

THE ROLE OF THE VOLUNTARY CARBON MARKET IN DECARBONISING SHIPPING

A PRACTICAL GUIDE TO LEVERAGING OPPORTUNITIES AND MANAGING RISKS

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1. Executive Summary

The international shipping industry is under increasing pressure to decarbonise, with changes coming to bear through a combination of regulatory enforcement and voluntary initiatives.

In the short term, market participants are contemplating new regulations under the International Maritime Organization's (IMO) Initial GHG Strategy, including the upcoming Energy Efficiency Existing Ship Index (EEXI) and Carbon Intensity Indicator (CII). In parallel, market feedback suggests discussions are taking place at Board level regarding additional voluntary measures that go beyond IMO compliance. Within these talks, shipping industry players, their customers, and their customers' customers, often cite The Paris Agreement target to limit global warming to 1.5° Celsius compared to pre-industrial levels. To meet this target, The Intergovernmental Panel on Climate Change (IPCC) estimates that global net human-caused emissions of carbon dioxide (CO₂) would need to fall by about 45% from 2010 levels by 2030, reaching 'net zero' around 2050¹.

Considerable uncertainty remains regarding the financial cost of fulfilling long-term climate mitigation commitments through the purchase of carbon credits, and to what extent offsetting could or should play a role in the strategies of businesses striving to meet voluntary climate pledges.

The Paris Agreement is outside of the regulatory regime of the IMO. However, this international climate treaty could play an increasingly influential role in the sector, amid the growing realisation that corporate actors aligning their activities with The Paris Agreement will be unable to achieve their goals unless there is a significant reduction in emissions from sea-borne transportation.

Despite this, shipping currently faces relatively higher abatement costs and technological challenges to decarbonise. As such, some market players have been exploring the immediate options available to catalyse environmental action demanded by stakeholders looking for tangible ways to reduce emissions within their global supply chains. At the same time, others are looking for ways to translate today's environmental pressures into new revenue-generating and/or brand-building opportunities. Whether the goal is environmental improvements, extraction of commercial value, or other related aspirations, the Voluntary Carbon Market (VCM) is an option that is subject to increasing interest, intrigue and even confusion within the shipping industry.

The VCM is a non-regulated global market where participants offset their emissions through the purchase of carbon credits. According to The World Bank's State and Trends of Carbon Pricing 2022 Report, the annual value of the market now exceeds USD 1bn. While the VCM is not an acceptable compliance mechanism for the IMO's Initial GHG Strategy, or other market-based measures such as the Sea Cargo Charter (despite signatories [of the latter] currently being 2.7% misaligned with the decarbonisation trajectory in 2021¹¹), our research finds that several factors linked to decarbonisation efforts in the shipping industry and beyond are motivating market players to consider participating in the VCM. Despite this, considerable uncertainty remains regarding the financial cost of fulfilling long-term climate mitigation commitments through the purchase of carbon credits, and to what extent offsetting could or should play a role in the strategies of businesses striving to meet voluntary climate pledges. A buyer's ability to finance carbon credit purchases in the mid to long term could also be affected by evolving climate science and how this emerging thinking influences mandatory and voluntary approaches to climate change mitigation. Furthermore, shipping industry players looking to sell carbon credits face open issues regarding the integrity of carbon credits.

In this paper, we will provide an overview of the VCM, its different uses within shipping, including transaction examples, as well as key short- and long-term considerations for market participants evaluating their approach to this evolving market. Appendices to this document also highlight the key differences between this market and compliance markets, including the EU ETS.

2. What are voluntary carbon credits?

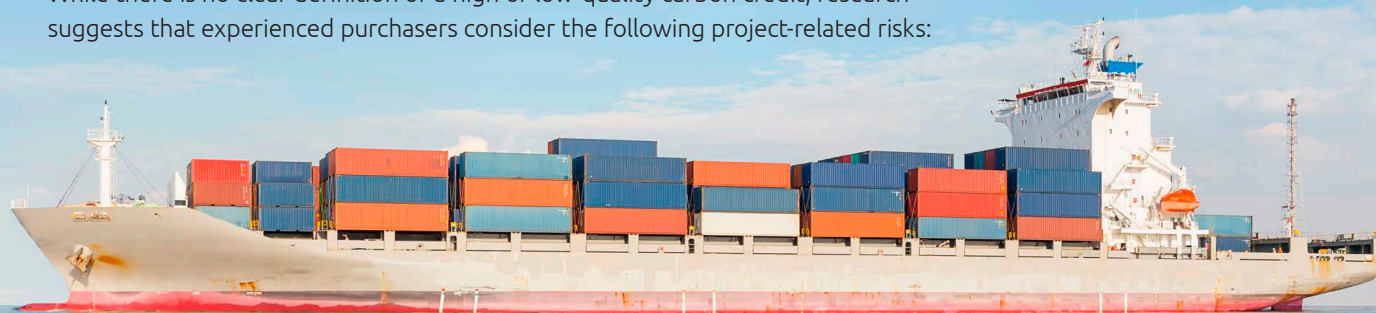
A carbon credit is a transferable instrument that represents the reduction or removal of one tonne of carbon dioxide equivalent (tCO₂e) from the atmosphere. Carbon credits used in the VCM are broadly referred to as voluntary or verified emissions reductions (VERs) or informally as carbon offsets, carbon credits or carbon units.

Carbon credits are produced by projects varying widely by type and scale. They are categorised as either:

- **Removal credits:** representing the creation of carbon pools/sinks that sequester carbon dioxide from the atmosphere. Examples of removal credits include planting trees or “blue carbon projects” such as mangroves, salt marshes and seagrass. Market feedback suggests that blue carbon credits may attract considerable interest from buyers
- **Reduction credits:** (also known as avoidance credits) representing a reduction in business-as-usual emissions associated with a project activity. This means current emissions are reduced by improved alternatives, although existing CO₂ is left untouched. Examples of reduction credits include renewable energy projects, community-based efficiency initiatives or ships/fleets equipped with energy efficiency technologies (see Section 8).

