

DAPHNE TECHNOLOGY

DAPHNE TECHNOLOGY

AN AWARD-WINNING

CLIMATE TECH

daphnetechnology.com

WORDS FROM THE FOUNDER & CEO

BEYOND PATENTED TECHNOLOGY AND PRODUCT MARKET FIT

In 2021, we achieved many of our objectives. We doubled our team, expanded our operations to Oslo (Norway), and significantly grew our IP portfolio. We also completed our second equity round and developed key strategic partnerships. However, what I am the proudest of, is that we continued to earn the trust and confidence of our employees and shareholders.

We welcomed an impressive group of new strategic shareholders to the Daphne team in the fourth quarter. These shareholders believe that we can help solve many of the emission challenges that hard-to-decarbonise industries face during the energy transition. Also, our vision to tackle multiple emissions with one solution is gaining traction. Tackling toxic and greenhouse emissions and growing the economy go hand in hand – we can and must do both together.

We now have an excellent combination of people, processes and technology to develop and launch our products and services. In the second half of 2022, we expect to commercialise and launch our first product on the market.

However, our ambition takes us beyond developing impactful technological innovation, supported by attractive business models. We aim to become a global provider of end-to-end emission reduction solutions to our clients. We will measure, report, and reduce emissions and carbon footprints in hard-to-decarbonise industries.

We expect to see exciting and impactful results in the years to come.

DR. MARIO MICHAN
FOUNDER & CEO



"We will reduce emissions and carbon foot prints in hard-to-decarbonise industries."

DAPHNE IN BRIEF

Founded in 2017, Daphne Technology is a Swiss climate tech start-up focused on solving the Greenhouse Gas (GHG) challenge in tough-to-decarbonise industries. The company cleans emissions from combustion engines at sea and on land. Daphne Technology revolutionises exhaust gas purification technology by removing toxic pollutants and GHG emissions in ONE system. The solution is what WE call a next-generation climate mitigation technology.

The company leverages innovative technology to remove toxic and GHG emissions from the combustion gas of any fuel type, including oil, LNG, biofuels, ammonia, and hydrogen. Our award-winning plug-and-play solution breaks down pollutants, converting them into non-hazardous by-products, which are either released into the environment or transformed into valuable products. As a result, we contribute to a circular economy and significantly reduce GHG emissions.

The transition to sustainable energy sources is fundamentally reshaping the global economy. Daphne Technology will help transition to net-zero in the maritime and hard-to-decarbonise sectors. A dramatic reduction of GHG emissions is a must to meet the Paris Agreement goals and International Maritime Organization (IMO) regulations.

Furthermore, we believe a combination of emission reduction strategies, including our single solution technology, can make shipping more sustainable and help reduce global warming. At our core, we address national and international environmental regulations and enable industries to reach net-zero GHG emissions while ensuring sustainable economic growth.

"Our number one goal is to reduce emissions and keep the earth healthy and green - for future generations.

In the second half of 2021, we successfully raised capital from Strategic and Impact investors to scale–up the company, position solutions in various landmark projects, and pursue commercial deployment.

