SEABOUND

An alternative approach to OCCS: turning CO_2 into limestone

IMO Technical Seminar | Sept 11, 2025

Alisha Fredriksson (CEO)

Agenda

1. Intro to Seabound
2. Technology Overview
3. Key Advantages
4. Indicative Case Study
5. Pilot Projects & Next Steps

Seabound is an award-winning startup developing modular carbon capture systems for the shipping industry.

KEY STATS:

- Founded in late 2021 by serial entrepreneur, ex-SpaceX engineers, PhD chemical engineers
- 20-person team, based in London
- $10M raised to date between equity & grants
- 2 world-first pilot projects completed

AWARDED:

Maritime UK Awards · Nor-Shipping 1965 – 2025 · European Patent Office · Forbes 30 30 · Women in Change

BACKED BY:

LowerCarbon Capital · Eastern Pacific Shipping · Y Combinator · Department for Transport · UKRI Innovate UK · Collab Fund

FEATURED IN:

The Guardian · CNN · BBC · Business Insider · Reuters · TechCrunch · TradeWinds

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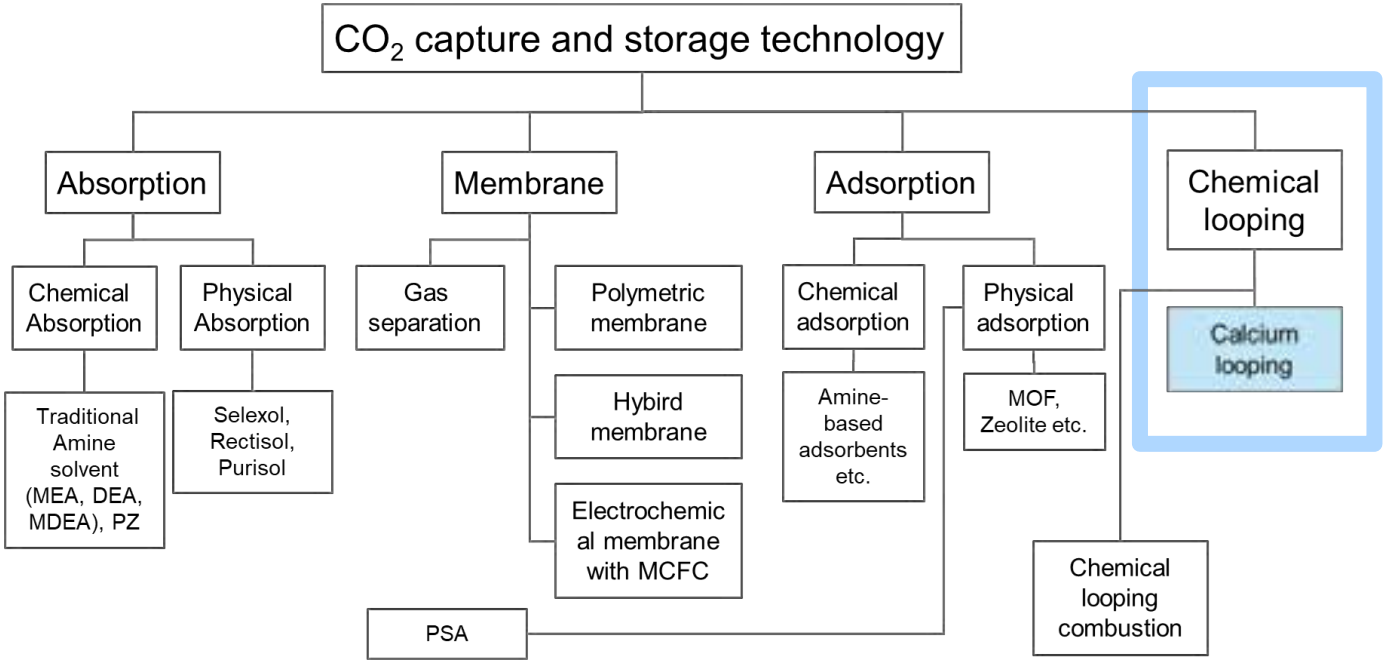
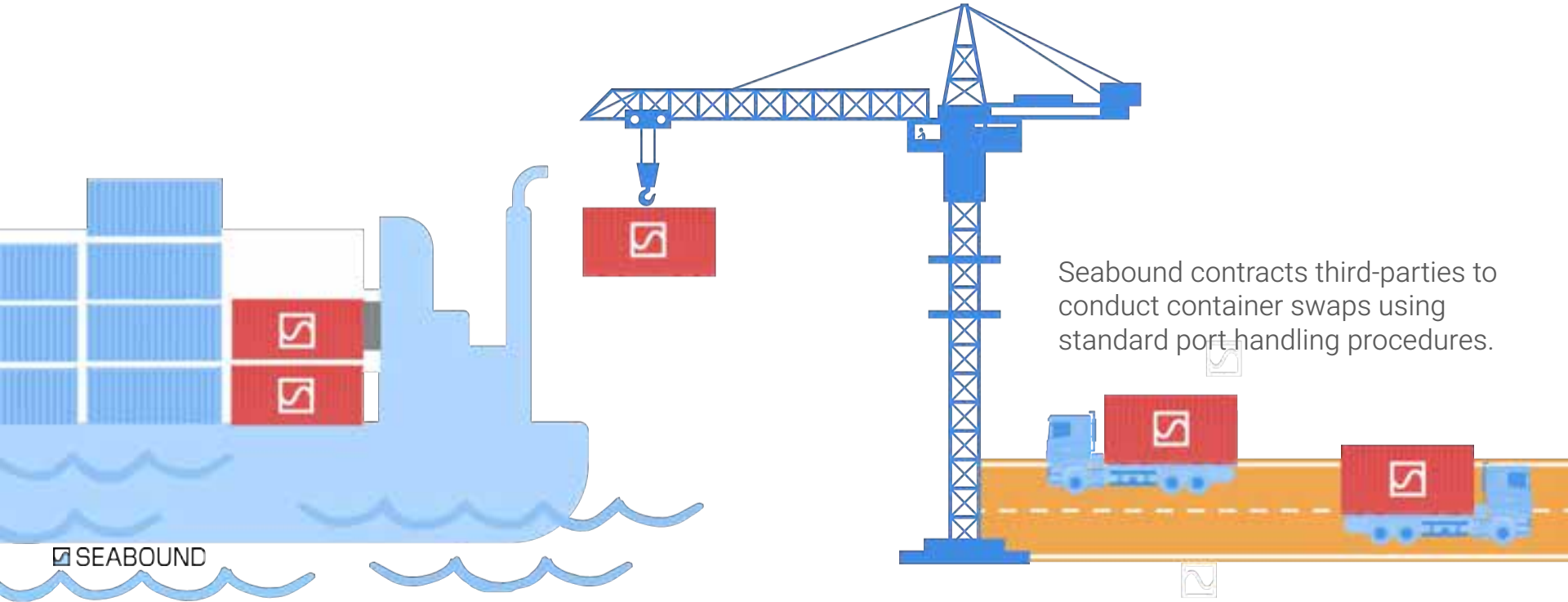
We **reviewed all types** of carbon capture technologies to find the best fit for shipping — **selecting 2nd-generation calcium looping**.



