



DAPHNE[®]
TECHNOLOGY



INTRODUCING PUREMETRICS™

ACCURATE GHG EMISSION MONITORING

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PureMetrics™

Providing true metrics to emissions measurement.



ACCURATELY MEASURING & REPORTING GHG EMISSIONS

PureMetrics™ is a cutting-edge GHG emission monitoring system that accurately measures and reports greenhouse gas emissions in real time. It is designed for the use with combustion engines and can measure greenhouse gases like methane (CH₄) and carbon dioxide (CO₂) as well as pollutants such as SO_x and NO_x. PureMetrics™ eliminates the need for estimating from fuel consumption reports by providing precise and instantly verifiable direct emission measurements and reporting.

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CEO & Founder, Dr Mario Michan

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It is now more important than ever to have a trusted solution that provides businesses and industries with the data and insights they need to reduce their carbon footprint and mitigate the effects of global warming. PureMetrics™ is our answer to this urgent need. Our world-class team has worked tirelessly to create a product that meets the highest standards of quality and accuracy and is also user-friendly and adaptable to various industries. By choosing PureMetrics™, you can have confidence in the power of our technology to make a real impact in the fight against global warming. Join us in this critical mission and choose PureMetrics™ - the trusted solution from an award-winning climate tech company.

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UNDERSTANDING CO₂e

WHY MEASURING CARBON FOOTPRINT MATTERS

CO₂e is a unit used to compare the global warming potential of greenhouse gases with carbon dioxide. It is calculated by multiplying the quantity of greenhouse gas by its global warming potential for a certain period, which measures how much heat a gas traps in the atmosphere relative to carbon dioxide over a specified period. Measuring CO₂e is vital for accurately assessing the impact of different greenhouse gases, developing effective strategies to reduce emissions, and comparing emissions from various sources and sectors. It is also valuable for calculating the Carbon Intensity Indicators (CII) relevant to the business activities that a corporation or entity is operating and making informed decisions about reducing emissions most cost-effectively. Overall, measuring CO₂e helps quantify the focal points of any business's carbon intensity as a means for precise accounting of scope 1 emissions so that asset owners can take necessary abatement measures.

**“Carbon accounting
- the key for climate action”**

Measuring CO₂e is crucial to assess impacts, develop strategies, compare emissions, calculate footprints, and address climate change by taking proactive reduction actions on relevant emissions focal points and quantifying the actual impact.



MEASURING - ANALYSING - REPORTING - OPTIMISING


PureMetrics™ is a stand-alone emission monitoring system that can measure greenhouse gases and other pollutants released in the exhaust from different combustion units burning all available fuels. It offers a cost-effective real-time method for quantifying the emissions of multiple greenhouse gases such as CH₄ and CO₂ and toxic gases such as CO, SO_x, and NO_x. PureMetrics™ measures and reports CO₂e MT (mass) GHG emissions up to 2% accuracy and establishes an accurate baseline measurement.

- PureMetrics™ supports optimising the operational profile of the vessel based on historical data.
- PureMetrics™ enables asset owners to establish real baselines for pre-abatement measurement so quantifiable reductions can be reported.
- PureMetrics™ complies with Vessel Performance Management Systems using sensor data rather than one data point per day.


HOW IT WORKS


PureMetrics™ measures GHGs in real-time by using flow, temperature, and gas analysis sensors to cloud, following standards such as ISO27001 and IEC62443 for end-to-end data encryption and acquisition, transmission, and data lineage from sensors to publication, certifiable for financial/insurance audits and ESG disclosures such as GHG and toxic emissions. The data is analysed using a robust data pipeline and methodology developed by the United Nations Framework Convention on Climate Change. In addition, historical emission data from PureMetrics™ can be used to track performance trends, CO₂ performance benchmarking, and calculate the exposure to future CO₂ taxation. The system can also be integrated and extended with Daphne Technology's SlipPure™ solution to provide a GHG measurement and post-combustion methane reduction solution.