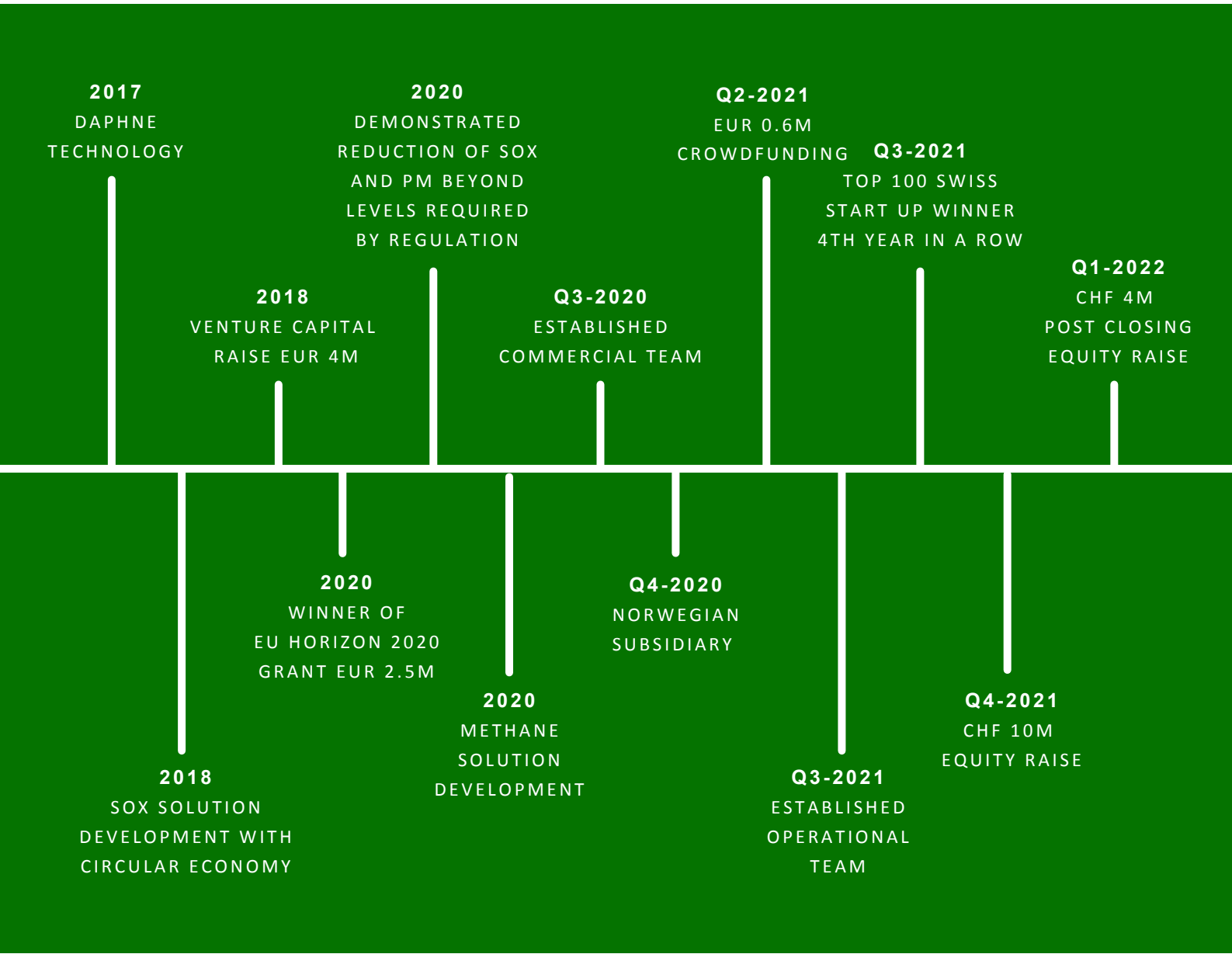
Our vision is to convert toxic and GHG pollutants such as sulphur oxides, methane and carbon dioxide into upcycled and useful products, both at sea and on land.

THE STORY

We are making history! We are revolutionising technology for reducing exhaust gas emissions by removing toxic pollutants and GHG emissions in ONE system. It is a next-generation climate mitigation technology.

COMPANY HISTORY

In 2015, when Dr Mario Michan was at the CERN, working on his Post-Doctoral research on antimatter, he saw an opportunity to use aspects of his research to help solve the global shipping emissions challenge. He further developed his idea at the Swiss Federal Institute of Technology (EPFL) and eventually spun off his research from EPFL and created Daphne Technology in 2017. Since then, the company has never stopped innovating and has attracted growth capital from global and Swiss corporate investors such as Shell and Aramco (through their venture capital arms), Trafigura and Swisscom.



ABOUT US

We are a climate tech company focused on solving the Greenhouse Gas (GHG) challenge in tough-to-decarbonise industries. We develop next-generation climate mitigation technology that reduces the detrimental impact on the environment, human health, and the global economy.

We maintain an open mind to allow us to identify opportunities and to create innovative solutions. Guided by our purpose and values, we are dedicated to making a difference. We evaluate our performance in environmental, social, and financial terms.