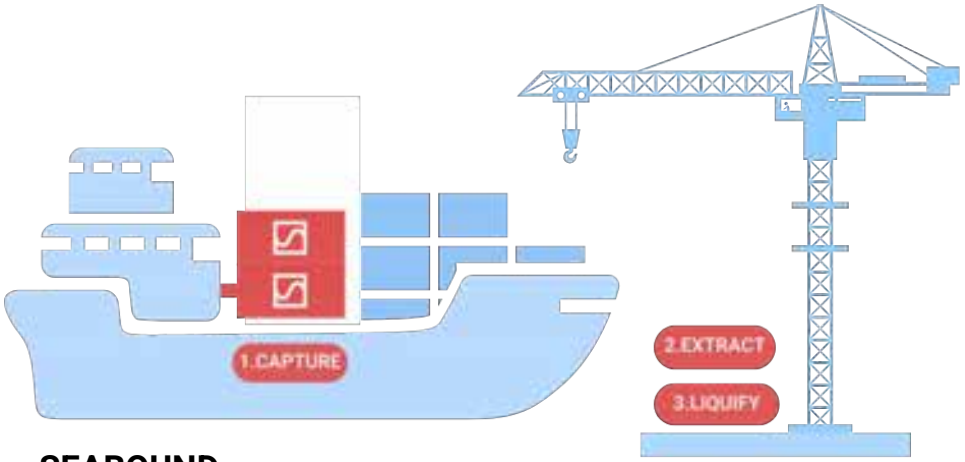
“Seabound Containers” are modular carbon capture systems filled with lime that absorb CO_2 and convert it into limestone.

Seabound Containers connect to a ship's exhaust with minimal retrofits. At port, saturated containers are swapped for fresh ones — just like regular cargo.



Seabound contracts third-parties to conduct container swaps using standard port handling procedures.

Seabound **uniquely decouples** the carbon capture process between ships and shore to **reduce cost and complexity**.



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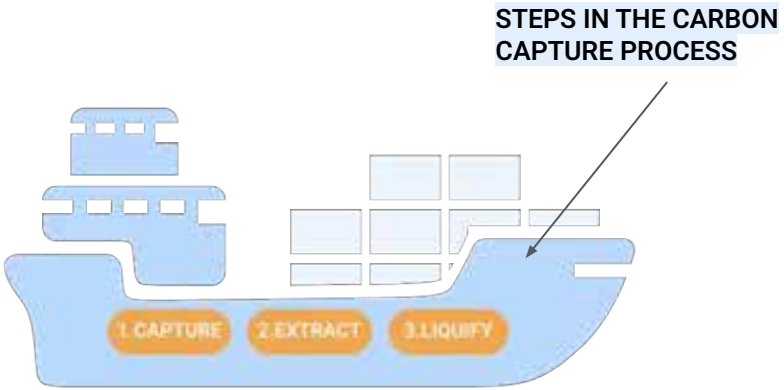
First principles thinking: Designed specifically for maritime constraints; decouple onboard and onshore parts, leverage 2nd gen tech (lime).

Low CAPEX, low onboard energy, just offload limestone.

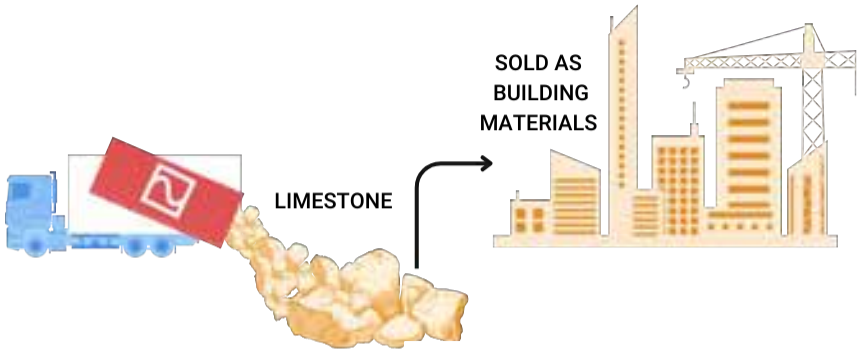


ALTERNATIVES

Conventional thinking: Miniaturize and transfer full carbon capture process (steps 1-3) from land to ships, using 1st gen tech (amines).