KEY FEATURES


 **APPROVED:** Proprietary methodology for CO₂e measurement.

 **WEB-BASED:** Reporting & Dashboard.


 **DATA INTEGRATION:** With other reporting tools using API.


 **AUTOMATIC REPORTING:** To authorities, in-house environmental reports, or external stakeholders.

 **AUTOMATED CALCULATION:** Of IMO emission factors for comparison with fuel consumption-based CII rating.

 **FORECAST:** Vessel & fleet rating. Support to future CO₂ taxation planning.

 **COMPARISON:** Of emission performance within fleet.

 **CLASS-APPROVED:** CII reporting based on measured emissions.

 **OPTIMISING:** Providing support for optimising the operational profile of the vessel.


 **SECURITY:** Industry-leading cybersecurity (IEC62443).



Image: PureMetrics™ interface.

Direct emission measurements are compliant with Regulation 2015/757 (Article 21) on the European Union's guidelines for monitoring, reporting, and verification (MRV) of carbon dioxide emissions, as well as Regulation 22A in MARPOL Annex VI of the International Maritime Organisation's (IMO) Data Collection System (DCS) for fuel oil consumption on vessels.

BENEFITS

Using PureMetrics™ offers a range of benefits for internal combustion engine asset owners, including:

- Real-time emission data with high accuracy and verifiability.
- Automated Reporting eliminating human error in emission data recording and reporting.
- Support for optimising the operational profile of the vessel based on historical data.
- Dynamic control, enabling analysis and impact assessment, for optimal engagement of the SlipPure™ abatement system.

CARBON ACCOUNTING

PureMetrics™ can be used to generate Verified Emission Reductions (VERs) or carbon credits.

Carbon accounting is a practice for measuring and tracking greenhouse gas emissions produced by an organisation or individual. It has become increasingly important in recent years as the impacts of global warming continue to affect the environment and society. Carbon accounting enables companies to understand their carbon intensity in relation to business operations and commercial activities, identify areas for improvement, and set targets for reducing emissions.

Today, many organisations are adopting carbon accounting as a standard practice to meet regulatory requirements, demonstrate their commitment to sustainability, and attract environmentally conscious customers and investors. Carbon accounting can also play a significant role in the fight against global warming by providing accurate data to governments and international organisations to develop effective policies and programs to reduce emissions. Carbon accounting can also help companies save money through increased energy efficiency and reduced resource consumption. Its importance will grow as the need to reduce greenhouse gas emissions becomes more urgent.

**“Carbon Credits,
an investment in our planet's future”**

PureMetrics™ is the right tool to quantify GHG emission reductions, and once they have been quantified and verified through a third-party verification process, they can be used to generate VERs or carbon credits that can be sold on the carbon market.

In addition to providing a new revenue stream for companies, this can encourage further emissions reductions and promote environmental sustainability. Furthermore, using CEMs (continuous emission monitoring systems) data to generate VERs or carbon credits can help build trust with stakeholders and provide a transparent and objective approach to verifying emissions reductions, which is essential for the credibility of the carbon market.

