Maritiem Masterplan → MENENS

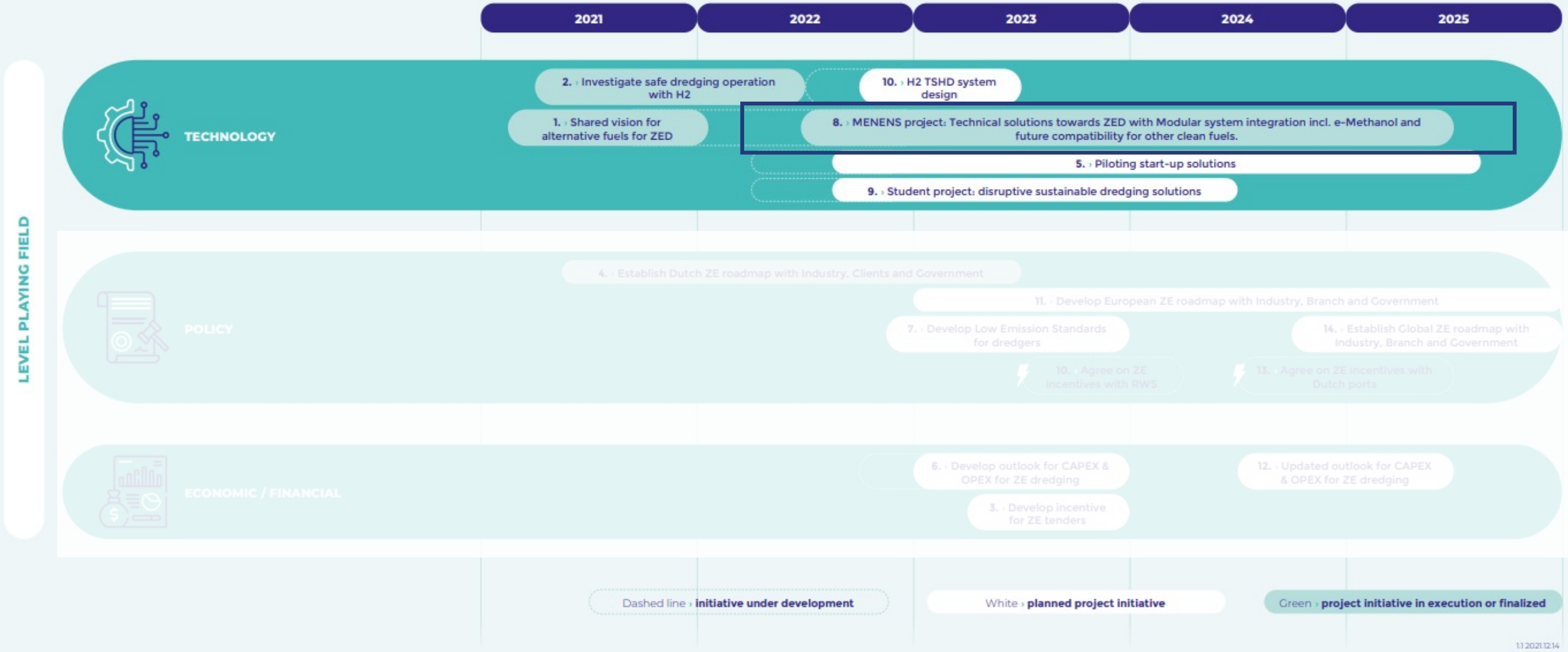
Jan Westhoeve

Sustainability engineer dredging

Van Oord

Zero Emission Dredging Hub

Programmalijnen
Zero Emission Dredging



1.1 2021.12.14

Onze waarden

Van Oord
Marine ingenuity

we (create care work together succeed)

Corporate Sustainability strategy

Ons doel realiseren via vier duurzaamheidspijlers

Van Oord
Marine ingenuity

Net Zero Emissions

Drie scopes zoals gedefinieerd in GreenHouse Gas Protocol

Van Oord
Marine ingenuity

Scope 1

Direct emissions

~ 33% of total Van Oord footprint

Mainly as a direct result of burning fuel onboard our own equipment.

