Securing ISO 14083 data inputs from inland waterway transport

Why this read is worth your time and attention

In the vast expansion of transport and logistics services, the maritime sector is a linchpin, connecting nations across the globe, or regions via inland waterways, allowing for an efficient transport of goods or passengers. The reliance on ships as a transport mode reinforces the imperative to address and mitigate greenhouse gas (GHG) emissions. Drawing on a conversation with Shipping Technology, this case study examines the need to tap into different data sources when calculating GHG emissions, highlighting that most of the necessary data is often already there.

Context

In March 2023, ISO published its new 14083 standard on the quantification and reporting of GHG emissions arising from transport chains. The standard establishes an internationally harmonised approach for quantifying and reporting on GHG emissions in the logistics sector.
To gather their views in relation to this new standard, our external partner LRQA has talked to

- Shipping Technology - case study 1.
- Bricklog - case study 2.
- BigMile - case study 3.

Zooming in on inland waterway transport

Companies across industries are increasingly asked to report on the greenhouse gas (GHG) emissions they are responsible for, as they directly or indirectly engage in energy-consuming activities. While practices to assess Scope 1 and 2 emissions have matured, calculating Scope 3 emissions is often more difficult, as it involves emissions that occur outside of the company's scope, such as those related to transportation activities. Within the transport sector, maritime shipping as a transport mode accounts for 11% of the total GHG emissions, making it the third-largest emitter following passenger vehicles with 39% and heavy trucks at 23% of carbon dioxide. The carbon footprint of the maritime sector is driven mainly by its reliance on fossil fuels, particularly marine gas oil and heavy fuel oil. Maritime shipping involves *inland waterway* shipping and *sea/ ocean* shipping, each serving distinct purposes within the global transportation network. Characterised by its ability to transport large volumes of cargo over long distances, sea transportation plays a crucial role in the international movement of goods and passengers across seas and oceans.

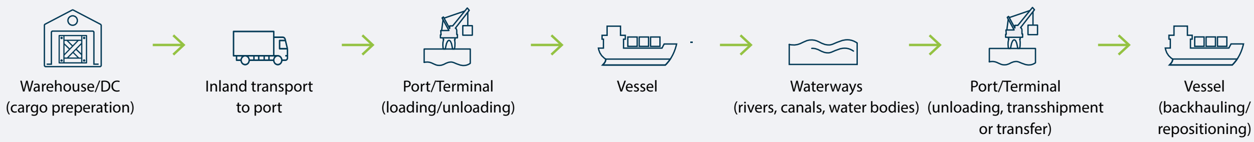
Transport by inland waterways refers to the movement of passengers or freight by vessels that are navigating rivers, canals, and other connected water bodies, featuring designs tailored to calmer conditions found in inland water systems. Vessels typically include barges, convoys, and tankers but also passenger ships or sports boats for example.

Accessing data for in-depth analyses can be challenging - but essential basic data is often already available

The maritime supply chain consists of an entire network that includes freight forwarders, shipping lines, port terminal operators, and land-based logistics systems. From the perspective of a shipping company, inland waterway transport is usually direct transport, with goods or passengers moving from origin to destination without intermediate handling.

This port-to-port transport is inherently unimodal, maintaining the mode of transport. Yet, the transport of cargo via inland waterway vessels can be part of a bigger, multimodal transport chain that leverages different modes of transportation to find the most cost-effective and environmentally friendly solutions.

A freight transport chain relying on inland waterway shipping usually starts with the preparation of the cargo at the warehouse or distribution centre, where goods are prepared and loaded. A truck or train transports the cargo to the nearest inland port, where the cargo is transferred to an inland waterway vessel. The vessels can differ in size and configuration (e.g. individual or pushed convoy) and carry the cargo along different waterways, which may include canals, rivers, or lakes. Upon arrival at the destination inland port, the cargo is unloaded and either transported to the next distribution centre or the final destination. The vessel may start a backhauling or an empty trip, to reposition itself for the next shipment.

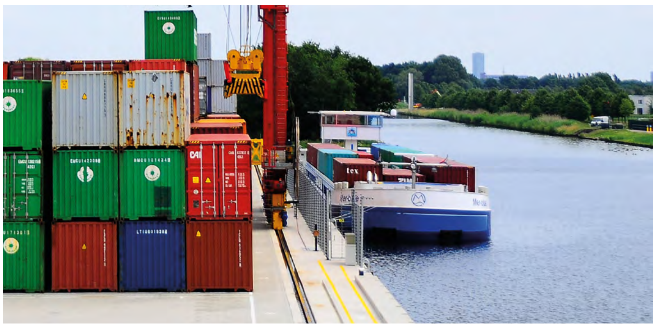


Examplary illustration of transport by inland waterways

It is crucial to define a clear scope and to be ready to tap into different data sources

ISO 14083 can be applied to calculate GHG emissions of complex intermodal transport chains, as well as of individual transport chain elements (TCEs), such as an inland waterway port-to-port trip. When preparing their GHG emissions calculation, shipping companies need to clearly define whether they want to calculate GHG emissions associated with an individual trip, i.e. for one TCE, or for an entire transport chain with multiple TCEs, including hub activities at connecting ports. In addition, the aspect of whether GHG emissions shall be allocated to one cargo owner or multiple cargo owners per container plays an important role when setting the basis for data collection.

