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Nordic Green Ammonia Powered Ships (NoGAPS)

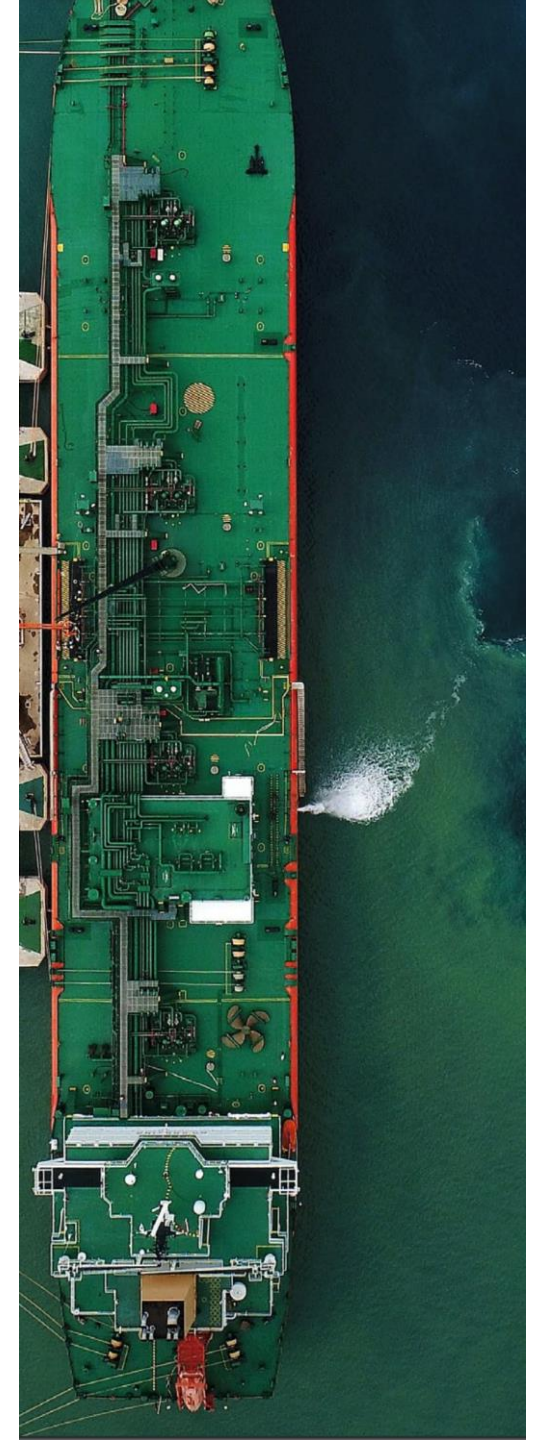
Nordic Energy Research Conference, May 3, 2023



Nordic
Innovation



GLOBAL
MARITIME
FORUM



Project background

“There is an urgent need to demonstrate the viability of powering ships with green ammonia”

“The Nordic region is in a unique position to pioneer this development”

— NoGAPS initiation, 2020



NoGAPS₁, 2020-2021

Consortium partners



Project lead

Co-author report

Funder



NoGAPS₁, 2020-2021



Objective:

Elaborate a concept for an ammonia-powered gas carrier, transporting ammonia as a cargo in Northern Europe, using zero emission ammonia as a fuel.