However, it's our company culture which contributes Daphne Technology's added value. Together, we work towards our purpose: To protect the environment by developing technology that eliminates toxic and Greenhouse Gas emissions.



Big ideas for small footprints "

PURPOSE

Daphne Technology is a climate tech company enabling industries to reach real-zero GHG emissions by 2050 or earlier.

VISION

At Daphne Technology, we protect the environment by developing technology that solves the impact of toxic and GHG emissions.

MISSION

At Daphne Technology, we have a technology-first approach, our innovations deliver economically viable routes to eliminate toxic and GHG emissions.

VALUES

Our values are our guideposts, our compass. They're how we hire, how we make decisions, and how we hold ourselves accountable. Everything we do, and the way in which we do it, says something about us.

I INNOVATION

Innovation is the core of all we do.

C CURIOSITY

We are curious and creative and actively seek opportunities to learn.

A ACT

We act today to save tomorrow.

R RELIABLE

We communicate honestly and openly, we are humble, and we build relationships of trust.

E EVOLVE

We started small but think big

I CARE

for sustainability

THE MANAGEMENT

Our leadership team has decades of experience leading highly successful companies, including large global corporations and small businesses. The team members bring complementary skill sets, deep insight, and market expertise to transition Daphne Technology from start-up to scale-up.

Scaling is hard. It requires focus, determination, discipline and a solid commitment to clients. Our strategic investors who share the company vision bring deep industry expertise and add value across all functions of Daphne Technology.

Together, we create and deliver solutions for our clients that enable an economically sustainable energy transition.

FOUNDER & CHIEF EXECUTIVE OFFICER



Dr. Mario Michan

PhD in Physics from the University of British Columbia and Executive MBA from INSEAD. Postdoctoral research at the ALPHA (Antihydrogen Laser Physics Apparatus) experiment at the Antimatter Factory, CERN - the European organisation for high-energy physics research, and scientist at The Swiss Federal Institute of Technology in Lausanne, Switzerland. Twelve years of experience in the marine industry as ship deck and engineering officer onboard navy and international cargo ships.

CHIEF FINANCIAL OFFICER

Ivan Raleff

Swiss start-up veteran with more than 12 years of experience as a CFO in luxury watches, marketing, advertising, and technology sectors. Spent six years in various operational and controllership finance leadership roles at General Electric and Bombardier. External auditor with PwC, specialising in the manufacturing and distribution sector. He is US CPA holder.



CHIEF TECHNOLOGY OFFICER



Dr. William Ramsay

PhD in Supramolecular Chemistry from the University of Cambridge – thesis in "Self-Assembly of Heterometallic Structures" Postdoctoral research in "Single-Molecule Analysis of Chemical Reactions" at the University of Oxford Senior Research Scientist for Milo Sensors in California, focusing on wearable biosensors. Grant wins: $2 million to scale-up wearable bio-sensors and €2.5 million from EU Horizon 2020.

CHIEF COMMERCIAL OFFICER

Frode Helland-Evebø

25-Years of experience within the maritime industry, of which 15 years in commercial leadership roles (Clean Marine, Honeywell, Consilium). Drove Clean Marine's growth worldwide by generating more than €200 million of incremental sales between 2017 – 2019. Secured partnership between the Green Shipping Programme (Norway) and Daphne Technology to study Ammonia as green shipping fuel of the future.



CHIEF GROWTH OFFICER



Fredrik Hedlund

12 Years in global leadership roles at General Electric, responsible for Business Development at GE Capital, NBC, and GE Plastics. Senior Vice President of Finance at Nielsen for 11 years, leading the finance function of the Global Connect business unit, a $3 billion revenue P&L with 31,000 employees across 105 countries. Expert in leading organisational and business process transformations.

"

The Daphne leadership team;

Where experience meets innovation!

OUR PEOPLE

Our people are essential to the successful delivery of our disruptive technology. Our people are the heart of the company. Their diversity, engagement and talent are what keep us moving.