Under ISO 14083, a company should include in its calculation all GHG emissions that are associated with the movement of respective freight or passengers. GHG emissions in inland waterway transport result from the energy consumed to power the vessel and any onboard equipment that is necessary for transporting the freight, or passengers, safely. To calculate these emissions, shipping companies need to gather and adequately use a range of different data inputs.



As a basis, data is needed on the distance travelled, the mass of freight or passengers transported, the energy sources used to power the vessel and onboard equipment, as well as adequate emission factors that are as specific as possible, reflecting the type of vessel used. If connecting activities at the ports shall be included, data on energy used for transfer processes needs to be gathered. This can include data on e.g. the unloading or transhipment operations at hubs, energy supplied to the vessel from the shore, or energy used for empty trips to reposition the vessel.

Tapping into data sources from vessels is the bread and butter of *Shipping Technology*, a data service provider that specialises in autonomous shipping solutions. *Shipping Technology* develops digital applications and algorithms for vessel navigation by utilizing nautical data. They can create a digital twin for each vessel, which offers clients actionable insights through a realtime monitoring dashboard and retrospective analysis. Additionally, their solution enables the automatic calculation of GHG emissions and *Shipping Technology* is actively working on a solution to allocate emissions per container, using data from other onboard programs such as stowage programs. Combining this data allows them to allocate emissions to a single (refrigerated) container.

Basic data are often already available

Depending on the scope set and the level of detail envisaged the data gathering can seem quite challenging. However, according to *Shipping Technology,* most shipping companies already have access to relevant data points but need to make sure they are using them in the right way to calculate their GHG emissions.

Onboard computers and equipment of inland waterway vessels typically already record or produce a range of data points that allow for secure navigation through the waterways and efficient operations. Data collected includes for example GPS coordinates and real-time speed of the vessel, logbook data on vessel activities including the distances covered, data on the cargo weight and volume loaded, data on the vessel's fuel consumption, engine speed, maintenance records etc. In turn, basic data on the distance travelled, the load of the vessel and the energy consumed, are usually already there, making the task of data gathering less challenging.

Yet, depending on the calculation scope, additional and not yet automatically collected data may be needed, such as on energy consumed for cooling or heating the cargo, for running airconditioning systems on passenger ships, or on power received from the shore. In addition, gathering data for new types of propulsion systems, such as hydrogen- or electric-powered vessels, may be more challenging.

The use of external solutions providers

External solutions, such as those of *Shipping Technology*, can help companies autonomously gather and adequately use data, providing real-time online access to the ship and its data. *Shipping Technology* can access almost all onboard equipment. This allows them to run automated emission calculations based on real-time data, offering insights into various aspects such as route details, port operations, fuel usage, and cargo metrics. Additional sensors are installed for specific data points, like shore power consumption, to enhance accuracy. Passenger ships introduce additional complexities due to factors such as conditioning for passenger vehicles.

In addition, *Shipping Technology* is expanding its scope to include enhanced access to onboard data, with initiatives underway to integrate emerging technologies like battery containers and hydrogen installations. The overarching objective is to streamline automated emission reporting following the ISO 14083 standard across diverse vessel types, independent of propulsion methods or energy sources. Furthermore, efforts are directed towards developing applications that offer practical guidance to crews, aimed at minimizing emissions during trips.

Efficient data gathering requires a structured approach and may benefit from external data solutions providers

The scope of transport-related activities, and subsequent efforts to gather data on energy consumption of core transport, or additional hub- and equipment-related activities, differ with each company. It is crucial to invest time in defining why GHG emissions shall be calculated, and in understanding which transport chains, or TCEs, are relevant within an individual company. Depending on the individual company, it may be sufficient to run the calculation on a trip level (for one TCE), or it may be necessary to also include linking hub operations or additional TCEs to the calculation.

Next, companies should evaluate which basic data, such as fuel consumption and distance travelled, they already have available, and which additional data e.g. onboard equipment they need to gather. Companies should check which data systems and internal processes are currently in place, even if not directly related to the gathering of GHG emissions data, and which data is available for their operations as well as for operations carried out by suppliers or sub-contractors.

Understanding the needs of clients and other actors in the wider transport chain and collaborating on data collection methods is crucial, not only to facilitate a smoother integration of ISO 14083 but also to strengthen the supplier- or client-company relationship.
Considering the time and resources necessary to ensure an effective approach, crafting a compelling business case is useful. Effectively communicating the benefits of calculating GHG emissions, despite associated costs and time investments, is essential. By highlighting the long-term advantages of aligning with ISO 14083 standards, particularly in terms of clarity throughout the value chain, companies can garner support internally and from stakeholders. Finally, companies in the logistics sector should stay proactive and adaptable, leveraging insights gained from the implementation journey to refine their approach and streamline processes. By doing so, they can effectively navigate the evolving policy landscape of emissions reporting in the logistics sector and maintain their competitiveness.

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