Also called *tank-to-wake* or *tank-to-propeller* emissions (from a fuel tank onboard to propulsion of a ship)

Scope 2

Indirect Emissions from Energy

~ 2% from total Van Oord footprint

Indirect emissions from purchased energy, like electricity, heat, or cooling, generated off-site (i.e. utility company) and consumed by Van Oord.

Mainly from office buildings, electrical excavators, shore power

Scope 3

Indirect value chain Emissions

Upstream ↑ and Downstream ↓

~ 65% of total Van Oord footprint

Steel from monopiles, copper from cables, concrete from coastal protection etc.

Fuel from third party equipment

Well-to-tank part of fuel for our own equipment (emissions from fuel production to a fuel tank onboard a ship)

Van Oord: Verlaag GHG emissies met 15% in 2025, 27.5% in 2030, net zero in 2050

Maritiem Masterplan
Opzet

- Ministerie van Infrastructuur en Waterstaat
- Ministerie van Economische Zaken en Klimaat
- Ministerie van Defensie
- RVO (Rijksdienst Voor Ondernemend NL)
- Nederland Maritiem Land (NML)

- Subsidieregeling R&D Mobiliteitssectoren (RDM)

- 8 projecten waaronder 3 scheepvaart gericht:
  - MENENS
  - SH2IPDRIVE
  - LNG-ZERO

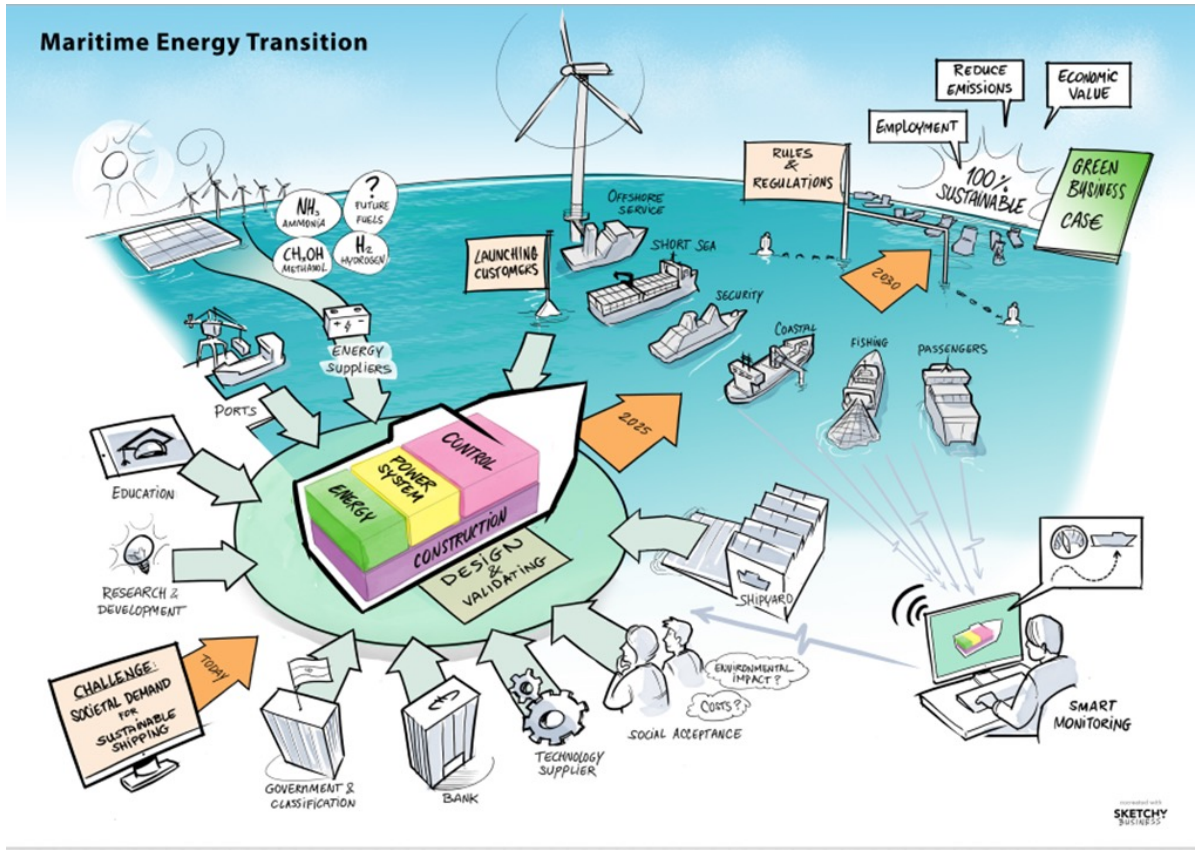
MENENS (Methanol als Energiestap Naar Emmissieloze Nederlandse Scheepvaart)

