MULTI

ENGINEERING SERVICES

Belgian Offshore Days
Inn2POWER

SME involvement on H2

24/03/2022

Who? Why? What?

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Naval architect
Managing Director MULTI.engineering
SME committee De Blauwe Cluster – representing 110 SME's

Sharing experiences

Examples of innovation projects
Examples of projects related to H2
Suggestions

Company | History & profile

History

1996 MULTI NV by Etienne Van Goeye
1998 DME (54% DAMEN)
1998 PHAROS, Vlissingen
2010 POLARIS, Komarno
2012 FORCE, Vught
2015 MULTI Engineering Group BV
2017 MARIDEA, Delft
2021 Jubilee 25th anniversary!

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CLIENTS	Shipyards, ship owners, ship managers.
PROJECTS	Newbuilding, conversion, refit, repair & maintenance, operational advisory, improvement consultancy, damage investigation, ...
SECTORS	Megayachts, Polar expedition, Inland leisure vessels, Dredging, Offshore Installation, Naval, Workboats, Offshore renewables, Autonomous shipping, …
LOCATIONS	Europe (home market), USA, Middle East, South-East Asia.
DISCIPLINES	Concept development, Basic design, Naval Architecture, Detail engineering, Intact & damage stability, Hydrodynamics, Propulsion systems, Technical management, …
CLIENT FOCUS	Long-term, Loyalty, Partnership, Expectation management.

Company | Facts & figures

400 000

ENGINEERING HOURS
100 000 on in-house engineering
300 000 via Projectsourcing

220

ENGINEERS
80 in-house
140 in Projectsourcing

3

COUNTRIES
The Nederlands,
Belgium, Slovakia

25

STAFF
service team

6

DESIGN- & ENGINEERING OFFICES
Temse, Vlissingen, Zwijndrecht, Komarno, Ghent, Delft

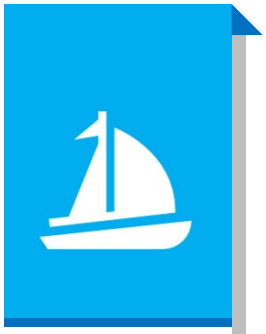
3

BUSINESS UNITS
Industry, Building & Infra, Maritime & Offshore

8

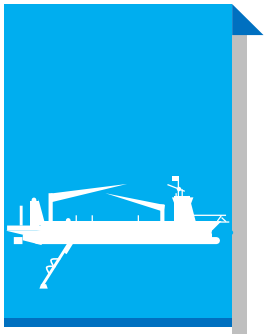
OFFICES
Temse, Vlissingen, Breda, Amsterdam, Komarno, Ghent, Delft, Zwijndrecht

Maritime & Offshore | Our clients

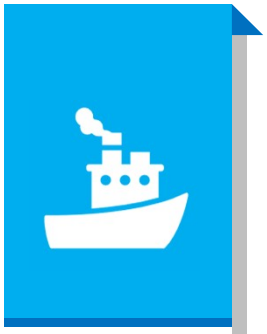


Yachting

Newbuild
Refit



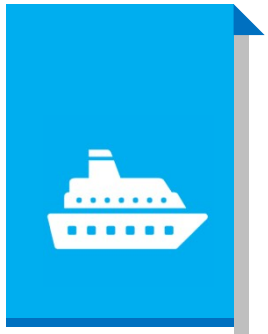
Dredging



Commercial
&
workboats

Offshore

Oil & Gas
Wind
Renewables



Leisure

Naval

6 Markets

Company | Vision & Mission

Belief

We believe in a strong economic and sustainable future for Europe. A healthy economy and a responsible attitude are the foundations for our society's prosperity.

Three challenges are determining this success:

1. Innovation and entrepreneurship
2. Productivity improvements
3. Ownership by qualified employees

Top quality engineering will play a prominent role in realizing these challenges.

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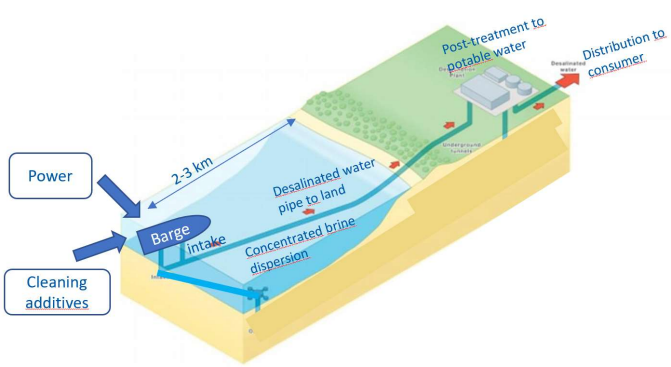
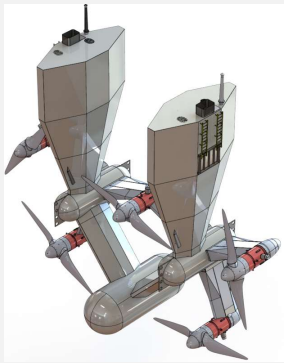
VISION	**Engineers define our future**. We empower our people to turn smart ideas into reality.
MISSION	To be the preferred **Engineering Partner** for our Clients and our Engineers. Working with us must always be a great experience.
PHILOSOPHY	Three major philosophies are embedded in our culture and DNA: **One engineering family | Customer king | Sensational projects** These require a real understanding of the expectations of our Clients and our Engineers. We have learned that knowing is far better than assuming, and that mutual respect goes beyond contractual obligations.
GOALS	MULTI commits to contribute maximally to the **Sustainable Development Goals** defined by the United Nations. We specifically focus to improve the quality of education, to provide clean water and energy, to create economic growth and employment through innovation and to protect the planet and marine life. We firmly believe these goals can only be achieved through **partnerships**.