At Daphne Technology, we have an inclusive and engaging work environment. We have a diverse and multi-disciplinary team that includes scientists, technologists, engineers, designers, and functional experts, committed to developing revolutionary solutions that positively impact global warming. We focus on empowering our people and enabling them to lead and contribute to their fullest potential.

3

ENTITIES

Daphne has three legal entities. The headquarters and research and development (R&D) are in St-Sulpice, next to the Swiss Federal Institue of Technology of Lausanne (EPFL), Switzerland. In addition, Gothenburg, Sweden, is the home of a section of the R&D team, and Oslo, Norway, is the home of the commercial and operations teams.

6

COUNTRIES

In addition to hiring the best talent and expertise, we aim to be close to the industries, markets, and customers we serve in many different parts of the world. Therefore, we also have a local presence in Romania, Dubai, and Singapore.

30

HEADCOUNTS*

At the end of 2021, we had 30 headcounts at Daphne Technology, of which five were part of the management team.

14

GLOBAL TEAMS

Daphne Technology employees are from 14 different nationalities, representing six continents.

*Full time, part time, temporary and contractors.

LARGEST INSTITUTIONAL SHAREHOLDERS

Saudi Aramco Energy Ventures LLC (SAEV) is the corporate venture fund of Aramco Ventures, the Venture Capital subsidiary of Aramco, the world's leading fully integrated energy and chemical enterprise. Headquartered in Dhahran with offices in North America, Europe and Asia, SAEV's mission is to invest globally in startup and high growth companies with technologies of strategic importance to its parent company. Visit https://saev.com/ to find out more.

Shell Ventures is the corporate venture capital arm of Shell. With major offices in Europe, the USA, India and China, Shell Ventures invests in innovative companies from seed- to late-stage to further the development of solutions and technologies that have the potential to accelerate the energy and mobility transformation. Visit https://www.shell.com/shell-ventures to find out more.

Founded in 1993, Trafigura is one of the largest physical commodities trading groups in the world. At the heart of global supply, Trafigura connects the world with the vital resources it needs. Through our Oil & Petroleum Products, Metals and Minerals, and Power and Renewables divisions, we deploy infrastructure, skills and a global network to move commodities from where they are plentiful to where they are needed most, forming strong relationships that make supply chains more efficient, secure and sustainable. Trafigura also owns and operates a number of industrial assets including a majority share of global multi-metals producer Nyrstar and fuel storage and distribution company Puma Energy; and joint ventures Impala Terminals, a port and logistics provider, and Nala Renewables, a power and renewable energy investment and development platform. With over 1,000 shareholders, Trafigura is owned by its employees and employs over 13,000 people working in 48 countries. Visit https://www.trafigura.com to find out more.

AET is a leading global owner and operator of maritime transportation assets and specialised services, committed to moving energy in a responsible, sustainable and eco-efficient way. Its current fleet of around 70 vessels includes 11 dual-fuel vessels comprising two Dynamic Positioning Shuttle Tankers, four Aframaxes, one of the world's first dual-fuel VLCCs with another four dual-fuel VLCCs under construction to be delivered in 2022 and 2023, and an overall orderbook of eight vessels. Headquartered in Asia with key commercial offices and a presence in Singapore, Malaysia, the US, the UK, Norway, Brazil, and Uruguay, AET is a wholly-owned subsidiary of Malaysian energy logistics group MISC Berhad. Visit https://www.aet-tankers.com/ to find out more.

Swisscom is Switzerland's leading telecoms company and one of its leading IT companies, is headquartered in Ittigen, close to the capital city Berne. Outside Switzerland, Swisscom has a presence on the Italian market in the guise of Fastweb. To the end of the 3rd Quarter 2021 over 19,100 employees generated sales of CHF 8,343 million. It is 51% Confederation-owned and is one of Switzerland's most sustainable and innovative companies. Visit https://ventures.swisscom.com/ or https://www.swisscom.ch to find out more. *