Van Oord
Marine ingenuity

- Vierjarig Experimenteel & Industrieel onderzoeksprogramma
- Groot Consortium

1 Fugro (penvoerder)
2 Wagenborg
3 Damen Global Support
4 Damen Workboats
5 C-Job
6 MARIN
7 TNO
8 TU Delft
9 RH Marine
10 Royal IHC
11 Feadship
12 Boskalis
13 Van Oord
14 EST-Floattech
15 Wartsila

17 Van Oossanen
18 Discom
19 Marine Service Noord
20 VT Group
21 TB Shipyards
23 DC Systems

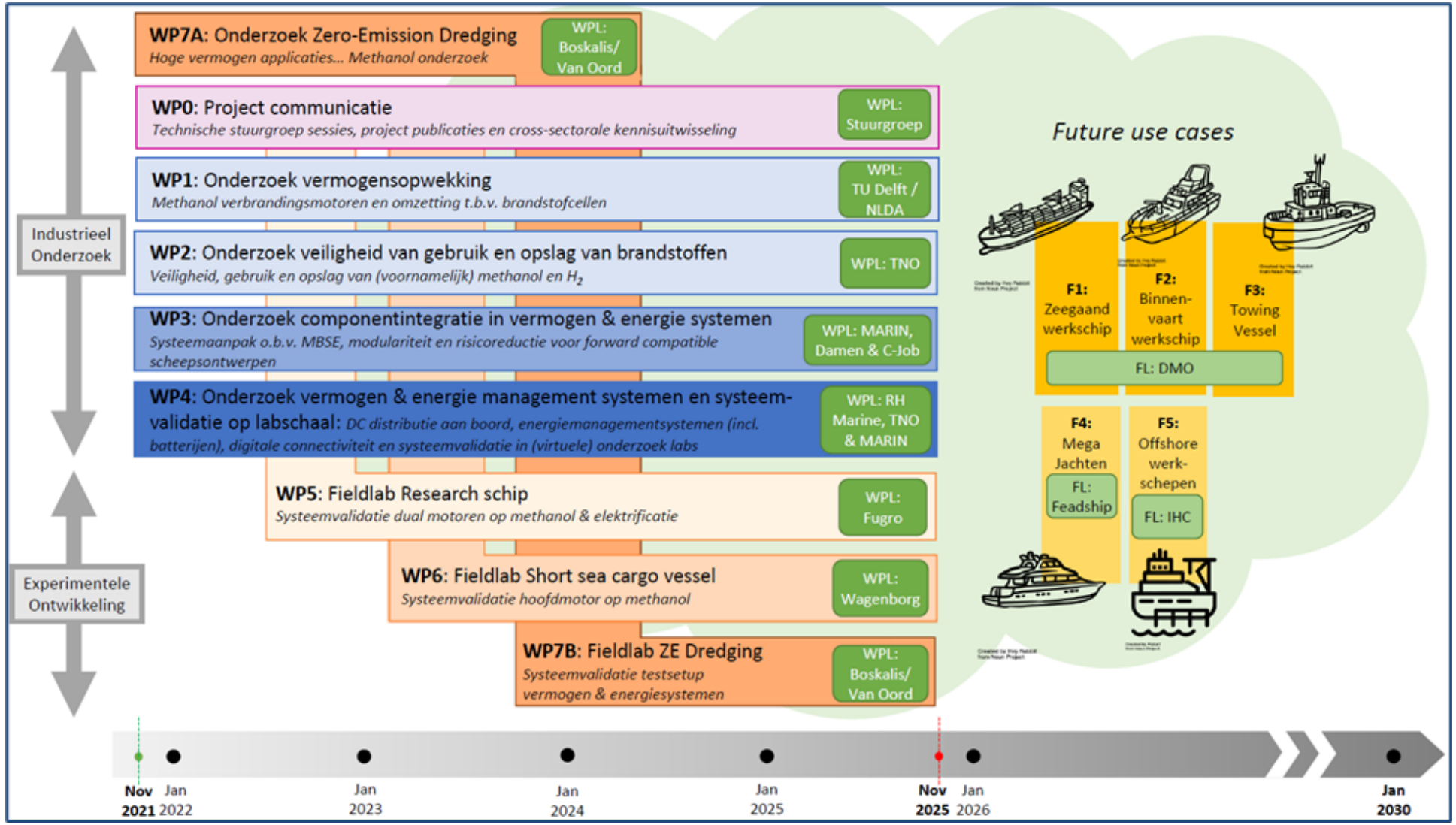


Doelstelling

Van Oord
Marine ingenuity

- Antwoorden op:
  - Veiligheid van methanol vergeleken met waterstof en ammoniak
  - Motor en brandstofcel technologie, system integratie, hybride vermogensopwekking
  - Modulair Scheepsontwerp
  - Belastings-, vermogens- en energiebalans binnen de baggersector
  - Gelijkwaardig speelveld voor emissie metingen (CO_2, N_2O, CH_4, PM, NO_X, SO_X, etc.)
