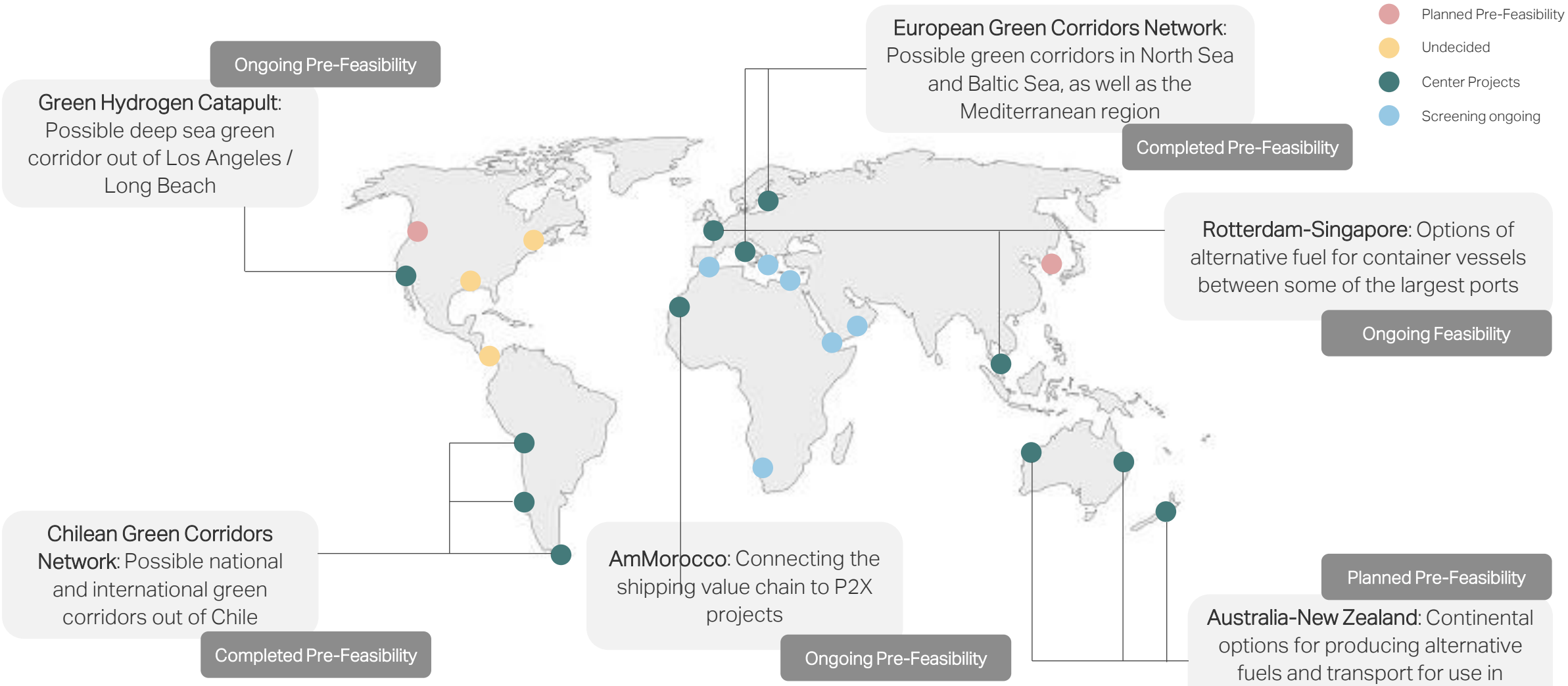
The pre-feasibility methodology involves three overall sections: Introduction, data collection, interpretation/discussion.

Activities include **preliminary assessment** of the main components of possible green corridors in a region or country to outline the most promising and viable corridors.The process addresses 18 key questions/areas covering the whole value chain: **fuel, ports, vessels, cargo and regulatory**. The data insight is validated / updated through interviews with key value chain stakeholders.

The outcome of the assessment is to determine whether **further investigation and maturation of the outlined green corridor projects is justified** (i.e. moving to the feasibility phase).



Green corridor projects developing under the Green Hydrogen Catapult



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For more information go to:
www.zerocarbonshipping.com