**PRESS RELEASE**

**Cutting ship emissions at the source: Alisha Fredriksson and Roujia Wen in top 10 innovators of the Young Inventors Prize 2025**

* **Most decarbonisation efforts in the maritime sector currently focus on updating the fleet with new ships and on transitioning to green fuels, which leave the shipowners with few options to meet emissions targets**
* **UK-based Alisha Fredriksson (Sweden/Canada) and Roujia Wen (China) founded Seabound, a startup that builds retrofittable carbon capture system that traps CO₂ from ship exhausts**
* **The team is among top ten innovators of the Young Inventors Prize, to be awarded by the European Patent Office (EPO) on 18 June 2025**

**Munich, 6 May 2025** – According to the [Organisation for Economic Co-operation and Development](https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/09/co2-emissions-from-global-shipping_b6c04994/bc2f7599-en.pdf), global shipping is a major contributor to emissions, releasing over 800 million tonnes of CO₂ each year. The [European Commission](https://climate.ec.europa.eu/eu-action/transport/reducing-emissions-shipping-sector_en) also reports that EU maritime transport alone exceeded 124 million tonnes in 2021, accounting for 3-4% of the bloc’s total CO₂ emissions. While alternative fuels and new ship designs offer long-term solutions, most existing vessels lack a feasible retrofit option for cutting CO₂ emissions to meet emissions targets. **Alisha Fredriksson (30) and Roujia Wen (29) co-founded Seabound to develop a retrofittable** **carbon capture system** to help shipowners cut emissions without replacing their fleets. By capturing CO₂ into solid limestone rather than storing it as a liquid or gas, Seabound’s solution makes offloading and processing simple, eliminating the need for complex onboard CO₂ equipment or specialised portside infrastructure. Their invention **has earned them a place among the ten global innovators, known as Tomorrow Shapers**, for the Young Inventors Prize 2025, selected from over 450 candidates by an independent jury.

**A modular solution for maritime decarbonisation**

Most carbon capture systems require costly, energy-intensive systems for compressing and storing CO₂ onboard, but Seabound’s compact, container-based system **captures CO₂ directly from a ship’s exhaust and binds it with a lime-based sorbent to form solid limestone pellets.** This removes the need for pressurised CO₂ tanks and also streamlines portside logistics as the limestone can be offloaded in shipping containers as ordinary cargo.

The Seabound system is designed to offer flexibility to shipowners - the modular units can be scaled up to match a ship’s emissions. The system operates efficiently, using exhaust heat to sustain the process while requiring only minimal energy for sensors and valves. The limestone can then be sold for use as building materials or post-processed at a nearby port to release CO₂ which can be used in other products (e.g., e-fuel production) or for sequestration, with the lime recycled for future capture. The **technology also removes sulphur emissions, making it a dual-purpose scrubber that helps ships cut pollution without costly fleet replacements.**

**From concepts to sea trials**

Fredriksson and Wen met at university and co-founded Seabound in 2021, driven by the need for a practical solution to maritime emissions. Fredriksson had worked with maritime e- fuels, where captured CO₂ was needed as a feedstock but was in short supply. Wen, with a background in applied mathematics and AI, helped **design a modular carbon capture system that could be easily installed on existing ships.** ”*We bind the CO₂ in solid form using calcium-based materials, making storage as simple as carrying cargo. No specialised equipment, no extreme conditions, just a stable, scalable way to reduce emissions at sea,"* explained Wen.

They iterated through multiple working prototypes in their London workshop before moving to full-scale trials at sea. According to Seabound, their system was tested on a commercial cargo ship and successfully captured CO₂ at 78% efficiency and sulphur emissions at 90% efficiency. “*Shipping is one of the last sectors to decarbonise, as existing solutions are neither effective nor economically viable yet. Carbon capture was an emerging technology in other sectors, so we began brainstorming ways to make it work and we decided to take on the challenge together,*” added Fredriksson.

**The Young Inventors Prize celebrates worldwide innovators 30 and under using technology to address global challenges posed by the United Nations Sustainable Development Goals (SDGs).** Fredriksson and Wen’s invention supports SDG 13 (Climate Action) by providing a practical, scalable solution for reducing carbon emissions in the maritime industry.

**The prizes of the 2025 edition will be announced during a ceremony** [**livestreamed**](https://www.epo.org/en/news-events/young-inventors-prize/2025-event?mtm_camp=pressrelease&mtm_key=yip2025&mtm_med=press) **from Iceland on 18 June 2025.**

Find more information about the invention’s impact, the technology and the inventor’s story [here](https://www.epo.org/en/news-events/young-inventors-prize/alisha-fredriksson?mtm_camp=pressrelease&mtm_key=yip2025&mtm_med=press).

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**About the Young Inventors Prize**

Aimed at individuals 30 and under, the Young Inventors Prize showcases the transformative power of youth-driven solutions and recognises the remarkable young people paving the way to a more sustainable future. Established in 2022, trophies were first handed out during the European Inventor Award ceremony. From 2025 onwards, the Prize will move up a gear with its own dedicated event, held separately from the Award. Among the 10 Tomorrow Shapers selected for each edition, three will be awarded a special prize: World Builders, Community Healers, and Nature Guardians. In addition, a People’s Choice winner, voted by the public online, will be revealed. Each Tomorrow Shaper will receive EUR 5 000, the three special prize winners will each receive an extra EUR 15 000. The People’s Choice winner will be awarded an additional EUR 5 000. [Read more](https://www.epo.org/en/news-events/young-inventors-prize?mtm_camp=pressrelease&mtm_key=yip2025&mtm_med=press) on the Young Inventors Prize eligibility and selection criteria.

**About the EPO**

With 6,300 staff members, the[European Patent Office (EPO)](https://www.epo.org/?mtm_camp=pressrelease&mtm_key=yip2025&mtm_med=press) is one of the largest public service institutions in Europe. Headquartered in Munich with offices in Berlin, Brussels, The Hague and Vienna, the EPO was founded with the aim of strengthening co-operation on patents in Europe. Through the EPO's centralised patent granting procedure, inventors are able to obtain high-quality patent protection in up to 46 countries, covering a market of some 700 million people. The EPO is also the world's leading authority in patent information and patent searching.