Three pillars investigated

The ammonia-powered vessel

Fuel supply & infrastructure

Business & financing considerations



Key takeaways, NoGAPS₁

Vessel

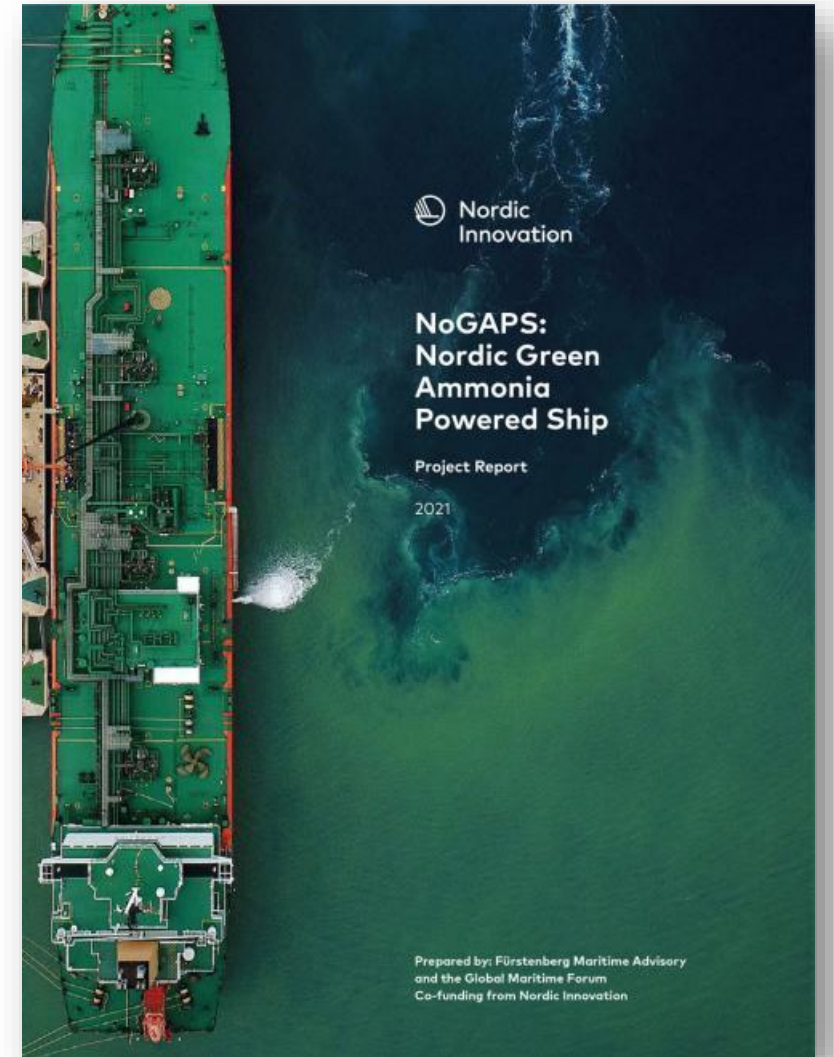
- Significant potential of ammonia-powered shipping in decarbonising maritime sector, ammonia carriers logical starting point
- No technical considerations or associated regulatory approval present major obstacles to putting M/S NoGAPS on water

Fuel

- Ammonia synthesized from green hydrogen represents a credible long-term, zero-emission fuel

Business & financing

- Crucial to develop and demonstrate a business model credible in the eyes of investors and operators
- Vessel design and fuel sourcing strategy offer opportunities to reduce risks and costs in meaningful ways
- Public support key for short-term investment in demonstration and to improve outlook for long-term development of ammonia as shipping fuel



Key takeaways, NoGAPS₁

What can strengthen the business case?