**Swisscom equity raise closed in January 2022.*

OUR PARTNERS

Green Shipping Programme

THE INNOVATION FUND
INNOVATION THAT IMPACTS

European Commission
Horizon 2020
European Union funding
for Research & Innovation

eit Climate-KIC
Climate-KIC is supported by the EIT, a body of the European Union

canton de vaud
Office for Economic Affairs and Innovation (SPEI)

EPFL

VENTURE KICK
KICKSTART YOUR HIGHTECH BUSINESS

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Office for the Environment FOEN

FIT
fondation pour l'innovation technologique

Swiss Climate Foundation

AWARDS

TOP 100
SWISS STARTUP AWARD
WINNER
2021 / 2020 / 2019 / 2018

The Maritime Innovation Award Winner
by Envirotech for Shipping
DAPHNE TECHNOLOGY

The Maritime Innovation Award
Daphne Technology

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

The United Nations adopted the Sustainable Development Goals (SDGs) in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. There are 17 SDGs, all integrated, recognising that action in one area will affect outcomes in others and that development must balance social, economic and environmental sustainability.

IMO's Technical Cooperation Committee has formally approved linkages between the organisation's technical assistance work and the SDGs.

Daphne Technology has a direct positive impact on six out of the 17 SDGs. According to Gothenburg Centre for Sustainable Development's SDG Impact Assessment Tool, the company also has a positive indirect effect on six more SDGs.

DIRECTLY IMPACTING













SUMMARY OF THE YEAR

2021 - A Pivotal Year for the Daphne Technology team. We successfully raised capital to scale-up the company and brought our technology closer to commercial deployment.

FUNDRAISING

We launched our fundraising campaign in early 2021 and reached our capital raise goal towards the end of the year. We ran the fundraising ourselves, and the team worked very hard to attract the best possible strategic investors. Investors in this round included Shell Ventures, Trafigura, AET and Swisscom, all committed to limiting global warming. Shell Ventures led the CHF 14 million capital raise along with Trafigura. AET, Swisscom, UBS Growth Advisory, and all previous investors co-invested, including Saudi Aramco Energy Ventures. The capital raise earmarked our second fundraising round since the Daphne Technology spin-off from the Swiss Federal Technical Institute (EPFL) in 2017. All new shareholders are joining us with the common goal of accelerating our technology deployment and maximising its impact.

2021

ORGANISATION

In 2021, we needed to hire additional talent to advance our product development and commercial activities. As a result, our team more than doubled during 2021, and we ended the year with 30 headcounts*, spread across our offices in Switzerland (St-Sulpice), Norway (Oslo) and Sweden (Gothenburg). We have built a terrific team that knows how to execute to help the transition to net-zero in the maritime and hard-to-decarbonise sectors.

*Full time, part time , temporary and contractors.

TECHNOLOGY DEVELOPMENT

During the year, we have moved our SulPure demo system from our Gothenburg (Sweden) office to a new facility in Freiburg (Switzerland). In addition to the 330kW Diesel (Fuel Oil) engine system already existing, we are now scaling up to a 1,5MW containerised system ready for testing and Approval in Principle (by class society) during the summer of 2022. After that, the SulPure system will be ready for deployment to the market.

For our SlipPure system, we have executed a HAZID (Hazard Identification) test together with a major class society and an oil major. We are happy to announce that the test was very successful and was a milestone achievement for Daphne in 2021. The following steps for SlipPure are to do an onshore Dual Fuel (DF) LNG engine testing and Approval in Principle (by a class society) in the second half of 2022.

"With a common goal of driving new technological innovation and enabling an economically sustainable energy transition.

COMMERCIALISATION

On the commercial side, we are developing consortiums with key maritime industry stakeholders, with a common goal of driving new technological innovation and enabling an economically sustainable energy transition.

We are actively involved in five different workstreams of the Green Shipping Program (GSP), focusing on advancing new technologies and solutions to decarbonise the maritime industry. DNV (Det Norske Veritas) leads the consortium on behalf of the Norwegian government.

We are also working closely with the Maersk McKinney Moller Center for Zero Carbon Shipping (MMMCZCS). Together with industry partners, we evaluate new fuels and technologies that could help decarbonise shipping and propose new global frameworks and standards.

