

Zero Emission Marine

A leading company ecosystem programme



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 - Multiple partners, impact
- Visit website to learn more + email address
- Add link to web site front page

What is Veturi?

- Veturi stands for leading company ecosystem programme funded by Business Finland.
- Business Finland offers partnership funding for research, development, and innovation projects in leading companies' ecosystem themes.
- Business Finland launched the first challenge competition for leading companies at the beginning of 2020.
- In 2021, a new challenge competition was launched and Wärtsilä received Veturi status with the Zero Emission Marine ecosystem programme.

What is ZEM?

- Zero Emission Marine (ZEM) is an ecosystem project led by Wärtsilä (2022-2025). We are creating an ecosystem aiming to decarbonise the maritime industry.
- ZEM develops technologies that will contribute to the emission reduction of different vessels and harbour operations.

The research and development in ZEM is divided into **four research themes**:



New technologies



Green fuels



Optimised operations



Business models

We welcome organisations with knowledge in these areas to join us in building the ZEM ecosystem.

VISION:

A Zero emission
marine Future

MISSION:

Creating an economically
compelling zero-emission
marine ecosystem driving
sustainable technology
solutions and services

OBJECTIVES:

With the ecosystem's collective over 300 million euro increase in R&D spend over the coming years, we will develop new competitive skills, human capital and world-class services and solutions, enabling the creation of additional annual revenue to Finland of one billion euros per year by 2030.

This will enable us to reach 60% GHG reduction in the maritime industry by 2030 and by 2050 all the Wärtsilä Veturi ecosystem products are carbon-neutral or carbon-negative.

**60% GHG
reduction
in the maritime
industry by 2030**



Wärtsilä roadmap for Veturi project Zero Emission Marine

Technologies enabling introduction of green fuels



Green fuel production



Automated and optimized operations – increased level of autonomy



Outcome based business models – OBBM



Technology transfer from Marine to Energy



 Wärtsilä's effort  Ecosystem effort

Technologies enabling introduction of green fuels

Main objective

Drive and develop operable engine technologies for engines running on green fuels like ammonia, hydrogen, and synthetic or biomethane. Explore and develop energy storage systems.

Wärtsilä is looking for organisations experienced especially in:

- Materials and components compliant to new fuels
- System integrators
- Control and automation experts
- Process and chemistry modelling





Technologies enabling introduction of green fuels

Hydrogen Internal Combustion Engine (ICE) concepts and related enabling technologies

Ammonia Internal Combustion Engine (ICE) concepts and related enabling technologies

Further develop the methanol and ethanol ICE concepts

Operating on blends – Develop technologies, testing and approving the use of various blends

Aftertreatment – further reduction of global and local harmful emissions

Further integration of new and existing Energy Storage systems for the Marine and Energy Markets

2022	2023	2024	2025	2026	2027+
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Green fuel production

Main objective

Enable the production and infrastructure of new fuels. Securing economically viable transition.