From a buyer’s perspective, while there is currently no material difference between the purchase of removal or reduction carbon credits, removal credits potentially gain more importance at the point that the buyer meets its net-zero target (in 2050, although dates vary between organisations). Goals set in line with The Paris Agreement definition imply that all residual emissions (i.e. emissions sources that remain unabated by the time a net-zero target is reached in 1.5° Celsius mitigation pathways) need to be balanced out by permanent removals. This can be achieved using high-quality removal carbon credits (reduction carbon credits are not acceptable). Notwithstanding this, in the short to medium term, feedback from the Voluntary Carbon Markets Integrity Initiative confirms that both removal and reduction credits are equally acceptable on the journey between now and mid-century, provided they meet high standards of environmental and social integrity (the definition of “high standards” remains subjective).

In addition to the emissions reduction achieved, purchasers may also wish to consider the specific co-benefits of the project from which the carbon credits originate. For example, some projects deliver biodiversity protection, while others offer local job opportunities, clean water supplies and/or improved educational opportunities, to name a few. These co-benefits could be significant, and provide the added benefit of supporting a buyer’s contribution toward the United Nation’s Sustainable Development Goals (SDGs), while also reinforcing brand values and positioning. Buyers who wish to take co-benefits into account when purchasing carbon credits should be aware of recent research which suggests that carbon credits with co-benefits will continue to command a price premium, although the value of benefits varies across different types of buyersⁱⁱⁱ. While there is no clear definition of a high or low-quality carbon credit, research suggests that experienced purchasers consider the following project-related risks:



- **Additionality:** To qualify as a genuine carbon offset, the reductions achieved by a project need to be 'additional' to what would have happened if the project had not been carried out (e.g. continued as business-as-usual). For instance, if a project is viable in its own right, say through the sale of electricity, or because of government funding, regulation or other policies, then it cannot be used as an offset project as it would have been undertaken regardless of the investment secured through carbon markets.^{iv} Each Carbon Standard-Setting Body (hereafter CSSB – more details in Section 4) has a certification process designed to exclude non-additional projects. However, this does not free buyers from the responsibility to examine additionality nor does it eliminate exposure to reputational issues resulting from the purchase of carbon credits that are perceived to be of a poor standard (see aviation industry case study in Section 6). Market feedback highlights examples of potential risks associated with low-cost carbon credits originating from renewable energy projects in China and India, where the cost of renewables production is cheaper than/in line with fossil fuel-based generation, making renewables increasingly the business-as-usual case, with the latter not needing revenue from the carbon markets to ensure feasibility
- **Balancing E, S and G:** Buyers need to be aware of the underlying risks, such as human rights violations, detrimental impacts on local populations, land and water usage, that may counter the positive impact of emissions reductions projects
- **Project start date:** The recent evolution in emissions calculation and verification, and carbon credit generating methodologies means experienced buyers may avoid purchasing carbon credits generated by projects that started prior to 2015
- **Anti-Money Laundering (AML) and Know Your Customer (KYC) due diligence:** The lack of price transparency, the highly fragmented nature of carbon credit supply, as well as the lack of regulatory oversight, have led to concerns about potential money laundering and fraud, which in turn has prompted market participants to undertake their own independent counterparty screening of VCM projects.

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3. How are voluntary carbon credits used?

Carbon credits are broadly used for two purposes:

Offsetting claims: These claims state or imply that a buyer's emissions have been offset, or counter-balanced, by the certified emission reduction or removal represented by a carbon credit

Impact claims: Claims that relate to the certified emissions reduction or removal impact represented by a carbon credit, without stating or implying that an entity's emissions have been offset. For example, this type of claim could be used as a material example of a buyer's efforts to contribute towards UN SDG 13 – Climate Action (as well as other SDGs associated with co-benefits).

4. How is a voluntary carbon credit created?

To generate a carbon credit, a project developer (hereafter PD), typically a private business, not-for profit, or NGO, must first certify their project with a CSSB, also referred to as a carbon standard programme provider or a carbon crediting entity. CSSBs develop and promote standards that must be adhered to by the PD, and also maintain a registry of the carbon credits that they issue. In the absence of one global regulator/standard, several competing CSSBs have emerged with market feedback suggesting these follow similar rules but with differing specialty areas. Buyers should exercise due care when selecting which carbon standard to adhere to; compliance and risk mitigation best practices require careful consideration of factors such as integrity, independence, specialisation, global acceptability and scale. While four CSSBs dominate the VCM as a whole (see Figure 1 below), at the moment, the Gold Standard Foundation is the only provider with a methodology that enables the shipping industry to generate carbon credits from energy efficiency technologies installed on ships/fleets (more in Section 8).

Figure 1: Key CSSBs, including their current market share (measured in credit issuance and number of projects in 2021 according to research by The World Bank⁹):

Carbon Standard-Setting Body (CSSB)	Credits Issued (MtCO ₂ e)	Number of projects registered
Verified Carbon Standard (VCS, developed and administered by Verra)	295.08	110
The Gold Standard	43.79	51
Climate Action Reserve (CAR)	4.83	44
The American Carbon Registry (ACR)	8.83	18

The certification process varies depending on the CSSB selected by the PD. However, the process broadly includes the following steps:

- The PD selects an applicable carbon offset methodology (see shipping specific example in Section 8)
- The PD, alongside appropriate service providers including consultants and technology providers, (collectively called Project Implementers), prepare a Project Design Description (PDD) with key project details (methodology, safeguards, anticipated GHG emissions reductions and removals, and monitoring)
- The PD opens a new registry account with a chosen CSSB
- The CSSB reviews and approves the preliminary PDD
- Accredited Validation and Verification Bodies (VVB) conduct a desk review and field visit. VVBs are independent bodies that confirm whether a project is in line with the CSSB requirements. Their names and sectorial scope are publicly available via the CSSB
- A monitoring period where a PD monitors and measures GHG emissions reductions or removals for a set period with results reviewed and approved by a VVB
- Project certified by the CSSB
- Project earns carbon credits which can be traded until being retired. Retirement takes a carbon credit's unique serial number out of circulation, ensuring it cannot be resold or effectively used twice. This contributes toward the integrity of the carbon-offsetting system, so buyers have evidence that the purchases of carbon credits are a legitimate form of reducing greenhouse gases. Buyers can retire carbon credits themselves or the task can be undertaken by a third party (such as a carbon credit retailer/service provider) on their behalf.