Daphne Technology brings new thinking and an innovative edge to the consortiums. And the consortiums bring us closer to our clients and help us create strong brand positioning in the industry. It's a win-win relationship.

Finally, we have signed LOIs to pilot our SulPure and SlipPure systems onboard ships and enter into advanced contract discussions beyond pilots. We expect to complete our first installations in the first half of 2023.

THE MARKET

Today maritime shipping carries 90% of global trade, responsible for roughly 2.5% of global Greenhouse Gas (GHG) emissions annually.

By 2050, the forecast is for maritime shipping emissions to increase by between 50% and 250% due to global economic growth. The International Maritime Organisation (IMO) is committed to reducing GHG emissions by at least 50% by 2050 compared to 2008, driving demand for new technologies and clean fuel alternatives.

Furthermore, the IMO is adopting mandatory measures to reduce ships' carbon intensity and establish a ship rating system. The new ship Energy Efficiency Index (EEXI) and Carbon Intensity Index (CII) will help drive the transition towards low carbon and carbon-free fuels since the most significant potential carbon intensity savings come from the fuel itself.

As the shipping industry embarks on a long and uncertain transition period into a multi-fuel low and zero-carbon future, shipowners are facing the difficult task of deciding how to "future-proof" their fleets and assets. And as the maritime industry adopts tighter regulations, emission abatement systems become an attractive option for ships to stay competitive.