  - Simulatie (digital twin) en voorspellingsmodel op energy, emissies en kostprijs niveaus

Werkpakketten

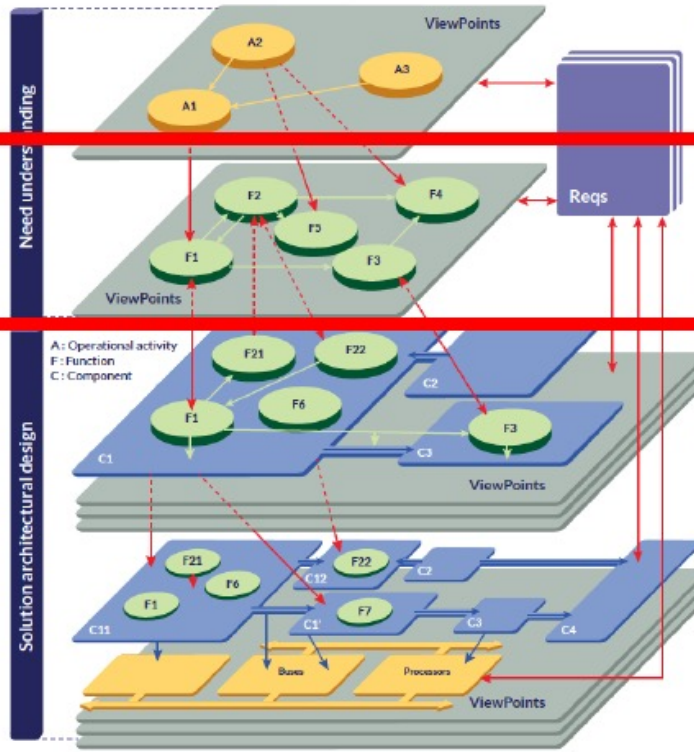


Model-based Systems Engineering

Arcadia-Capella

MARIN

Speed, endurance Capacity/payload, accommodation Sea going capabilities Availability, equivalent safety	OA
Power (primary and secondary) Propulsion chain efficiency Hydrodynamic performance Fuel capacity, reserves, weights Controls, stability Safety (FHAs), Reliability/Maintenance	SE
Key technologies System architecture/schematic principles Key equipment characteristics FMEAs, LSA/LCC	SE/BE
General arrangements Structural design/built plan Outfitting design Detailed RAM/ILS analysis	SE/BE
To be built models/drawings Procurement specifications Test & Integration specifications	BE/DE



Operational Analysis
What do the stakeholders want ?
not relevant: Exact boundaries of the system.