AUTOMATED REPORTING

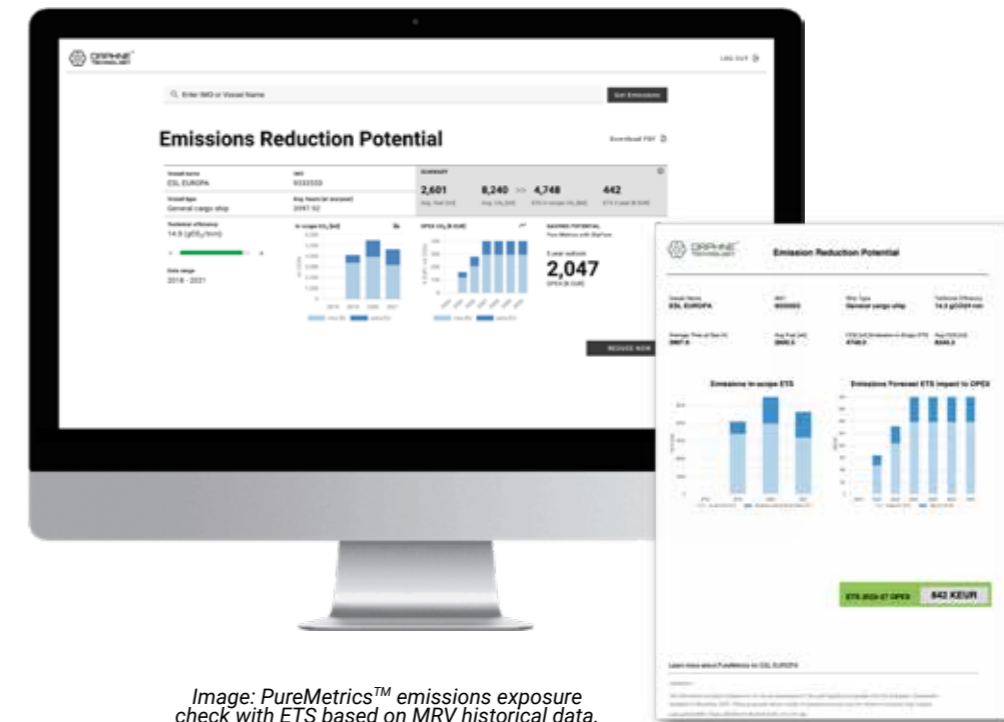


Image: PureMetrics™ emissions exposure check with ETS based on MRV historical data.

PureMetrics™ auditable data can be used to track and quantify emissions reductions over time, which can include optimising fuel consumption, improving operational efficiency, and investing in emissions reduction technologies.

Direct emission measurements are compliant with Regulation 2015/757 (Article 21) on the European Union’s guidelines for monitoring, reporting, and verification (“MRV”) of carbon dioxide emissions, as well as Regulation 22A in MARPOL Annex VI of the International Maritime Organization’s (“IMO”) Data Collection System (“DCS”) for fuel oil consumption on vessels.

PureMetrics enables OVD (Operational Verification Data) interface for MRV DCS (Data Collection System/Monitoring Reporting Verification), reducing the reporting time and complexities involved when applying emissions factors over multiple fuel types.

Users can generate various types of reports, such as compliance reports. These reports can be scheduled or generated on-demand and can be exported in multiple formats like PDF, Excel, or directly to APIs for further analysis.

To ensure seamless integration with DCS/MRV systems and other third-party platforms, the OVD interface offers a comprehensive API toolkit.

This ensures that the product is not just a standalone solution but a synergistic component that enhances the overall emissions monitoring and reporting ecosystem.

CONTINUOUS EMISSION MONITORING

CEMs offer enhanced accuracy in emissions measurements compared to traditional monitoring methods. Continuous monitoring ensures precise and comprehensive data, capturing spikes and variations in emissions output. This allows companies to identify areas for emissions reductions and optimise fuel efficiency.

In PureMetrics, emissions measurements are computed within 15sec in a standard four-stack configuration.

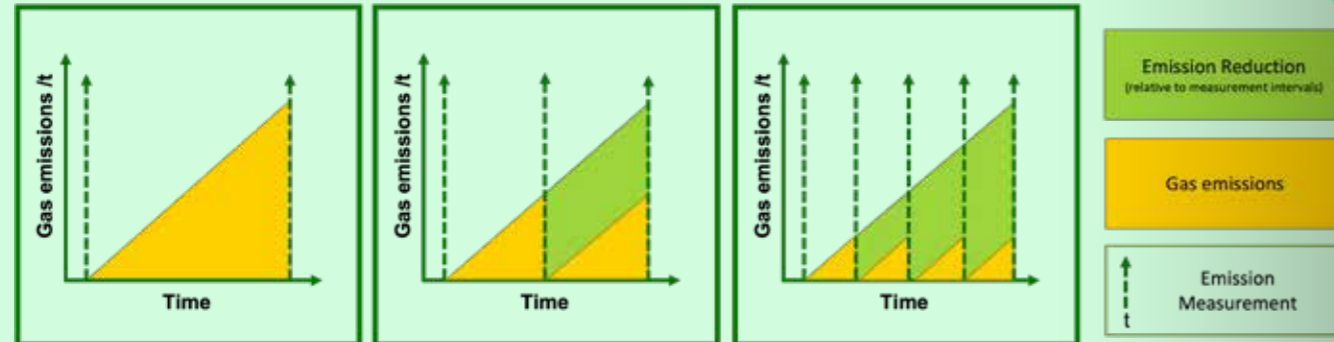


Figure: Theoretical overview of how emissions measurement frequency affects the emissions (source: Carbon Limits: Statistical Analysis of leak detection and repair in Canada - Summary report).