Industry measures

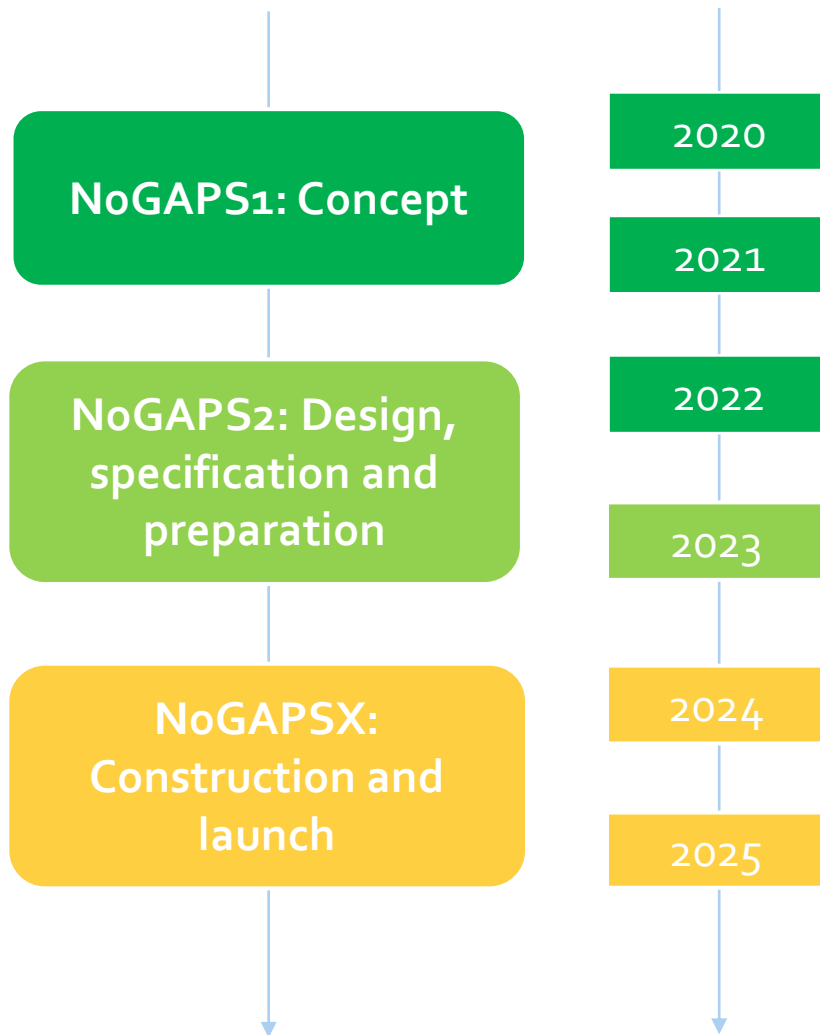
- In-kind contributions/financial concessions to reduce the risks of cost overruns
- Vessel design optimization to minimize cost related to ammonia fuel storage
- A long-term chartering contract or joint venture to decrease the risk of ship ownership
- Dual fuel capabilities to decrease exposure to fuel supply and residual value risks
- A transition strategy from grey to green NH₃ aligned with access to subsidies and premia and reflected in the risk sharing in chartering contract/joint venture

Governments measures

- Grant financing of the “excess” costs of vessel construction relative to conventional ships
- Loan guarantees
- Contracts for difference or equivalent for green ammonia production/use
- Eventual regulations or incentives for CO₂ reductions



From generic concept to specific design



- Identified key issues to be addressed if ammonia-powered ammonia carrier is to be approved, operationally effective, and economically viable
- First-order options for strengthening the business case
- Necessary public support
- **NoGAPS₂ to produce a specific design and advance the findings from NoGAPS₁**
- M/S NoGAPS to operate from the region

NoGAPS phase 2

2022-2023





Develop a vessel design for an ammonia-powered ammonia carrier, prepare this design for Approval in Principle and explore the options for commercializing the vessel.



Objectives of NoGAPS2, 2022-2023



NoGAPS₂, 2022-2023

Ongoing

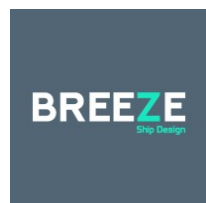
Project Partners



Co-funder



Flag state & ship designer



NoGAPS₂ consist of **three work areas:**

1. Vessel design

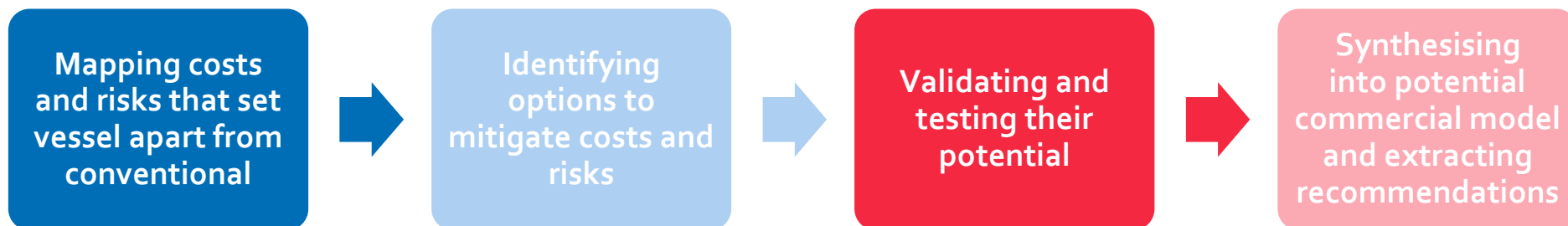
- Produce a vessel design that can be used in the construction of an ammonia-powered ammonia carrier
 - Address vessel design challenges identified in NoGAPS₁:
Best practices of safety standards and safeguards in design; optimal tank sizing and placement; energy efficiency; among other issues
- Formulate preparatory materials for Approval in Principle (AiP).