5. Who sells voluntary carbon credits?

Voluntary carbon credits are bought and sold via primary and secondary markets:

- **Primary market:** the initial transaction involving the sale of generated carbon credits from the PD to the first buyer in line (i.e. an end user, broker, retailer, etc.)
- **Secondary market:** sale of carbon credits amongst/between market intermediaries and/or end buyers/users.

Figure 2: Examples of sellers of carbon credits

Seller name	Description and potential buyers
Project Developers	<p>Buyers with larger purchasing demands who are seeking to avoid or reduce transaction costs</p> <p>Shipping industry-specific example: <i>Ship owners looking to de-risk investment in energy efficiency retrofits through the establishment of their ship/fleet as a carbon credit generating project. This approach could enable owners to extract commercial value from the sale of carbon credits in addition to the cost reductions achieved by fuel-saving innovation. In addition, market players are also investing in onshore carbon credit generating projects with the view to selling carbon credits or using credits generated to offset their own emissions against a voluntary corporate climate pledge</i></p>
Carbon Standard-Setting Body (CSSB)	<p>Online marketplaces which give buyers the option to purchase credits from a range of project types certified by their standards</p>
Carbon credit retailers/ carbon credit service providers	<p>Providers of a range of services in addition to carbon credit purchasing, including project development and consultancy, carbon footprinting analysis and UN SGD impact reporting. Such providers typically take temporary ownership of carbon credits before re-selling them to a buyer in the secondary market</p> <p>Shipping industry-specific example: <i>Bunker suppliers selling carbon credits to customers (especially those in the container market where environmental pressure is more acute due to close proximity with consumers) looking to offset emissions</i></p>
Brokers	<p>Brokers reduce the time and effort buyers would otherwise be required to spend engaging directly with sellers</p> <p>Shipping industry-specific example: <i>Ship brokers with in-house carbon credit brokers connecting end users including ship owners, operators and charterers with project developers selling carbon credits. Some brokers have also launched online platforms enabling buyers to purchase carbon credits from project developers offering numerous co-benefits, with credits verified by various CSSBs. Research also uncovered one example of a broker offering other services such as EU ETS training (in preparation for the sector's likely inclusion within this compliance carbon market, see Appendix 1) and carbon trading within other sectors (for example, working with oil companies with carbon trading departments)</i></p>
Exchanges	<p>CME Group, the world's largest derivative marketplace, now offers three voluntary carbon emissions offset contracts, with each serving slightly different markets. For more details, see Figure 3 overleaf</p>



Figure 3: Key product specifications for voluntary carbon emissions offset contracts available on the CME Group exchange

CBL Product:	GEO	N-GEO	C-GEO
CBL Product name:	Global Emissions Offset	Nature-Based Global Emissions Offset	Core Global Emissions Offset
CBL Product launch:	10/5/2020	3/11/2021	1/5/2022
Description:	The GEO contract is a physically settled contract that allows for delivery of CORSIA ¹ -eligible voluntary carbon offset credits from three registries: Verified Carbon Standard (VCS), American Carbon Registry (ACR) and Carbon Action Reserve (CAR).	N-GEO futures follow the industry leading VCS for Agriculture, Forestry, and Other Land Use (AFOLU) projects and require additional certification of Verra Registry's stringent Climate Community and Biodiversity (CCB) Standard, which identifies projects that simultaneously address climate change, support local communities and smallholders, and conserve biodiversity.	CBL C-GEO futures are standardised instruments for high-quality voluntary emissions offsets that are intended to align with the Core Carbon Principles, an emerging set of transparent and consistent standards around the supply of carbon credits to be overseen by the Integrity Council for the Voluntary Carbon Markets.
Products:	Tech-based (non-AFOLU)	Nature-based (AFOLU)	Tech-based (non-AFOLU, large hydro excluded w/ exception of Run-of-River hydro)
Contract size:	1,000 environmental offsets (each offset representing 1 mtCO ₂ e)	1,000 environmental offsets (each offset representing 1 mtCO ₂ e)	1,000 environmental offsets (each offset representing 1 mtCO ₂ e)
Underlying supply:	~40 million credits	~70 million credits	~100 million credits
Quoted price for December 2022 contract:	USD: 4.00 per tonne (Updated 4th October 2022)	USD 8.34 per tonne (Updated 4th October 2022)	USD 1.88 per tonne (Updated 4th October 2022)

1 Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) is a global carbon offsetting scheme, whereby participating aeroplane operators will offset any growth in CO₂ emissions above 2020 levels. For more information, see Appendix 2

6. Shipping industry-specific transactions

Bunker suppliers selling to fuel purchasers

Within the bunkering industry, certain suppliers see the VCM as an opportunity to turn environmental pressure into a potentially revenue-generating opportunity. This would be realised through the sale of voluntary carbon credits to customers looking to offset emissions from their chosen fuel choice. While multiple market sources have confirmed that transaction volumes are presently low, demand for this service appears to be driven by bunker fuel purchasers facing pressure from their customers to decarbonise their supply chain. The approach appears to have gained the most traction in the container shipping segment, which operates more closely to end-consumers and therefore faces more significant calls for environmental action.

Market dialogue suggests that there are several approaches to structuring a commercial carbon offsetting service within the bunkering industry. Sources at some entities spoke of subcontracting the service out to a third-party consultant due to low transaction volumes, while another source stated that some bunker suppliers have signed contracts with a ship broker that has an established carbon trading desk in order to take advantage of their large portfolio of carbon credits. Other bunker suppliers have established their own carbon desks whereby the bunker supplier could either work in the capacity of a broker or carbon credit retailer.

In a scenario where the bunker supplier takes temporary ownership of carbon credits (i.e., as a carbon credit retailer), one key consideration could be price fluctuations; while VCM carbon credit prices appear to currently be on an upwards trajectory, one market source stressed the need to consider the impact of a downwards price cycle, which could force a bunker supplier to sell credits at a loss.