System Analysis
What is expected from the system ?
not relevant: Anything related to a specific solution.

Logical Architecture
How will the system work ?
not relevant: Specifics about a technical implementation.

Physical Architecture
How will the system be developed ?
not relevant: Detailed design of component.

Design Specifications
How will the system be built ?
output: Design specifications

16

MENENS

Zero Emission Dredging Fieldlab

Van Oord
Marine ingenuity

- Ontwerp, test en optimaliseer het aandrijfsysteem van een baggerschip met realistische belasting wisselingen
  - Simulatie (digital twin) van een baggerpomp aandrijving met dynamische belasting
  - Validatie van methanol dual-fuel motor op testbank
  - Toepassing in ontwerp van een zero emissie baggerschip

MARIN
BETTER SHIPS, BLUE OCEANS

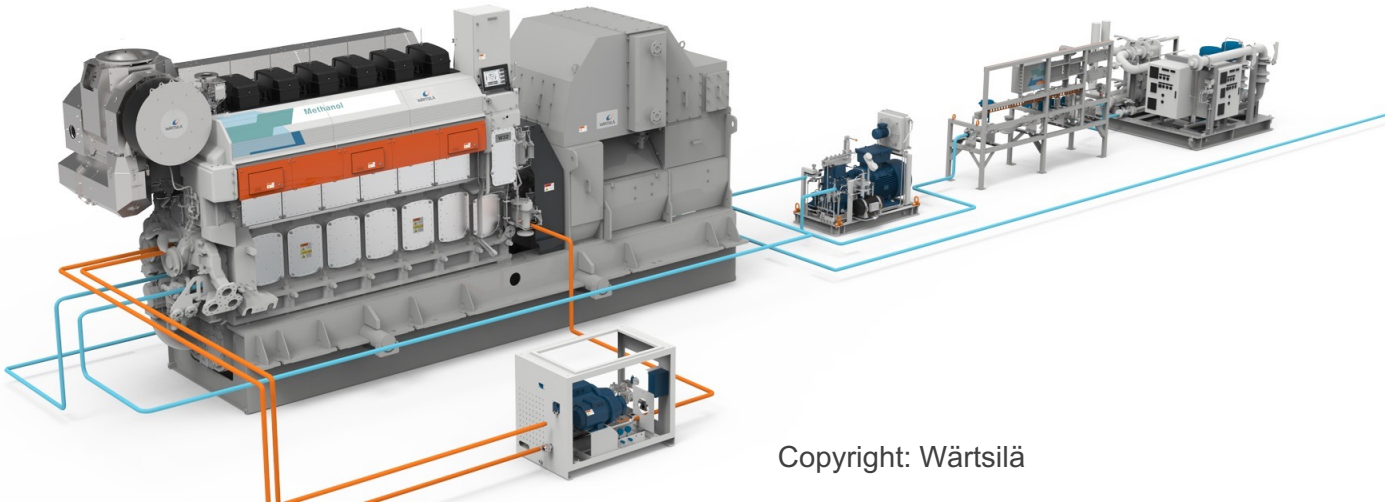
TU Delft

WÄRTSILÄ

Royal IHC

Van Oord
Marine ingenuity

Boskalis

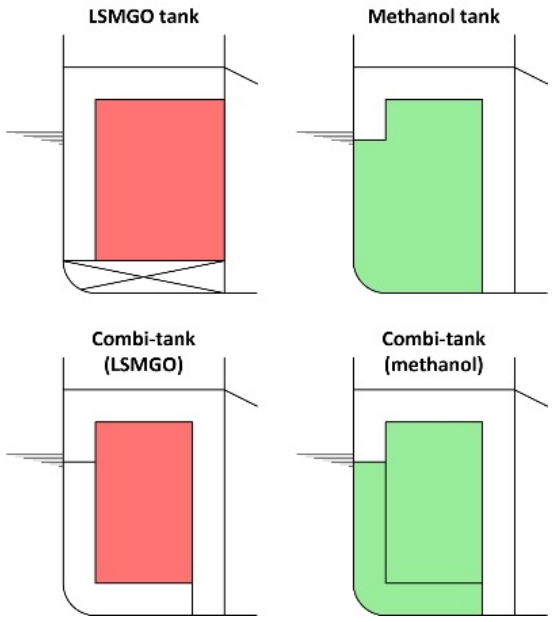


Copyright: Wärtsilä

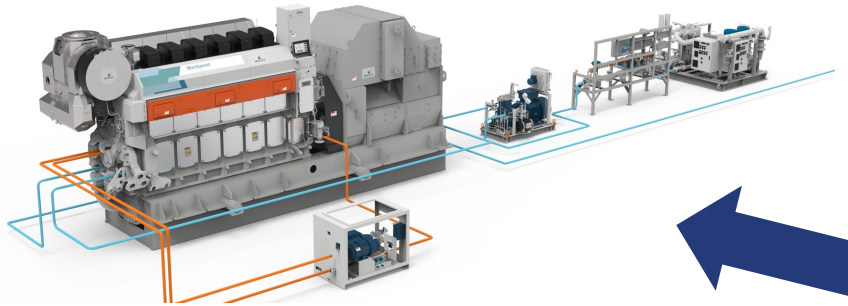
MENENS

Zero Emission Dredging Fieldlab

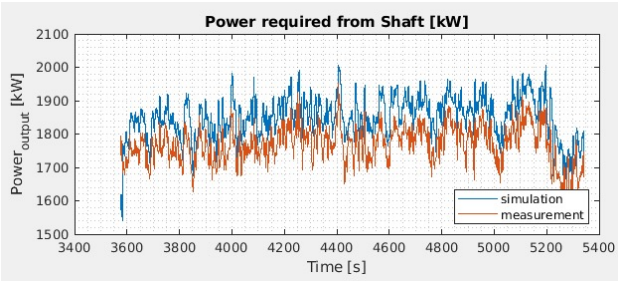