"Continuous sampling at a rate of once per minute results in emissions measurements that are approximately 99% more accurate compared to sampling once per day. This heightened accuracy enables us to pinpoint areas for emissions reduction and effectively monitor progress towards our emission reduction goals."

TACKLING GHG EMISSIONS

ACROSS INDUSTRIES

PureMetrics™ is changing the game in the maritime and energy industries. Its real-time and accurate measurement and reporting of greenhouse gas emissions provide an essential tool for industries reliant on internal combustion engines burning different fuels.



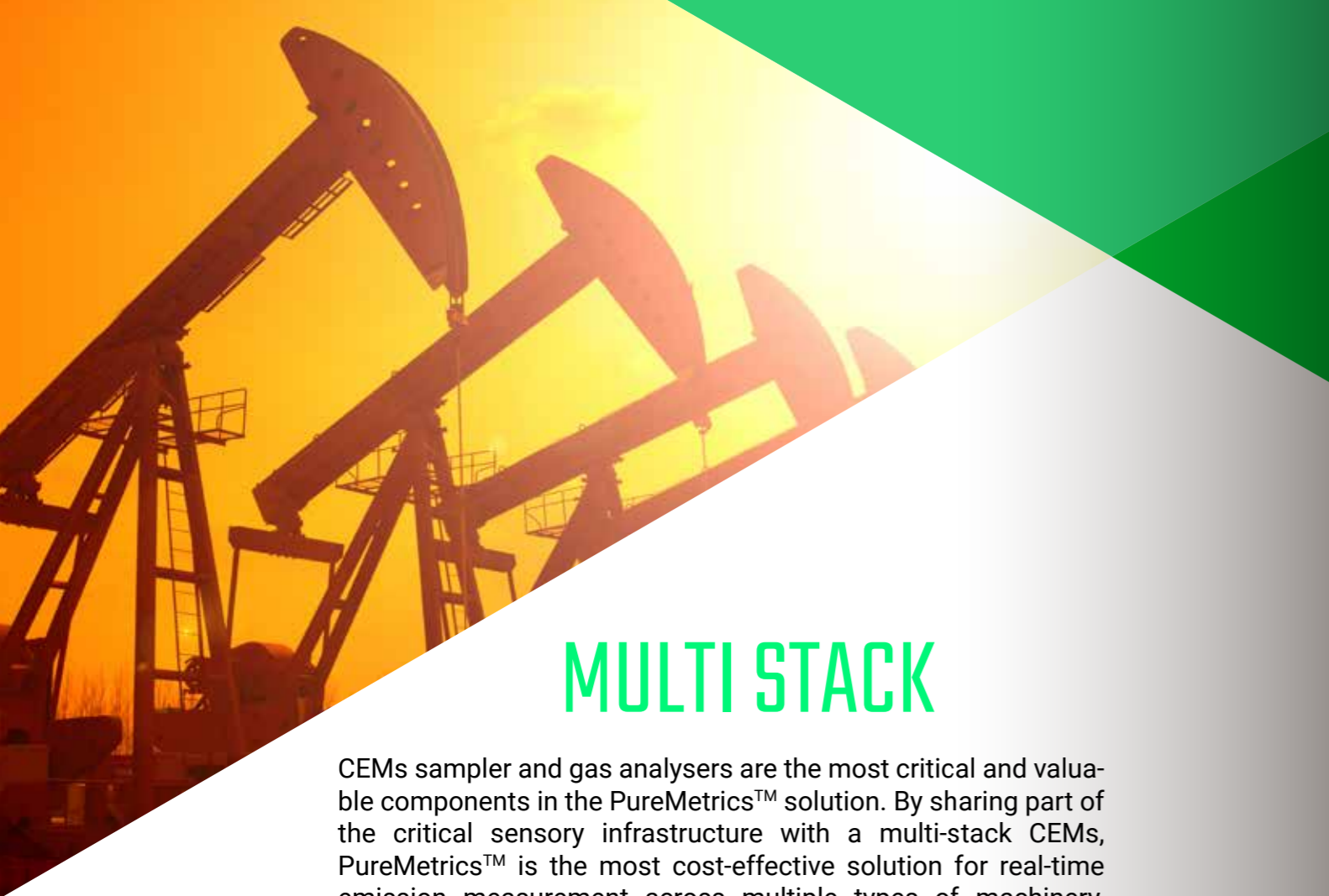
PureMetrics™ can be used in the maritime and land-based industries to measure emissions from combustion engines burning different fuels. Accurate and timely measurements are essential in industries such as shipping, manufacturing, and energy production, where there is an increased reliance on natural gas for internal combustion engines. The maritime industry, in particular, needs a reliable emission monitoring system to meet the international maritime industry's requirements to calculate its Energy Efficiency Existing Ship Index (EEXI) and the CII rating.