Those buying carbon credits from bunker suppliers appear to have diverging preferences, with some targeting the lowest prices available and others seeking credits with co-benefits relevant to their businesses (for example, a Brazilian buyer looking to purchase carbon credits that benefit Brazilian communities). One market source identified vintage (i.e., the year the carbon credits were issued) as a deciding factor, with purchasers reluctant to buy carbon credits issued more than four or five years ago. A further source suggested there could be a linkage between this preference and the vintage of carbon credits eligible for resale on the CME Group Exchange.

Regardless of the type of carbon credit acquired, buyers wishing to make an offsetting claim should exercise due care in confirming responsibility for retiring carbon credits. This process appears to be undertaken by a variety of entities (buyer, bunker supplier, or third party, for example), depending on the specifics of the transaction. They should also consider whether the offsetting meets the scope of their environmental requirements (some bunker suppliers claim to offset well-to-wake emissions of a customer's chosen bunker fuel, while others give a number of options including offsetting a single bunker delivery, voyage or yearly CO₂ output).

Bunker suppliers as end buyers

In addition to offering a service to customers, some bunker suppliers are already, or are actively considering, purchasing carbon credits to meet their own environmental goals. For example, a bunker supplier could offset CO₂ emissions generated from the consumption of marine fuel on the barges used to distribute the bunkers (i.e., a marine fuel provider's Scope 1 emissions²). Market feedback suggests that bunker suppliers undertaking this are currently buying their carbon credits from third parties, albeit future aspirations could see bunker suppliers establish themselves as project

² According to the Greenhouse Gas Protocol, a global standardised framework to measure and manage GHG emissions, Scope 1 emissions are direct emissions from owned or controlled sources. Scope 2 emissions are indirect emissions from the generation of purchased energy. Scope 3 emissions are all indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

developers, generating their own credits and retiring them against their own operational emissions.

Ship owners and operators as end buyers

In recent years there has been a flurry of corporate announcements from ship owners and operators reporting the completion of a carbon offset voyage, achieved through the purchase of voluntary carbon credits (some announcements also stress the application of other sustainability measures such as advanced biofuels and energy efficiency retrofits). The motivations behind certain announcements are unclear, although some endeavours appear to be positioned as demonstration or pilot projects aimed at showing the immediate ways carbon emissions generated during sea transportation can be compensated, amid limited technological solutions and/or zero-carbon fuel-options.

Market feedback suggests that transaction volumes are currently low, with the majority of transactions restricted to a single voyage, and few purchasers publicly committing to a long-term offsetting strategy.

However, market feedback suggests that transaction volumes are currently low, with the majority of transactions restricted to a single voyage, and few purchasers publicly committing to a long-term offsetting strategy. This is further evidenced in recent research by Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping which suggests that only 4% of the largest companies by owned capacity in the tanker, bulk, container, and RORO/car segments plan to use offsets to lower carbon emissions^{vi}.

Notwithstanding this, some market players are signalling their commitment by making capital investments to acquire further knowledge of the VCM. An example of this is NYK Group, which announced its investment in Australian carbon credit sales company Australian Integrated Carbon in September 2021^{vii}. In a further isolated example, Pacific Basin is also reported to have offset all carbon emissions from its global shoreside operations starting from 2020, including all office activities, commuting, and business and crew travel^{viii} (Scope 2 and 3 emissions).



Reputational risks for voluntary carbon offset buyers

When it comes to communicating the news of an offset voyage, bunker delivery, etc., market research and feedback have uncovered instances of inconsistent approaches and information gaps. While certain ship owners and operators have opted to present activities such as a single voyage as carbon neutral, bunker suppliers appear more hesitant, with multiple market sources stating their opinion that the phrase is incompatible with the (currently) carbon-intensive shipping industry.

According to The Carbon Trust, a carbon neutral footprint is defined as “where the sum of greenhouse gas emissions (CO₂e) produced is offset by natural carbon sinks and/ or carbon credits,”^{xiv}. The phrase has been previously used in the aviation industry whereby, in September 2021, British Airways reported a carbon neutral flight (BA1476 from London Heathrow to Glasgow Airport) completed by powering their aircraft with sustainable aviation fuel (SAF), with 38% of emissions offset using high quality, verified carbon offsets^{xv}.

However, the aviation industry’s approach to carbon offsetting is subject to scrutiny. In the same year, a joint *Unearthed* investigation by The Guardian newspaper and Greenpeace highlighted perceived problems with the calculation (additionality) of carbon savings generated by VERs purchased by the aviation industry. Issues with the carbon credit generating projects (e.g., conflicts of interest with logging companies reported to have cut down ancient and rare trees) were also highlighted.^{xvi}

Projects investigated in the *Unearthed* report were certified by Verra, which disputed the findings of the investigation. Notwithstanding, the case study highlights that purchasing carbon credits from an established CSSB does not mean buyers are immune to adverse media and associated reputational risks. Therefore, prior to purchase, prudent buyers may wish to complete their own additionality and KYC checks (for more on this, see Section 10).

Thereafter, following the purchase of carbon credits, our market sources stressed the importance of communicating with clarity around offsetting projects. Useful information for inclusion (which is often missing from media announcements) could include:

- Name of project from which carbon credits have been acquired
- Country/ region of project
- Number of carbon credits purchased
- Year carbon credits are created
- Type of credit (reduction/removal)
- Carbon Standard-Setting Body (CSSB)
- Project description
- Name of the activity offset
- Rationale behind offsetting activity and details of credit retirement (if applicable).

7. How are voluntary carbon credits priced?

Price discovery can be challenging for prospective buyers and sellers of carbon credits in the VCM. Currently, there are no consistent available indicators to determine how the price of carbon credits sold in the voluntary market are determined or the role of price in influencing the quality of the offset purchased. Although, broadly speaking, key aspects that influence the price of carbon in the VCM include project category and type, project location, CSSB, vintage (the year in which emissions reductions occur), co-benefits, as well as supply and demand characteristics and the transaction size. Of these factors, transaction size could be particularly relevant to shipping industry players, where transaction volumes are typically low and restricted to purchasing carbon credits to offset a specific voyage or bunker delivery. Data from Ecosystem Marketplace Global Carbon Hub, which allows VCM participants to voluntarily disclose confidential details of their carbon credit trades, shows that the weighted average price per tonne for transactions less than 10,000 tCO₂e was close to USD 7 per tonne, whereas 100,000+ tonne deals averaged USD 2.68 per tonne in 2020 and USD 3.59 per tonne in 2021 (through August).^{ix} The linkage between higher volumes and lower costs per tonne of carbon was confirmed by market feedback in the bunkering sector.