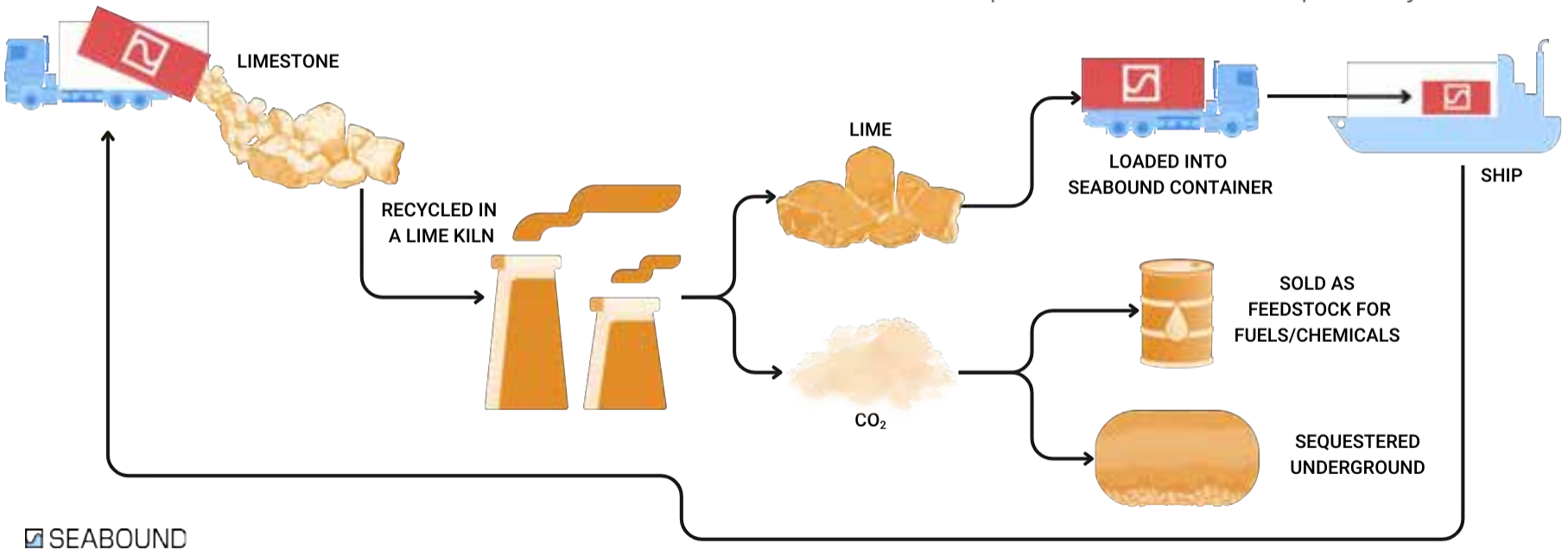
High CAPEX, high onboard energy consumption, limited scalability as ports can't receive pure CO_2.

Onshore, limestone is sold as a building material in Seabound's "open loop" operating model.



Alternatively, limestone can be **recycled to reuse the lime and sell/sequester pure CO_2** in Seabound's "closed loop" model.

Seabound partners with major lime companies to enable both pathways.

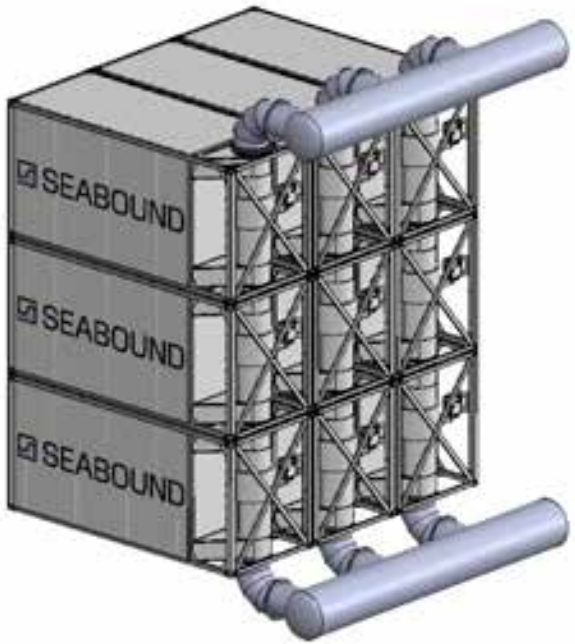


Seabound Containers follow **standard TEU conventions** for **maximum simplicity and scalability**.