Oil and Gas: The oil and gas industry is one of the largest consumers of fossil fuels, as it uses them extensively for its operations, including the extraction, production, and transportation of oil and gas. According to the International Energy Agency (IEA), the oil and gas industry accounted for respectively 32% and 22% of the total global CO₂ emissions from fuel combustion in 2020.¹ Our products are focused on GHG emission measurement and the reductions in production phase of the land-based oil and gas industry.

Maritime: Reducing CO₂ emissions in the maritime industry is crucial for mitigating the impact of climate change. According to the International Maritime Organization (IMO), the shipping industry is responsible for around 1,056 million tonnes of CO₂ in 2018, which is about 2.9 percent of global GHG emissions.² This figure is expected to increase in the coming years as global trade continues to grow. Our products are focused on CH₄ and CO₂ reduction from the maritime industry.

¹ IEA: Greenhouse Gas Emissions from Energy Data Explorer <https://www.iea.org/data-and-statistics/data-tools/greenhouse-gas-emissions-from-energy-data-explorer>

² IMO: Fourth Greenhouse Gas Study 2020 <https://www.imo.org/en/OurWork/Environment/Pages/Fourth-IMO-Greenhouse-Gas-Study-2020.aspx>



MULTI STACK

CEMs sampler and gas analysers are the most critical and valuable components in the PureMetrics™ solution. By sharing part of the critical sensory infrastructure with a multi-stack CEMs, PureMetrics™ is the most cost-effective solution for real-time emission measurement across multiple types of machinery, accommodating up to 3-6 stacks. This helps asset owners to quantify multiple emissions sources in large plants with a cost-efficient solution.

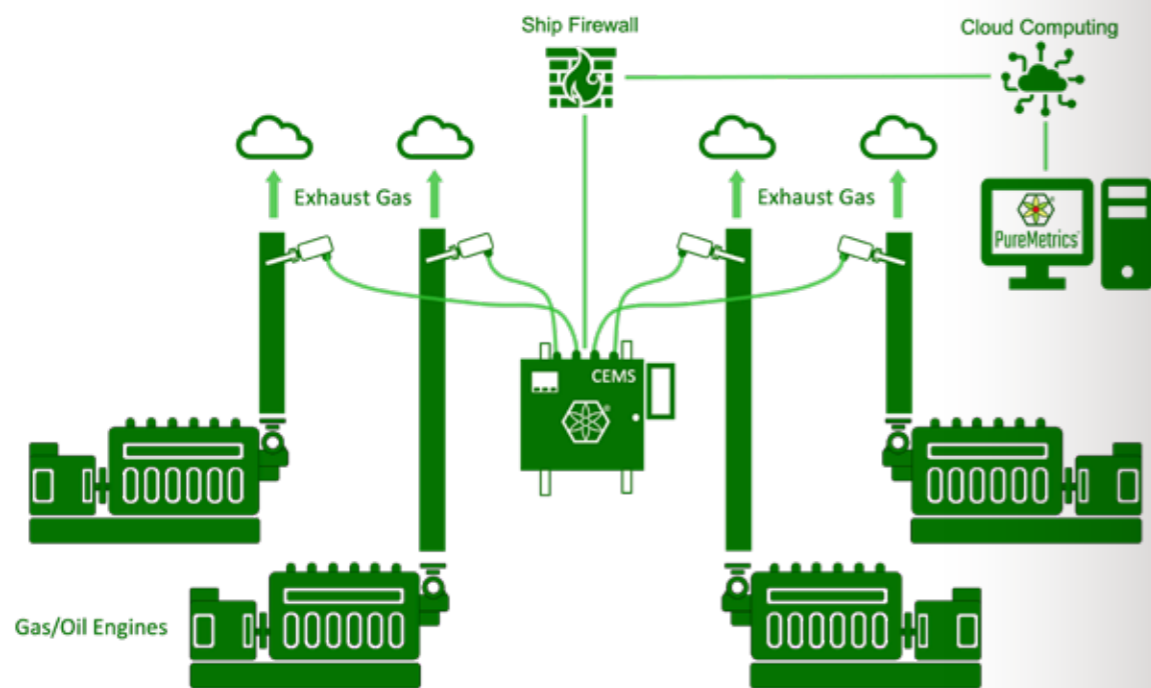
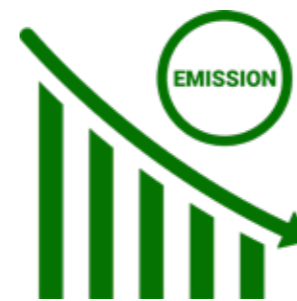


