ARUNDO

Arundo CarbonPath - Scope 3 emissions management for shipping



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INTRODUCTION

Ship owners will soon have no choice but to disclose their full emissions footprint to the public. Already now, investors and lenders are asking questions about the emissions of suppliers and customers that many ship owners struggle to answer with confidence.

Arundo Analytics will solve this problem for ship owners and ship managers by offering CarbonPath, a new software solution that connects the parties in the shipping value chain, allows them to share their emissions securely, and reveals the full picture of their Scope 3 emissions.

Fully cloud-delivered, developed in collaboration with leading ship owners, and powered by machine learning algorithms, CarbonPath promises to fit the operating model of major ship owners better than industry-agnostic solutions.

REGULATORS ARE TARGETING THE SHIPPING INDUSTRY

Ship owners have seen regulators take an increasing interest in their operations in the last few years.

New disclosure requirements, each adjoined by a new acronym like CII, EEXI, and EEDI, have been added to the regulatory burden of the ship owners' compliance teams.

The next mandatory disclosure is Scope 3 Greenhouse Gas Emissions. Scope 3 emissions are the greenhouse gasses (GHG) emitted by the reporting company's suppliers, customers, and other stakeholders in the value chain. These GHG are not emitted by the reporting company itself, but are emitted by companies upstream and downstream in the same value chain as a consequence of the activities of the reporting company. The purpose of calculating and disclosing Scope 3 emissions is to get better facts on where GHG emissions occur in the intertwined value chains, and identify the hotspots where companies can focus their efforts to reduce their overall GHG footprint.

Distinctive features of Arundo CarbonPath

- Built-in fixture calendar allowing the reporting company to dynamically allocate fuel emissions between Scope 1 and Scope 3
- Seamless collaboration flow with suppliers directly in the app - no need for long email trails and attached spreadsheets
- Artificial Intelligence for classifying emission-generating activities and assigning emission factors based on prior human action
- Export reports in XBRL and make SEC filings easy for your Compliance team
- Track data completeness and quality continuously through visual dashboards and audit logs
- Prepare standard presentation views that continuously update themselves, saving time in preparing reports to management and stakeholders

Scope 3 emissions are subdivided into 15 categories (see sidebar A). How emissions are distributed between these categories will differ significantly between industries and company business models. A ship owner taking delivery of a new vessel will see large Scope 3 emissions in the emissions from Capital Goods category, while an asset-lean Technical Manager would rarely see any large records in that category.

Reflecting the urgency of combating climate change, regulators are moving fast to get this new value-chain carbon accounting in place. The European Union has made Scope 3 emissions reporting mandatory as part of the CSRD (Corporate Sustainability Reporting Directive), which enters into force for large companies in 2025. The United States are following with Scope 3 disclosure being part of the Climate Corporate Data Accountability Act (also known as SB 253). Other regions that are setting timelines for Scope 3 emissions disclosure include New Zealand (2024), Singapore (2025), and India (2027). In summary, shipping companies with a global value chain will be required to disclose the GHG emissions of their suppliers and customers to multiple different regulators quite soon and should prepare for doing so sooner rather than later.

Sidebar A: Upstream & downstream categories

Upstream categories

1. Purchased goods and services
2. Capital goods
3. Fuel- and energy-related activities
4. Transportation and distribution
5. Waste from operations
6. Business travel
7. Employee commuting
8. Leased assets

Downstream categories

9. Transportation & distribution
10. Processing of sold products
11. Use of sold products
12. End-of-life treatment of sold products
13. Leased assets
14. Franchises
15. Investments



MANY SHIP OWNERS LACK THE TOOLS AND DATA REQUIRED TO MEET REGULATORS' AND FINANCIERS' EXPECTATIONS

It's not only regulators that are putting pressure on shipping companies to disclose Scope 3 emissions. Already today, financial institutions and active shareholders are asking questions that are hard to answer without diligent preparation.