MULTI

Maritime & Offshore | Ongoing innovation projects





- Plastic river waste collection
- Structural glass in shipbuilding
- SMARAGD
- OPAL
- INTENSSE-H2
- Fresh water factory
- Offshore wind floater
- Tidal turbines
- Wind assisted propulsion

Innovation projects | Lessons learned

Time: don’t underestimate it. It is worth it, but be aware.

Within partnership: transparancy, added value for each partner.

Think about how to make business out of it.

Support by VLAIO, DBC, … is highly valuable.

Just do it!

Innovation projects | Side effects

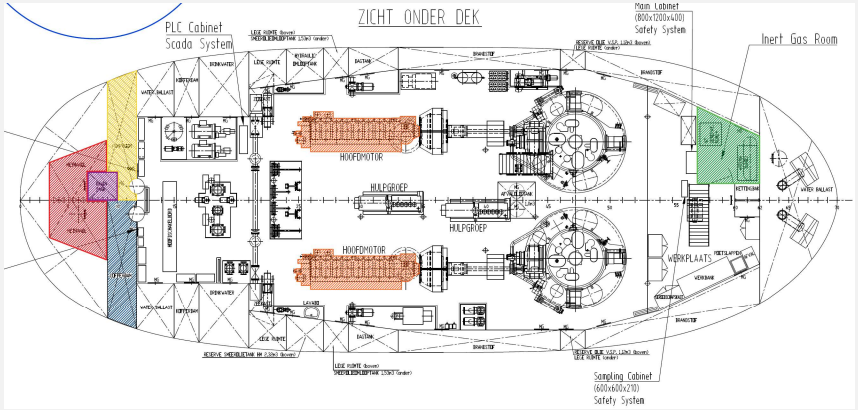
It makes you think about business you do not have yet.

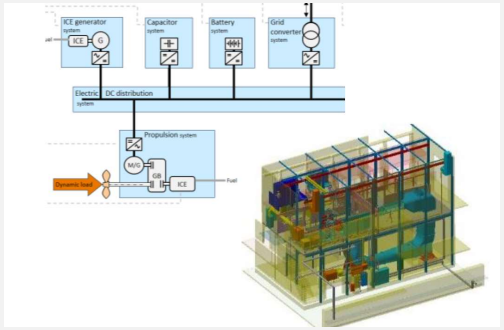
It forces you to look for partnerships.

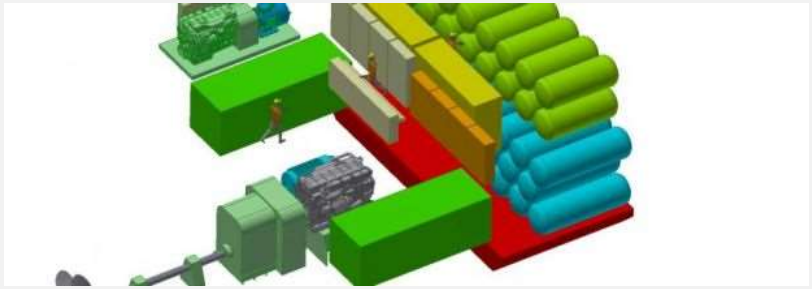
It pulls you out of your comfort zone.

It leads to more leads.

MULTI | Alternative propulsion projects related to H2







- Methanol conversion project
- H2 bunker barge concept
- MARIN JIP ZERO
  - tugs
  - yachts
  - dredger
  - naval
  - CTV
- Hybrid propulsion in yachting
- Consultancy projects for authorities
- Feasibility study on H2 production offshore
- H2 production linked to offshore wind