Transaction size aside, multiple sources have stated that the price of Gold Standard carbon credits is currently between USD 5 and USD 10 per tonne. Current estimated prices of voluntary carbon credits on the CME Exchange are listed in Figure 3.

Potential sellers looking to establish their assets as carbon credit generating projects (for example a ship owner considering the use of the Methodology for Retrofit Energy Efficiency Measures in Shipping), should undertake appropriate due diligence to verify the veracity of claims related to the potential earnings a ship/fleet could achieve through the generation and sale of carbon credits. Market feedback has revealed examples of conflation between compliance carbon markets and the VCM. This conflation could lead to a dramatic over-estimation in potential earnings since carbon trades at a substantially higher price in compliance markets (currently over USD 65 per tonne in the EU ETS, versus an estimated USD 5-10 per tonne for Gold Standard Carbon Credits in the VCM).

Potential sellers looking to establish their assets as carbon credit generating projects (for example a ship owner considering the use of the Methodology for Retrofit Energy Efficiency Measures in Shipping), should undertake appropriate due diligence to verify the veracity of claims related to the potential earnings a ship/fleet could achieve through the generation and sale of carbon credits.

8. Shipping entities as project developers – generating and selling carbon credits:

The Gold Standard has an approved carbon offset methodology that enables eligible ship owners (or an appointed third party) to generate carbon credits following the recent installation of one or more energy efficiency retrofits. The methodology, named “Methodology for Retrofit Energy Efficiency Measures in Shipping”, was published in 2017



and builds on and expands the first methodology for shipping (“Reducing vessel emissions through the use of advanced hull coatings”) published in 2012.

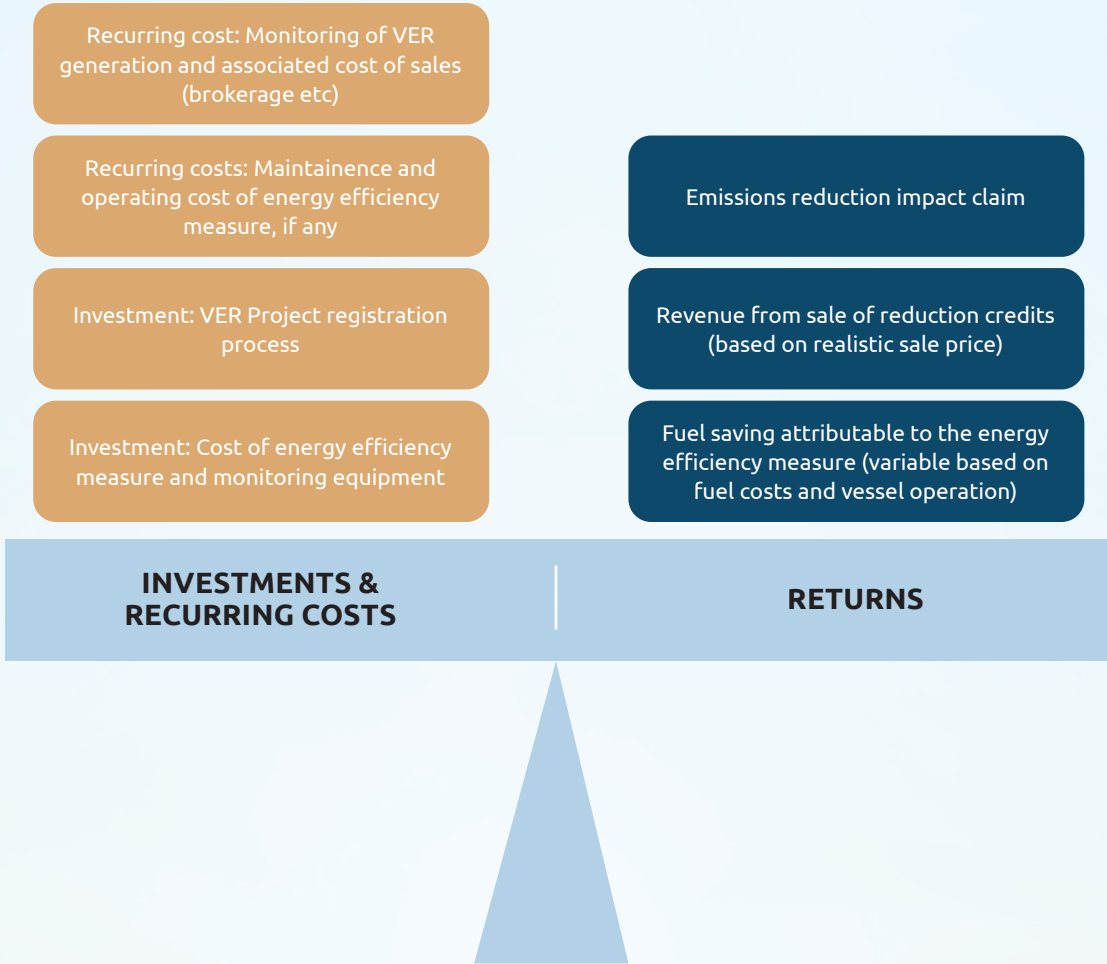
Figure 4: Past and current methodologies to generate carbon credits from ships/fleets:

Methodology name	Methodology for retrofit energy efficiency measures in shipping	Reducing vessel emissions through the use of advanced hull coatings (version two)
Carbon Standard-Setting Body	The Gold Standard	The Gold Standard
Methodology Developer	The FReMCo Corporation Inc. Carbon War Room Grütter Consulting	MGM Innova Group The FReMCo Corporation Inc. International Paint Ltd.
Status	ACTIVE Projects with methodology underway, but credits yet to be issued	WITHDRAWN Advanced hull coatings are included in the “Methodology for retrofit energy efficiency measures in shipping”, which follows similar principles and approaches (although users should check new requirements and approaches)
Description	Builds on and expands the original methodology (Reducing vessel emissions through the use of advanced hull coatings) Allows ship owners (or third party) to apply for carbon credits if they have made one or more retrofits	Allows ship owners (or third party) to generate carbon credits by applying an advanced low-resistance hull coating instead of the traditional, baseline coating. The advanced coating keeps the hull cleaner and reduces hydrodynamic resistance, compared to the traditional coating, thus reducing fuel consumption for ship propulsion
Publication Date	2017 (revised version published in 2021 incorporating a new Annex*)	2012 (revised version published in 2014)
Project developer	Typically ship owner (due to commercial sensitivities regarding data sharing) However, there are no restrictions, meaning a third party could be contracted as an aggregation entity	Ship owners/operators when claiming for a large fleet For smaller fleets/single ships, the coating manufacturer acts as an aggregation entity
Ships applicable	Not applicable to new ships Applicable to all other ships subject to eligibility criteria and conditions within the methodology*	Not applicable to new ships Other restrictions related to hull cleaning and engine overhaul and replacement, use of biofuels
Technology applicable	30 retrofits included Project developer can apply for new retrofits to be included with substantiating documentation of the technology benefits Retrofits can be added in any combination, offering broader applicability to participants	Advanced hull coatings
Crediting Period	Five years (with the option to renew for an additional five years; subject to eligibility requirements)	N/A (the scheme has been withdrawn)
Buyers	TBC – first credits likely to be issued for sale in early 2023	Reported to be a number of private companies operating in the fishing, aviation and yachting sectors with the desire to meet carbon neutrality claims

*The retrofit energy efficiency measures in shipping methodology also includes an Annex that provides an alternative method (“The SDGL Model”) to monitor and calculate baseline emissions and project fuel consumption and fuel consumption savings. Those considering the use of this SDGL Model alternative method should look into whether they have the correct measuring equipment installed on their vessel/fleets to enable the use of this monitoring and calculation method. Furthermore, ships using this SDGL Model alternative method require a speed trial, during which the engine power is measured while the ship operates at a range of speeds. The service is understood to be performed by a third party, which certifies the results. As such, additional costs could be required.

Regulatory risks notwithstanding, in today's fuel inflationary context, it is likely that the cost and emissions reductions delivered by energy efficiency retrofits will continue to support an attractive investment case, with commercial value from carbon credits an additional and complementary benefit. Project developers looking to participate in this market should consider an integrated approach to payback calculations, considerations for which are detailed below in Figure 5.

Figure 5: Payback calculation considerations for shipping VCM project registration



Shipping methodology, current interest levels, and future developments

Any entity wishing to offset emissions from the transportation of goods can buy any type of carbon credits, so long as the number of credits purchased equals the tonnes of emissions that require offsetting. Sources suggest that non-shipping companies under pressure to reduce emissions derived from the sea and air transportation of their goods may find the co-benefits associated with so-called transportation credits to be particularly attractive. This is particularly the case for logistics firms and large soft commodity traders; with a large portion of their emissions derived from transportation, these entities may perceive the purchase of so-called transportation credits as a tangible way to link their brands with efforts to improve energy efficiency within their supply chains. Feedback from multiple market sources has shown that demand for carbon credits derived from shipping currently outstrips supply, with limited credits available until the first units generated under the new methodology are issued for sale (in late 2022 – early 2023, according to current estimates).

In terms of future developments, those considering establishing a ship/fleet as a carbon credit generating project should consider whether their ship/fleet's ability to generate carbon credits could be impacted by future regulations relating to fuel efficiency or CO₂ emissions from shipping.

Regulations that might affect a vessel/fleet's ability to achieve carbon emissions savings over and above those that would have occurred as a result of regulations include:

IMO Carbon Intensity Indicator (CII)

CII comes into effect on 1 January 2023, with the first ratings (A to E) expected in March 2024. The IMO has made its vessel performance expectations clear (ships rated D or E for three consecutive years will need to submit a corrective action plan to show how the required index rating (C or above) will be obtained). However, from a carbon credit generating perspective, market sources indicate that uncertainty remains with regards to where regulatory compliance ends, and additionality begins.

EU ETS

There are many open issues around shipping's inclusion within EU ETS and the specifics thereof (see Appendix 1). Until the sector's inclusion is ratified, it will not be possible to assess the precise impact of the regulation on carbon credit generating projects. However, project developers may find that certain voyages would not be eligible to claim voluntary carbon credits, or be limited to regulatory surplus only. Split incentives between ship owners (likely project developers) and charterers (whose route could reduce/eliminate additionality if sailing in EU ETS areas) will also need to be addressed.



9. Voluntary Carbon Market Proponents and Opponents

While maturing, the VCM can be a source of polarised debate, both within the shipping industry and across wider business, financial, academic and NGO circles.

Proponents of the VCM believe carbon offsetting can make a significant, measurable and positive contribution to the goals of The Paris Agreement, while delivering co-benefits in support of the UN SDGs. By purchasing carbon credits, participants can also reduce the overall cost of achieving a given emissions goal, while directing private finance into climate mitigation at speed and scale.

In the shipping industry, the VCM broadly offers a route for market participants to catalyse the environmental action that's increasingly being demanded by their customers who, in turn, must demonstrate to their stakeholders the efforts they have taken to reduce global supply chain emissions. When it comes to specific market players, several organisations that are vocal on the topic appear to share the views of the Taskforce on Scaling Voluntary Carbon Markets, which states that offsets will play an important role in a transitional phase in sectors where technological limitations mean total emissions reduction is not yet possible^x. In the ship-owning community, for example, a proponent of carbon offsetting stated an expectation that some of the global fleet will still use fossil fuels during the transition to zero-emissions fuels and, therefore, these ships will require offsets to reduce their GHG emissions to net-zero^{xi}. Elsewhere in the tanker segment, the approach is perceived as a bridging strategy that can make an immediate and meaningful contribution to efforts to reduce cumulative emissions in the atmosphere, while the industry pursues efforts to reduce its actual emissions^{xii}. Views in the chartering sector differ to an extent, with market feedback suggesting that offsetting may have a role to play in future, but, in the meantime, the focus should remain on physical solutions that reduce the carbon footprint of ships.