NoGAPS₂ consist of **three work areas:**

2. Commercial model

Produce a publicly available report exploring the options for commercializing the vessel, relating to financing vessel construction; joint venture and/or long-term charter; fuel strategy and risk/cost sharing



NoGAPS₂ consist of **three work areas:**

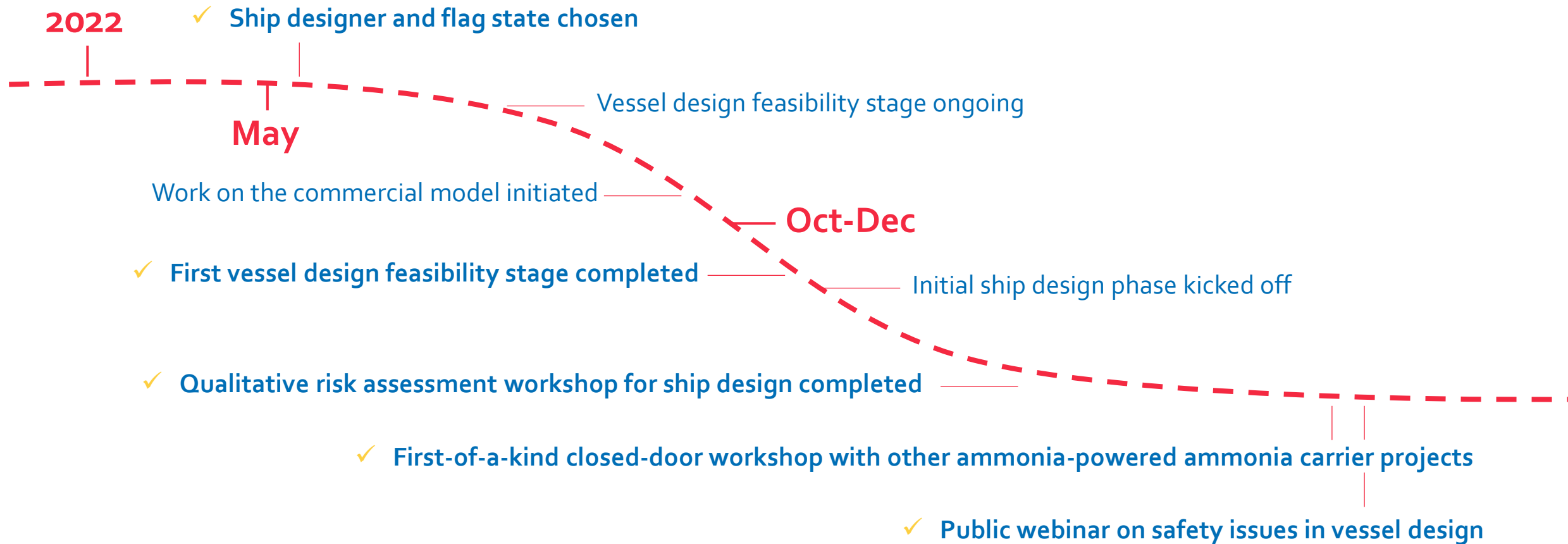
3. External engagement



The vessel design, commercial model and the communication of its progress and final outputs are important contributions to standardization in the sector and a more sustainable and integrated Nordic region.