These questions come from three angles:

1. Long-term capital providers are expecting more carbon taxes and punitive fees in the next decade and want to understand the risk exposure in carbon-intensive companies' profit and loss statements.
2. The capital cost advantages of "sustainability-linked loans" that give companies that can prove emission reduction a rebate on interest are attractive to investors.
3. Financial institutions are themselves forced to disclose Scope 3 emissions of their investment on an accelerated schedule and can be expected to pass on the burden of this accounting to their portfolio companies.

To answer the questions of capital markets today and regulators tomorrow, companies must look beyond their own operations and Scope 1 emissions and scrutinize the GHG emissions of their suppliers and customers. However, the shipping industry has over the years developed into a structurally complex value chain, more easily conceptualized as a "value web" due to its two-way dependence nature (see sidebar B). This division of labor has given ship owners the ability to pass on operational risk, reduce crewing costs, and create lean operations teams.

However, the drawback of this highly outsourced operating model is that ship owners are now expected to have detailed knowledge of emissions from an operation that is no longer under their day-to-day control. Specifically, four aspects will be particularly challenging for ship owners:

Establishing data transparency along a distributed value chain: Regulators expect ship owners to report the emissions caused by the production and distribution of vessel equipment, spare parts, and bunker fuel. This requires ship owners to work together with their numerous suppliers to collect and quality-assure this data. The operating model where ship owners employ ship managers to handle the day-to-day arrangements with suppliers complicates this further as there's no direct channel through which GHG emissions can be estimated and reported.

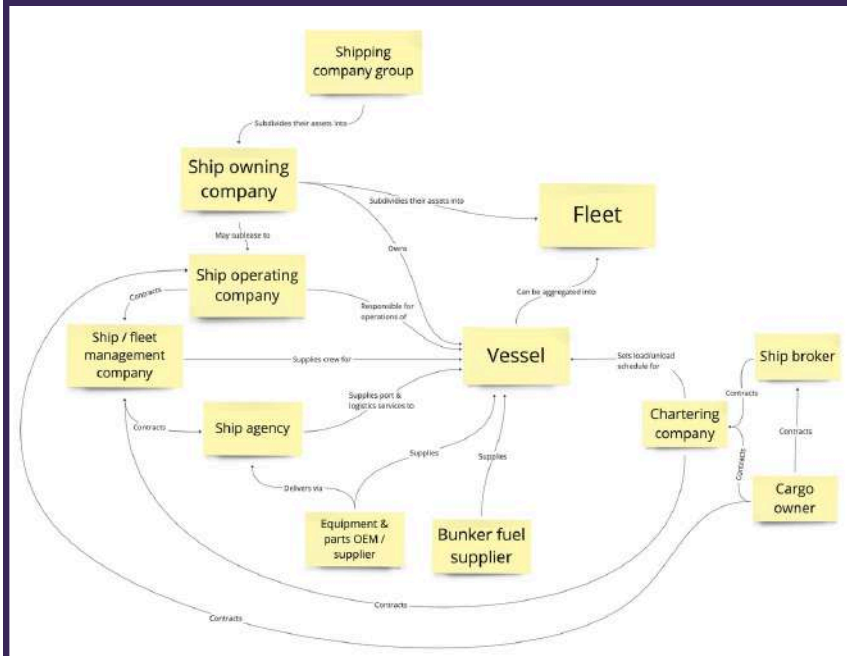
Acquiring and vetting emission factors: Emission factors serve to convert the financial value or physical quantity of an activity in the value chain to an estimate of the GHG emissions of the activity. The science involved in calculating, applying, and vetting such emission factors is rarely an existing capability for a ship owner, and will require partnering with third party consultants, data providers, or software vendors.