KEY INNOVATIONS:

- Miniaturized and modularized calcium looping system
- Decoupled process between onboard & onshore components
- Patent-pending design
- Proprietary lime/sorbent recipe
- Automated optimized operations

Seabound Containers follow **standard TEU conventions** for **maximum simplicity and scalability**.



Seabound's key advantages are **low CAPEX, low onboard energy consumption**, and **low infrastructure requirements.**

1

LOW CAPEX

- Decoupled process and modular design minimize equipment needs onboard and simplify vessel retrofit
- Scale capture with regulation and swap Seabound systems across vessels – investing in fleets vs ships

2

LOW ONBOARD ENERGY CONSUMPTION

- Onboard reaction is exothermic, reducing energy demand to <10 kWh/ton CO_2
- Future waste heat recovery possible to repurpose thermal energy onboard

3

LOW INFRASTRUCTURE REQUIREMENTS

- Limestone is a safe, non-toxic material that can be easily offloaded in ports worldwide
- No specialized tanks required onboard nor new infrastructure required in ports; Seabound Containers can be fitted onto various vessel types and lifted on/off vessels using standard port cranes

Case study:

Key Inputs/Assumptions:

- Panamax vessel; 5000 TEU
- ~43 metric tonnes of HFO per day
- Intra-EU voyage; 7 day route
- 2028 operations
- Vessel avoids IMO and EU penalties

Case study: To **meet IMO's base threshold**, a Panamax ship needs **20 Seabound Containers**, paying back in **<4 years**.

Key Inputs/Assumptions:

- Panamax vessel; 5000 TEU
- ~43 metric tonnes of HFO per day
- Intra-EU voyage; 7 day route
- 2028 operations
- Vessel avoids IMO and EU penalties

Capture Rate
7-18%
of CO_2 emissions

Seabound Containers
<20
Onboard

Space Needs
<0.5%
of TEU capacity

Payback Period
3.75
years

By 2031, a Panamax ship could capture **40% of CO_2** emissions with **~40 Seabound Containers** and a **<2 year payback.**

Key Inputs/Assumptions:

- Panamax vessel; 5000 TEU
- ~43 metric tonnes of HFO per day
- Intra-EU voyage; 7 day route
- 2031 operations
- Vessel avoids IMO and EU penalties and earns surplus units

Capture Rate 40% of CO_2 emissions	**Seabound Containers** 43 Onboard
Space Needs <1% of TEU capacity	**Payback Period** 1.81 years

PILOT #1 SUCCESS

Seabound's **world-first pilot** with Lomar and Hapag-Lloyd **captured CO_2 at ~80% efficiency.**

LOMAR lomarlabs Hapag-Lloyd

British Start-up Completes Sea Trial of Onboard Carbon Capture System

Seabound demonstrates carbon capture technology at sea for first time

The UK start-up worked with Lomar's corporate venture lab lomarlabs on the project, which took place in 2023.

Environment

A container ship just tested a system to capture its own CO2 emissions

Shipping companies are experimenting with onboard carbon capture systems, but they face difficult trade-offs on energy and space for regular cargo

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🔗 CNN, Reuters, Mini documentary

Seabound's second pilot – **the world's first port-based CO_2 capture** – achieved 94% efficiency, unlocking a new application.

🔗 *Spectrum broadcast*, *TradeWinds coverage*

Next up, we're launching our **first commercial demonstration with Hartmann Group and Heidelberg Materials** in Norway.

This cargo ship is turning its CO2 emissions into green cement

The first commercial carbon capture system for boats has

Brevik becomes home to new onboard carbon capture project

Meet the cement transport ship that makes cement ingredients while sailing

Seabound launches carbon capture initiative on cement vessel

Seabound's carbon capture technology uses calcium looping to capture up to 95% of CO_2 and 98% of sulphur emissions from ship exhaust.

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Thank you.

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