Van Oord
Marine ingenuity

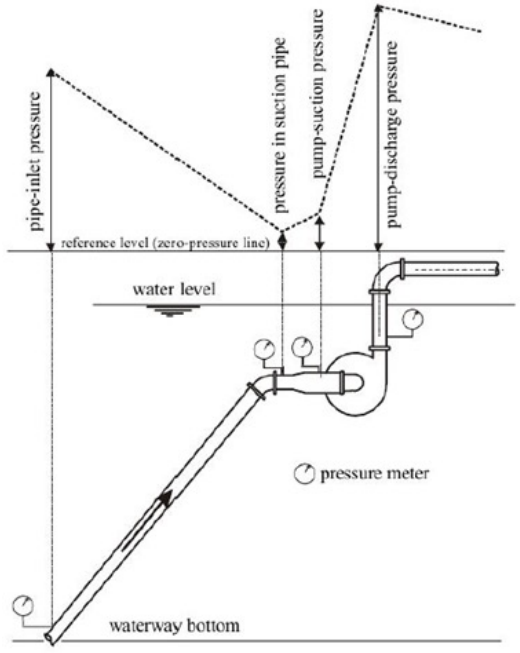


Copyright: Royal IHC



Copyright: Wärtsilä

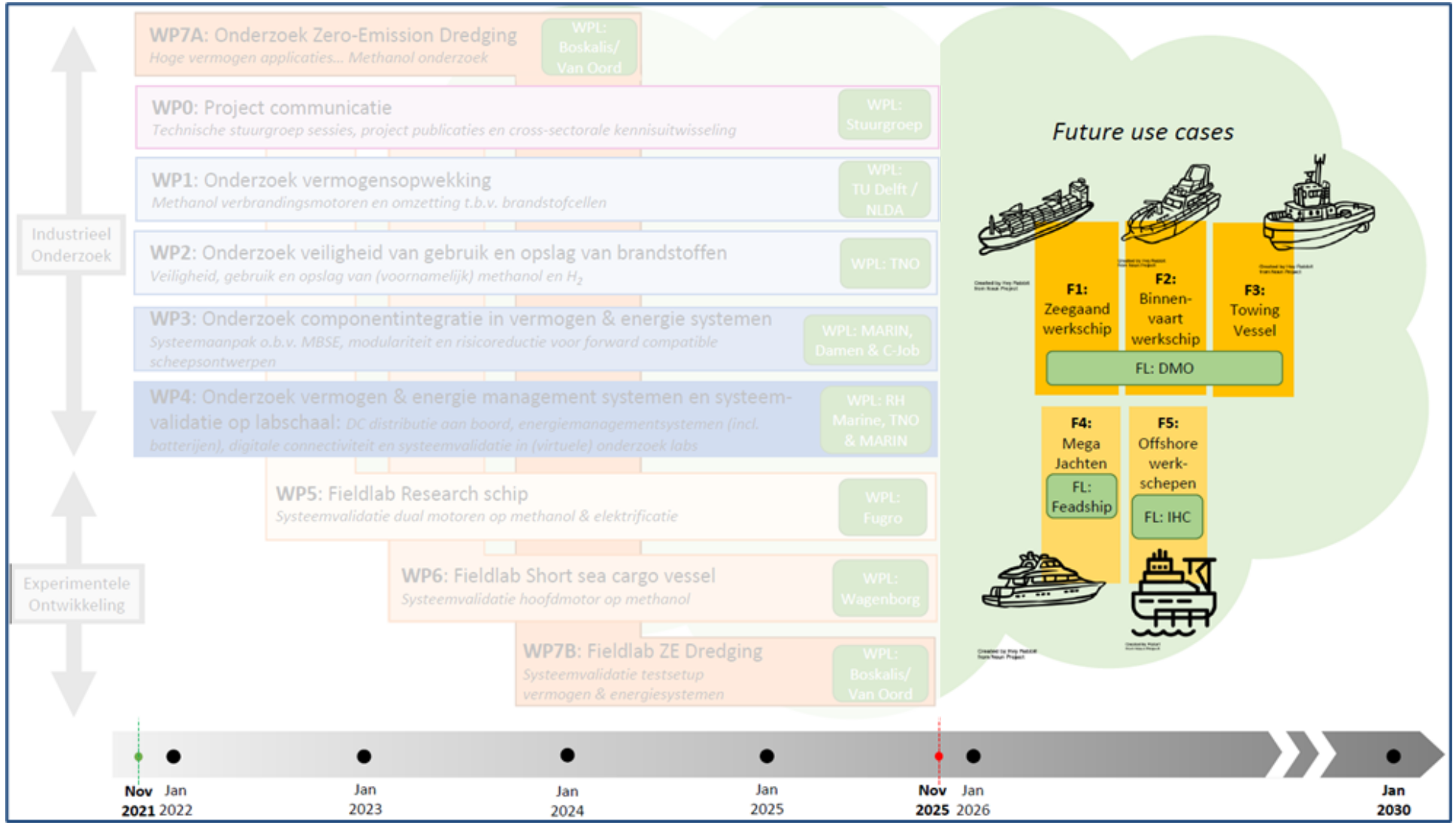




MARIN BETTER SHIPS, BLUE OCEANS
TU Delft
WÄRTSILÄ
Royal IHC
Van Oord Marine ingenuity
Boskalis

Ultiem doel: route naar zero-emissie scheepvaart versneld mogelijk maken

Van Oord
Marine ingenuity



Working together towards net zero emission dredging

Van Oord
Marine ingenuity

ZEDhub

Boskalis DAMEN Royal IHC Van Oord Marine ingenuity

Deal SMART DELTA DRECHTSTEDEN

Dordrecht Academy

DORDRECHT