Key deliverables to date, NoGAPS2



Key deliverables to date, NoGAPS2



2023

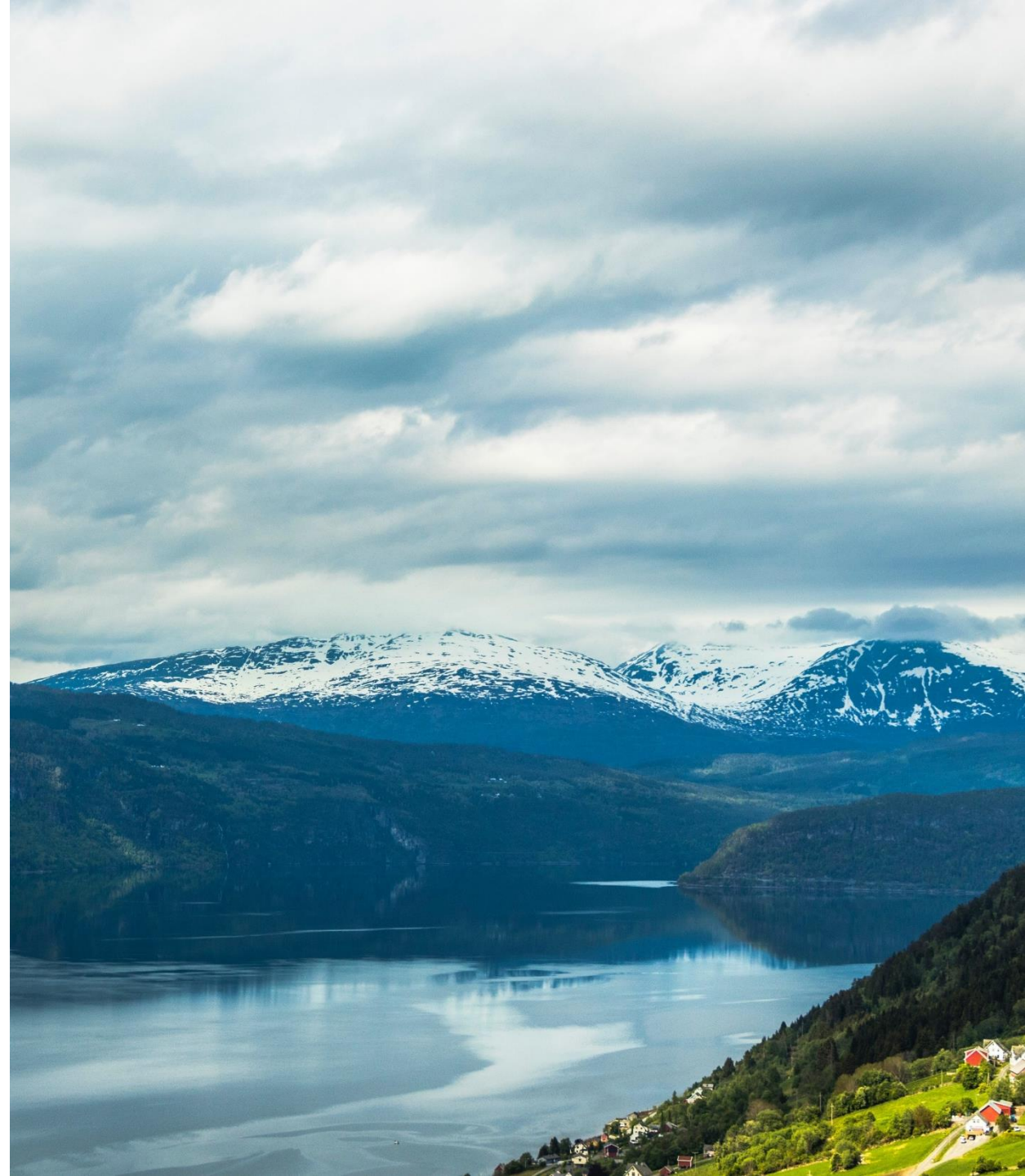
✓ Feasibility assessment report and renderings published



Next steps, NoGAPS2

- Prepare design for Approval in Principle (AiP)
 - Finalize commercial model
- Launch and synthesize project findings
Summer, 2023
- Prepare initial design package for submission to shipyards for official tenders

Continue to share learnings and best practices to promote standardization in sector



Thank you for listening!

For any questions, please contact Anna Rosenberg at
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Visit project website [here](#).