Opponents of the VCM are largely concerned with the potential for offsets to pose a risk to the environmental integrity of climate actions, causing potential delays to investment and innovations in lower-emitting technologies, while also risking a scenario where higher emissions infrastructures are locked in. Within the academic community, readers with knowledge of the shipping industry suggest that carbon offsetting will become obsolete because the industry can become completely carbon free, and to suggest otherwise "erroneously suggests that the International Maritime Organization regulation will neither enforce the agency's intent nor spur innovation to decarbonise maritime". While industry commentators suggest carbon offsetting could be used as a "get out of jail card: a way to continue the use of fossil fuels on vessels"^{xiii}.



10. Recent developments and future considerations

Shipping industry players looking to engage with the VCM should consider their participation in the context of broader international climate mitigation efforts stemming from The Paris Agreement, The IMO's evolving GHG Strategy and the changes that could come to bear in the market as voluntary and mandatory efforts grow and mature in line with the latest climate science.

Evolving regulations in the shipping industry could influence market players' strategic approach to decarbonisation, including their ability to finance voluntary and mandatory climate mitigation measures. Revisions to the IMO's GHG Strategy due at MEPC 80 in July 2023 could have a substantial impact, with potential new market-based measures such as full decarbonisation by 2050, an IMO-led emissions cap-and-trade system and levy systems (absolute well-to-wake emissions, absolute tank-to-wake emissions and CII performance) all adding new risk exposures and opportunities. Although purchase volumes of voluntary carbon credits are currently low in the shipping industry, those with ambitions to scale up purchases in line with growing calls for climate action should be aware that their long-term purchasing power may be curtailed by the need to finance more ambitious IMO requirements and regional regulatory interventions such as the likely inclusion of shipping within the EU ETS.

New developments in the international carbon compliance markets and their potential influence on the VCM also create further uncertainty. Article 6 of the Paris Agreement, agreed at the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow, establishes a new international carbon market where governments that are members of The Paris Agreement will purchase carbon credits to meet emissions reduction commitments within their Nationally Determined Contributions (NDCs). This market is yet to be operationalised and remains subject to international policy negotiations. Market feedback from a seasoned carbon trader with experience of studying and investigating this potential new market emphasised its complexities, acknowledging that changes to the VCM are likely, although it will take time to fully ascertain the extent and nature of the impact. Moving forward, buyers in the VCM should ensure they understand and comply with any future regulation or guidance in place that may require credits purchased for offsetting purposes to be correspondingly adjusted³ to prevent double-counting in the pursuit of international climate goals. Retailers buying and reselling carbon credits may also need to be aware of their buyers' intended use of the credits, and ensure corresponding adjustments are applied if required where the goal of the purchase is to offset emissions. At present, with negotiations ongoing, any potential price differential between carbon credits that are/are not correspondingly adjusted remains to be seen.

As the regulatory landscape continues to mature and evolve, market participants face more immediate issues in navigating the lack of transparency in the VCM, which presents a significant risk even to those buying and selling in low volumes.

A robust evaluation of underlying assumptions such as payback calculations for sellers and counterparty risks related to ownership, sanctions, reputational factors, and competence/track record for buyers, can minimise some of the risks inherent in the market.

³ A corresponding adjustment means that the "host" country, or the country where the carbon project is located, must first authorise the transfer and then adjust its own greenhouse gas inventory to reflect the fact that the emission reduction achieved inside its borders is being credited to another country. The buying country then adjusts its greenhouse gas inventory by the same amount.

Due Diligence Checks for Voluntary Carbon Market Participants

To successfully navigate risks and seize opportunities within the Voluntary Carbon Market (VCM), prudent participants should undertake robust due diligence that provides a verifiable assessment of counterparties and other stakeholders, including their remit and standing within this fragmented and evolving market.

Recommended checks and relevant participants in the VCM ecosystem include:

Market Participants	Recommended due diligence checks
<ul style="list-style-type: none"> • Project developer • Project consultants • Validation and Verification Bodies (VVB) • Carbon Standard-Setting Body (CSSB) • Broker • Retailer • Buyer • Seller 	<ul style="list-style-type: none"> • Legal identity • Ultimate beneficial owners and/or persons with significant control • Shareholders • Directors • Sanctions • Contractual remit • Adverse media

In addition, specific market players may consider the following points in more detail:

Buyers

- Project developer risks (sanctions risks and reputational risks covering conflicts of interest, ultimate beneficial owner and adverse media)
- Project risks such as those that are vulnerable to claims of real and perceived non-additionality, project start date, project vintage, and unintended adverse impact (breach of human rights of local populations etc.,) leading to adverse media
- Transparency of offsetting claims to reduce risk of greenwashing (UNFCCC certified, retirement of credits, clear and sufficiently detailed communication to stakeholders)
- Competency and track record of an intermediary such as a retailer or broker and structure of their offering (including additional costs incurred by buyers)
- Ability to finance medium-to-long term offsetting strategies amid the costs associated with increasingly stringent environmental regulations in shipping
- Reliability of a desired carbon credit supply (i.e. transportation credit, blue carbon credit, etc.)
- Compatibility of carbon credit futures on the CME Exchange or any other VCM exchange under development.

Sellers:

- Regulatory risks and their impact on a ship/fleet's ability to generate carbon credits
- Accuracy of payback calculations (overinflated VCM prices, conflation with EU ETS, full disclosure of financial and managerial commitments)
- Competency and track record of project advisors/consultants
- Operational risks related to retrofit measures that underwrite carbon credit generation.

Retrofit energy efficiency technology providers:

- Risk profile of their counterparties (ship owners and operators and, on occasion, charterers) that takes in the unique operating and payment characteristics of the shipping industry.

Among the plethora of open issues are high market fragmentation, a lack of regulatory oversight and pricing transparency, as well as concerns over integrity including the lack of a common definition of a high-quality carbon credit. Efforts are underway at an international level to address these areas, but the complex network of stakeholders engaged in this market may lengthen the time it takes to achieve meaningful progress and clarity. In the meantime, a robust evaluation of underlying assumptions such as payback calculations for sellers and counterparty risks related to ownership, sanctions, reputational factors, and competence/track record for buyers, can minimise some of the risks inherent in the market. This is particularly important amid a perceived lack of VCM experience within the sector. Indeed, with experienced carbon market traders (circa five to seven years) now scarce and expensive, many market players are opting to transfer incumbent executives into new roles, an approach which could leave market players exposed in a market that's both fast-moving and volatile.