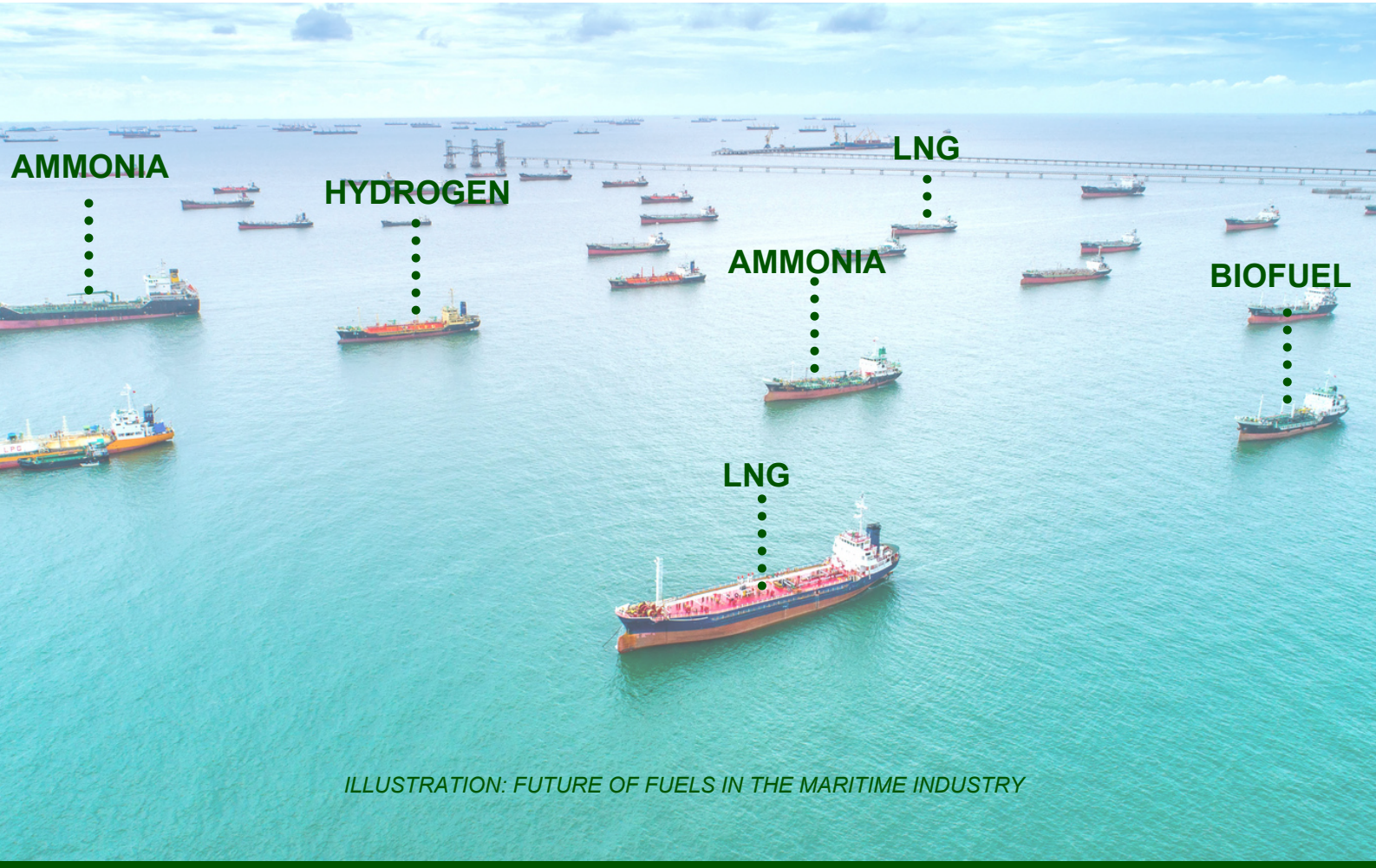


ILLUSTRATION: FUTURE OF FUELS IN THE MARITIME INDUSTRY

OUR PRODUCTS

Daphne Technology has developed the next generation exhaust gas cleaning system. Our solutions remove toxic and GHG emissions such as nitrogen oxides, methane and carbon dioxide from the combustion gas of any fuel type, including oil, LNG, biofuels, ammonia, and hydrogen, allowing shipowners to remain compliant with current and future regulations.

SLIPPURE™

Many shipowners have already invested in ships with LNG propulsion in the race to reach IMOs ambitious "50% by 2050" GHG emission reduction target. Investments in LNG propulsion is increasing, driving market share gains in the years ahead. LNG fuel has the effect of reducing CO2 emissions, but engines using LNG are prone to the problem of methane slip. LNG is predominantly methane. When LNG is burned as fuel, most methane is consumed in the energy conversion process. Still, the unburned methane escapes into the atmosphere, reducing the climate advantages of using LNG.

While the amount of methane slip might seem small, the Global Warming Potential for 20 years (GWP20) is more than 80 times higher than CO2. Hence, this is a critical issue that the maritime industry must resolve to qualify LNG propulsion as a credible solution towards the IMO target. Addressing the methane slip is vital to LNG's viability as a clean fuel solution.

Daphne Technology's response to this challenge is the SlipPure system, which converts the methane slip into harmless byproducts. Our technology transforms electrical energy into chemical energy and generates reactive species that convert pollutants to non-pollutants. The system can also convert toxic pollutants and GHG emissions from future fuels such as ammonia. The SlipPure system is modular, enabling customisation to tackle exhaust emissions from all engines and ships.

SULPURE®

The current challenge for shipowners is the global sulphur cap, limiting the amount of SOx emissions allowed from a ship. Daphne Technology's SulPure® solution is an emission abatement system designed to remove SOx from the exhaust gas.

SulPure® uses water and ammonia hydroxide to convert pollutants into valuable byproducts (fertiliser). The added value of the fertiliser offsets the cost of using ammonia hydroxide in the conversion process. SulPure® is a closed-loop system with no discharge of pollutants to the sea. SulPure® can be fitted on ships of all sizes and operate in all waters, including Emission Control Areas (ECAs).

DAPHNE INSIGHTS

Daphne Insights is an emissions monitoring and reporting system that provides ship operators with real-time emissions data during a single ship (or an entire fleet) voyage.

Our solution helps ship operators understand the current emissions profile of the ship, analyse data in new ways to provide actionable insights, and set baselines to measure the effects of emission reduction actions. Daphne Insights enhances the transparency and reliability of the emissions profile of the ship and provides a data-driven foundation to optimise the environmental footprint.



DAPHNE TECHNOLOGY SA
CHEMIN DE LA VENOGE 7
1025 SAINT-SULPICE
SWITZERLAND

daphnetechnology.com