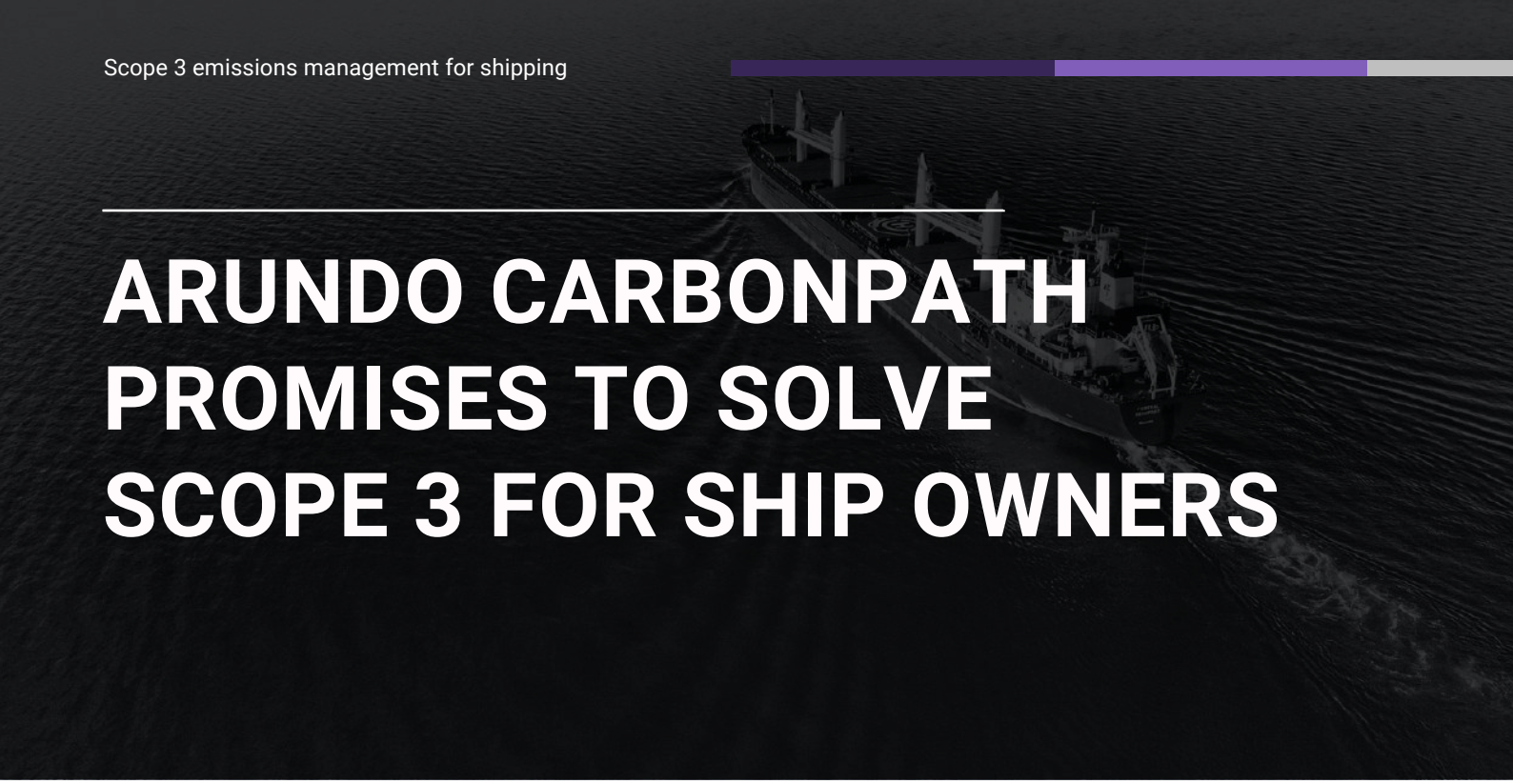
Keeping track of contract-specific reporting accountability: Scope 3 disclosure rules will require companies to separate emissions from leased-in, leased-out, and owner-operated vessels. Given the highly dynamic nature of vessel trading, and the lack of alignment between chartering terms and accounting terms, categorizing the value chain emissions correctly is a time-consuming puzzle unless a system designed for the task is used.