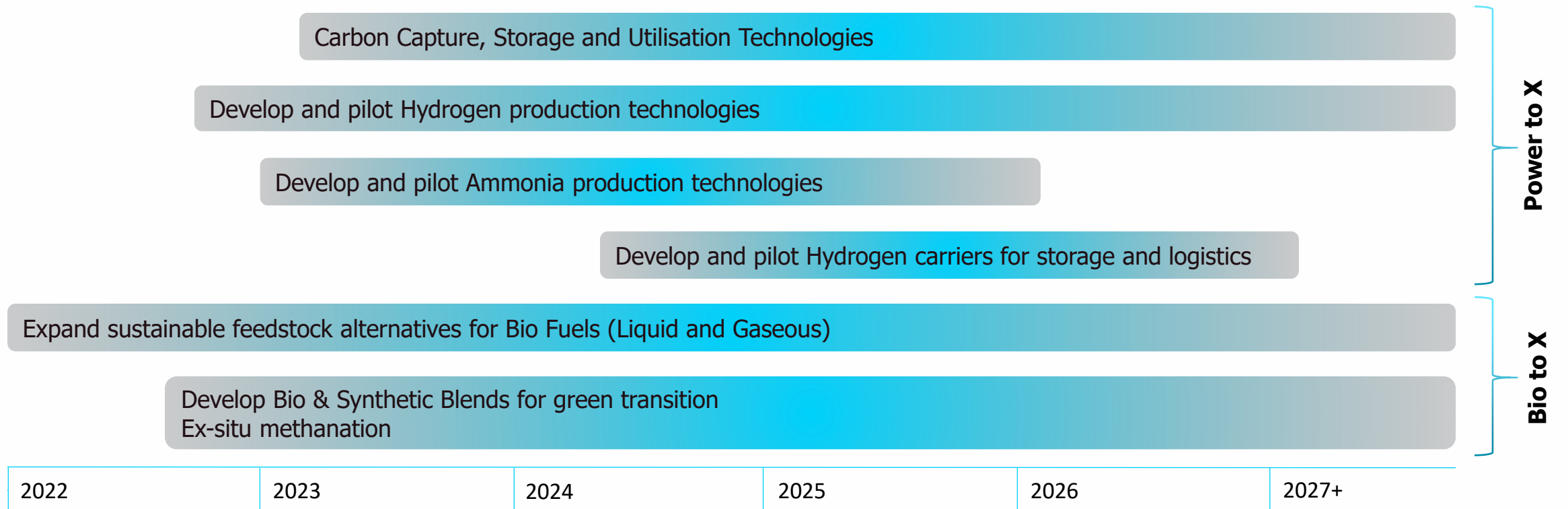
Wärtsilä is looking for organisations experienced especially in:

- Biofuel, ammonia and hydrogen production
- Hydrogen storage and compression
- Process and chemistry modelling
- Levelised cost calculations





Green fuel production



Automated and optimised operations – increased level of autonomy

Main objective

Develop and integrate systems to further optimize ship operations, including navigation and automation. Enable gradual transition from decision support to remote and autonomous operation.

Wärtsilä is looking for organisations experienced especially in:

- Situational awareness
- Data integration and connectivity between different marine stakeholders
- AI, machine learning and edge computing in the maritime context





Automated and optimised operations – increased level of autonomy

Platform enabling cloud applications

Models & APIs - Development of optimization and "autonomous ready" models, APIs and libraries, helping to quantify vessel and ecosystem level energy usage and related emissions

Integrations and data sources – Open APIs for equipment integration onboard, enabling new data for model development as well as integration of new data sources

Applications for automated, connected and optimized operations

2022	2023	2024	2025	2026	2027+
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Outcome-based business models

Main objective

Develop new business models that enable commercially feasible adaptation of current and future decarbonization technologies across marine industry.

Wärtsilä is looking for organisations experienced especially in:

- Fuel efficiency technologies (e.g. hybrid power systems with batteries)
- Vessel energy management optimisation
- Emission compliance monitoring and optimisation
- Business modelling for shared benefits and incentives





Outcome based business model – OBBM

ENGINE SFOC OPTIMIZATION

VESSEL FUEL OPTIMIZATION WITH ENERGY SAVINGS DEVICES

FINANCING & RISK MANAGEMENT

ASSET USAGE OPTIMISATION FOR ENERGY SAVINGS DEVICES

EMISSION COMPLIANCE

FUTURE ZERO-CARBON FUELS

2022

2023

2024

2025

2026

2027+

Funding



50
M€



WÄRTSILÄ

80
M€

20
M€

Business Finland

60
M€

Wärtsilä



Why join the ZEM ecosystem?

- Collaboration with partners on new innovative concepts
- New business opportunities
- End-to-end value chain cooperation
- Opportunity to initiate research projects on ZEM themes and apply for funding from Business Finland
- Sharing ideas with those who share the same vision of a Zero Emission Marine future
- Workshops, events, ideation and latest news from the ecosystem





How to join?

1. Contact Zero Emission Marine to discuss about your ideas and align common interests
 - Contact via [website form](#) or send an email to zem.ecosystem@wartsila.com
2. If your idea suits ZEM, we will send you a link to an online form to provide more information about your organisation and project or we will set up a meeting with you.
3. Create a clear project plan and prepare your application.
4. Receive enhancement from Wärtsilä and apply for funding from [Business Finland](#).

zemecosystem.com