Figure: Overview of how multi-stack PureMetrics™ solution works.

Subscription Model



Implementing a multi-stack solution for the PureMetrics™ system will lead to significant cost reductions, specifically for the measurement and monitoring of emissions from multiple exhaust stacks.



By implementing SlipPure™, a significant reduction in methane emissions will be achieved in four-stroke dual-fuel engines. This implementation ensures substantial environmental benefits and contributes to the overall sustainability goals of reducing greenhouse gas emissions.

PureMetrics™ continuous emission measurement system is easy to install and commission. PureMetrics™ can be acquired with suitable Hardware as a Service (HaaS) subscription model. Companies can enjoy a CAPEX-free with the HaaS solution. The turn-key all-inclusive monthly subscription fee includes equipment cost, PureMetrics™ software subscription, an SLA that supports high availability standard system maintenance and yearly calibration for all sensors.

The installation and setup process is simple and can be completed in less than 48 hours with a low deployment cost.



SMALL STEPS BIG IMPACT



In conclusion, PureMetrics™ offers a streamlined and reliable solution for real-time greenhouse gas emission monitoring and reporting, making it a valuable tool for reducing emissions and mitigating climate change. Measuring emissions in terms of CO₂e helps companies to assess the impact of different greenhouse gases, set targets, track progress, and make informed decisions about reducing emissions. PureMetrics™ provides accurate and instantly verifiable direct emission measurements and reporting, eliminating the need for emissions factors estimations and fuel consumption reports and reducing human error. The system is certified for financial and insurance audits and ESG disclosures and

can be used in various settings. With its features, including a customised web-based CO₂ and CO₂e dashboard and historical digital emission data availability for analytics, PureMetrics™ is a versatile and cost-effective solution that offers the highest accuracy on the market, establishing an accurate baseline measurement and benchmarking CO₂e emission performance. By utilising PureMetrics™, companies can reduce their carbon footprint, improve sustainability efforts, and save money on carbon credits, making it a valuable investment for any organisation.



ABOUT



Daphne Technology is a Swiss climate deep-tech company, focused on solving the greenhouse gas challenge in tough-to-decarbonise industries.

The company develops technologies and scales innovative products to measure and reduce GHG emissions from industrial sources, with a portfolio approach to decarbonisation targeting GHG emission inefficiencies in power generation and energy conversion across the globe.

Daphne's high-tech, innovative approach has attracted global industrial leaders, including Shell Ventures, Saudi Aramco Energy Ventures, Trafigura, AET, Swisscom and JP Morgan, who are committed to enabling an economically sustainable energy transition.

The company has received multiple awards and recognitions, including the Horizon 2020 EU grant, Vaud Innovation Fund SPEI, Swiss Ministry of Environment Award, VentureKick 2020, Climate-KIC 2020, and Venture Business Idea. Daphne has also been featured as a top Swiss Clean Tech and Top 100 Swiss Start-up by VentureLab five times. The company has won several awards, including the Envirotech Maritime Innovation Award in 2021, the inaugural Nor-Shipping Ocean Solutions Award in 2022, and voted the top deep-tech company in Switzerland honoured with the prestigious Deep-Tech/Life Science Award at the 25th edition of the Swiss Economic Forum 2023.