Coping with effort spikes in data quality assurance: The sheer amount of fuel, parts, and crew travels necessary to sustain the operation of a modern commercial vessel creates a long list of Scope 3 emissions that the usually small compliance teams of a ship owner must assess to be able to report an accurate picture of their Scope 3 emissions.

We expect the Scope 3 rules in most jurisdictions to be the same for all industries. Asset owners with fixed-place factories, integrated operations, and deep supplier relationships will find it easier to comply with these new rules than ship owners with their global value chains and mobile assets. We might still see sector-specific guidelines as the rules are refined, but pushing actions on Scope 3 into the future and hoping for significant exemptions from the regulations for the shipping industry is a risky bet.

Sidebar B: Example value web of a ship owner group





ARUNDO CARBONPATH PROMISES TO SOLVE SCOPE 3 FOR SHIP OWNERS

Small ship owners with a high degree of inhouse ship management are positioned to handle the coming Scope 3 emissions disclosure requirements with standard IS/IT tools or generic accounting solutions. However, the operating model and interlinked value chain of large ship owners make general industry solutions for Scope 3 management a poor fit. Therefore, Arundo has developed CarbonPath, a software-as-a-service that makes the unique aspects of the shipping value chain a first class citizen, rather than a bolt-on afterthought.

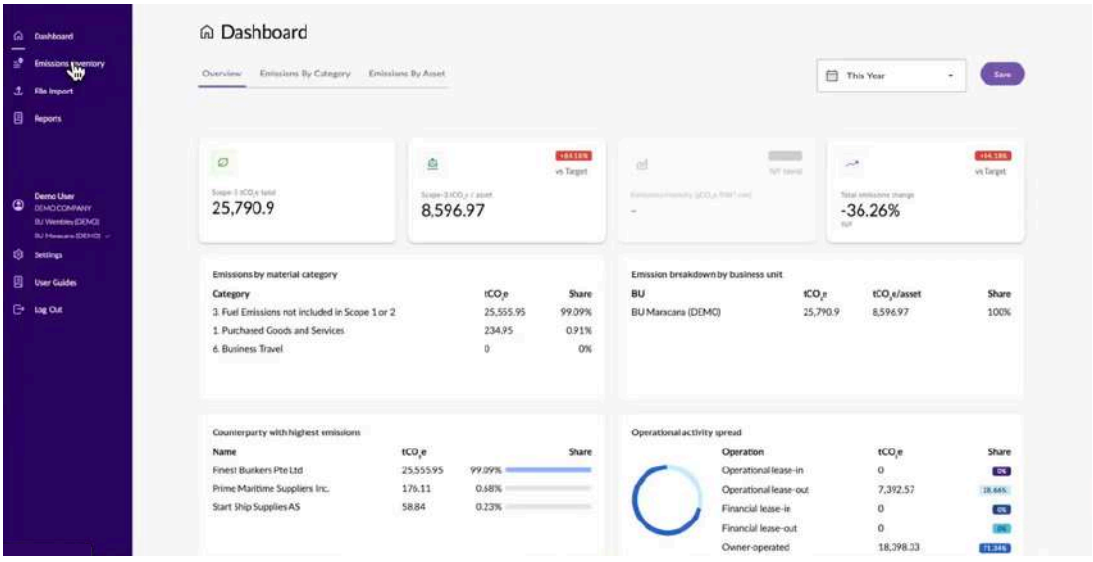
When designing CarbonPath, we've put three key aspects of the shipping industry at the center, and built the user experience with those top-of-mind:

1. **Streamlined collaboration:** Ship owners, ship managers, charterers, and suppliers can all work together in one application, reducing the use of emails and standalone spreadsheets for exchanging information.
2. **Leasing/chartering management:** The built-in fixture schedule provides an intuitive interface for defining the leasing agreements on a per-vessel basis, which in turn ensures that emissions are allocated to the correct categories as fixtures expire and new leasing arrangements enter into force.
3. **Vessel location awareness:** By keeping track of the location of vessels, CarbonPath can automate the selection of emission factors to match the region of where the vessel is operating and improve the precision of the emission estimate.