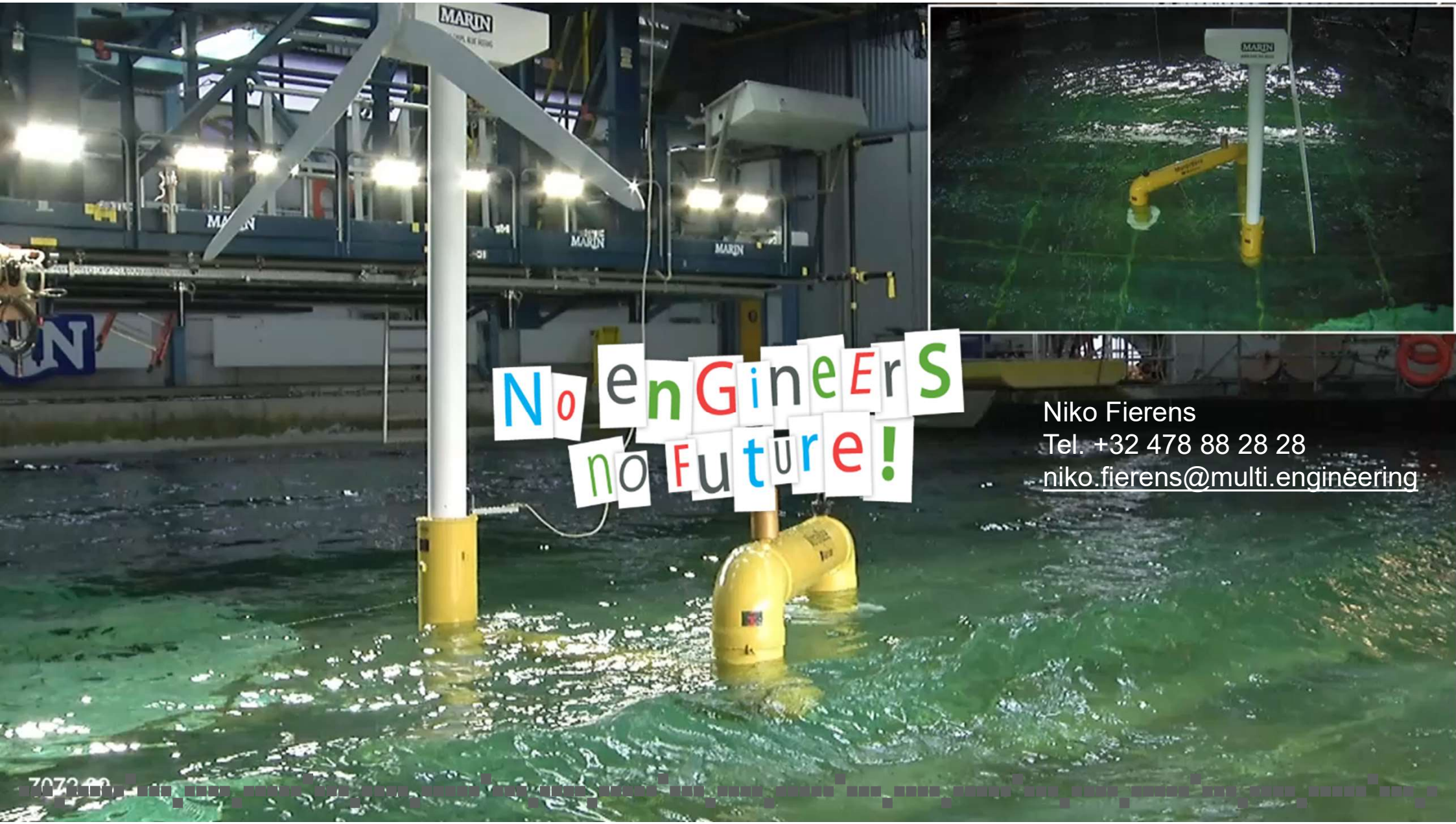
Suggestions on SME strategy towards H2

- H2 is more than H2
- Innovation
- Active partnerships (DBC, Waterstofnet, …)
- Internationalization
- Time & patience
- Supply chain
- Problem definition & owner
- Business LT vision
- Need for policy

Energy source	Fossil (without CCS)					Bio	Renewable[3]		
Fuel	HFO + scrubber	Low sulphur fuels	LNG	Methanol	LPG	HVO (Advanced biodiesel)	Ammonia	Hydrogen	Fully-electric
High priority parameters									
• Energy density									
• Technological maturity									
• Local emissions									
• GHG emissions			[2]						
• Energy cost									[4]
• Capital cost (Converter / Storage)									
• Bunkering availability									
Commercial readiness [1]									[5]
Other key parameters									
• Flammability									
• Toxicity									
• Regulations and guidelines									
• Global production capacity and locations									

[1] Taking into account maturity and availability of technology and fuel.
[2] GHG benefits for LNG, methanol and LPG will increase proportionally with the fraction of corresponding bio- or synthetic energy carrier used as a drop-in fuel.
[3] Results for ammonia, hydrogen and fully-electric shown only from renewable energy sources since this represents long term solutions with potential for decarbonizing shipping. Production from fossil energy sources without CCS (mainly the case today) will have a significant adverse effect on the results.
[4] Large regional variations.
[5] Needs to be evaluated case-by-case. Not applicable for deep-sea shipping.

Source: DNV-GL Report No.: 2019-0567, Rev. 3, dd. 2019-07-05



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