To these shipping-specific features, we've added the features needed for enterprise-scale Scope 3 carbon accounting, such as:

4. **Management dashboards and reports:** Graphical dashboards allow the compliance team and the company leadership to create self-service reports, shortening the time from insight to action and reducing human labor.
5. **Calculation method compliance:** Support for all calculation methods endorsed by the GHG Protocol (spend-based, average-data, and supplier-specific), with integrations to leading emission factor providers, out-of-the-box support for data quality assessment, and tools for validating supplier-provided emission factors.
6. **Seamless integrations:** Extensive support for data import and export makes it easy to both use data from other systems in CarbonPath, and to integrate information created in CarbonPath in 3rd party applications and business intelligence platforms.
7. **Automation:** A highly flexible "rules engine" allows CarbonPath users to set up rules that automatically categorize and calculate the Scope 3 emissions of activities that occur in the company's value chain.
8. **Traceability:** Extensive and configurable change logging, providing the traceability needed for internal compliance controls and external auditing of carbon accounts.

These features and tools have been integrated as a cloud-native software-as-a-service with high priority given to creating a great user experience, and with zero compromises in assuring data security and integrity.



Example dashboard view showing total Scope 3 emissions and selected breakdowns, allowing the management team to quickly get an overview of trends and opportunities for emission reductions.

BRINGING YEARS OF EXPERIENCE IN DATA-DRIVEN APPLICATIONS AND ARTIFICIAL INTELLIGENCE TO THE SUSTAINABILITY ARENA

Arundo was built around the belief that companies only realize a fraction of the value sitting in their data. With CarbonPath, we've taken that belief into the sustainability arena, with the focus on solving the challenges for shipping companies to measure and report their Scope 3 emissions. Based on our experience from automating the analysis of high-frequency telemetry data, we're putting emphasis on automating the classification of emissions and the allocation of emission factors to activities performed in the reporting company's value chain. A high level of automation provides consistency in reporting and reduces the manual labor that would otherwise be required to evaluate each GHG-emitting activity.

Arundo CarbonPath promises to learn from its users over time and bring the manual workload of classifying and allocating emissions to a minimum. Our vision is to reduce the information gap on emissions created along the shipping value chain without redefining the profitable operating model. We believe that integrated data flows and Artificial Intelligence will be key for this vision to come true.



CONCLUSIONS

Arundo CarbonPath aims to be the software solution that best fits the needs of major ship owners and companies with a similar operating model.

The software product was released in 2024 to its first licensed customers, who are now well on track to meet the reporting requirements under the European Union CSRD that enter into force in 2025.

We believe that companies that are ahead of the curve on Scope 3 management will see outsized returns from lower cost of compliance, improved supplier relationships, lower cost of capital, and a stronger brand in the eyes of the general public. You're invited to join this voyage with us!

ABOUT ARUNDO

Arundo Analytics supports equipment operators to make better decisions and improve efficiency, reliability, and sustainability.

Our products link data science, AI, cloud computing, and big data with industrial IoT, providing insights beyond simple alerts. Broad industry experience makes us a powerful partner for digitalization and process optimization.

Companies choose Arundo Analytics for our unique combination of consulting, data science, domain expertise, and software engineering.

Our experts excel at translating complex business scenarios into scalable software solutions. This means businesses can use their existing platforms for advanced analytics and AI/ML applications without the need for new development.

Maximize your business' capabilities with Arundo products.

Benefit from more than 250,000 development hours for:

- Reduced operational costs and energy consumption
- Minimized production process losses and carbon footprint
- Ensured transparency, traceability, compliance, and end-to-end sustainability.

Get the answers you need: contact@arundo.com

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