Of the many questions surrounding the VCM, perhaps one of the most important and challenging to answer is the ultimate success of the market in combating climate change and its effects. It could take many years to understand whether the purchase of voluntary carbon credits spurs climate mitigation (as per the aims of the methodology for retrofit energy efficiency measures in shipping) or disincentives it, by creating a route to offset emissions while high emissions infrastructure remains locked in. The answer could depend on how market players interact with the VCM; whether their motivations for buying and selling are disclosed transparently, and to what extent they are challenged by environmentally-conscious stakeholders, amid energy price volatility and inflationary pressures that are changing priorities and perceptions. Developments underway in defining best practice in the market may go some way to creating a framework that enables market participants to devise and report on an offsetting strategy that makes a significant, measurable and positive contribution to achieving goals of The Paris Agreement. However, even this approach is likely to require constant re-evaluation between now and the mid-century point, as regulatory interventions and new abatement solutions continually prompt a reassessment of voluntary carbon credits and their ultimate role within global decarbonisation.



11. Appendices

APPENDIX 1

European Union Emissions Trading System (EU ETS)

What is the difference between carbon offsets and emission allowances (EUAs)? If shipping is included in the revised European Union Emissions Trading System (EU ETS), can both be used as a compliance mechanism?

The likely future inclusion of shipping within the revised European Union Emissions Trading System (EU ETS) Directive under Phase 4 (2021-2030) has prompted questions from some market players regarding the possibility of purchasing suitable emissions credits now and surrendering them against shipping emissions in the future.

While there are many open issues around shipping's inclusion within EU ETS and the specifics thereof, current thinking suggests that Emissions Allowances or EUAs, which are the tradeable emissions credits from EU ETS, are expected to be fungible with shipping allowances. This means any EUAs purchased now could, in theory, be surrendered in later years.

However, it is important to note that VERs have never been eligible for trading within the EU ETS. This is due to concerns over a lack of transparency and control exercised over the market. In previous phases, participants were permitted to use international carbon credits towards fulfilling their obligations under EU ETS, subject to certain restrictions. This approach was aimed at allowing participants/buyers to invest in emissions reduction projects in developing countries as an alternative to more expensive reduction measures in their own countries. Two of the key international carbon credit mechanisms established under the Kyoto Protocol are the Clean Development Mechanism (CDM), which creates Certified Emissions Reductions (CERs) and the Joint Implementation (JI), creates Emissions Reduction Units (ERUs). However, under EU ETS Phase 4, international carbon credits will no longer be an acceptable compliance mechanism.

APPENDIX 2: A comparison between the Voluntary Carbon Market and other key carbon markets

Name of credits	Mechanisms	Buyers	Motivations
VOLUNTARY CARBON MARKET			
<p>Voluntary Emissions Reductions/ Verified Emissions Reductions (VER)</p>	<p>Various independent Carbon Standard-Setting Bodies, including: The American Carbon Registry, Climate Action Reserve, the Verified Carbon Standard from Verra, Plan Vivo and the Global Carbon Council</p>	<p>Individuals and businesses Financial institutions (on behalf of corporate buyers) Traders and investors</p>	<p>To meet internal voluntary targets or commitments Value-added offering to provide to clients that have pledged a net-zero target, and/or other climate action</p>
INTERNATIONAL COMPLIANCE CARBON MARKET – PRE THE PARIS AGREEMENT (STATUS – ACTIVE)			
<p>CDM credits: Certified Emissions Reductions (CERs) Joint Implementation credits: Emissions Reduction Unit (ERUs)</p>	<p>Clean Development Mechanism (CDM) Joint Implementation (JI)</p>	<p>CDM: for trading emissions from developing countries (with no emissions targets or caps) JI: for trading emissions between developed countries (with emissions targets or caps) Other entities may use/ retire them under voluntary offset programs (including CORSIA – see below)</p>	<p>Meeting emissions reduction commitments under the Kyoto Protocol CERs transferrable for the The Paris Agreement Article 6.4 Mechanism for a limited time – see below Recent updates: Following COP26, CERs can still be used for voluntary purposes However, CERs already issued under the CDM may only be used towards NDCs (see below) if: The Project was registered after 2012 (2013–2020 = Kyoto Protocol second commitment period) CERs are transferred from the CDM registry to the 6.4 mechanism registry and identified as pre-2021 emission reductions CERs may only be used towards the achievement of the first NDC only</p>

continues >

Name of credits	Mechanisms	Buyers	Motivations
INTERNATIONAL COMPLIANCE CARBON MARKET – THE PARIS AGREEMENT ARTICLE 6.4 MECHANISM (STATUS – UNDER DEVELOPMENT)			
<p>Internationally Transferred Mitigation Outcomes (ITMOS)</p> <p>A revised version of international trading that builds upon the existing CDM/JI</p>	<p>Under Article 6.4 of The Paris Agreement Implementation Guidelines, a new UN crediting mechanism has been established, which will operate in a broadly similar way to the CDM</p> <p>However, a full transition could be years away, with most countries still developing and refining administrative, transparency and accounting practices</p>	<p>Member countries of The Paris Agreement, or official buyers working on their behalf. For example, KfW Foundation on behalf of the Swiss government</p>	<p>Meeting emissions reduction commitments under the Paris Agreement; integrated within participating countries' NDCs and supporting the mitigation of global emissions</p>
CARBON OFFSETTING AND REDUCTION SCHEME FOR INTERNATIONAL AVIATION (CORSA)			
<p>CORSIA Eligible Emissions Units</p>	<p>Various. A full list of CORSIA eligible emissions units is published on the International Civil Aviation Organization website.</p> <p>Currently approved programmes (March 2022) are**:</p> <ul style="list-style-type: none"> American Carbon Registry (ACR) Architecture for REDD+ Transactions (ART) China GHG Voluntary Emission Reduction Program Clean Development Mechanism (CDM) Climate Action Reserve (CAR) Global Carbon Council (GCC) The Gold Standard (GS) Verified Carbon Standard (VCS) <p><i>**Eligibility timeframe, unit dates and scope applies.</i></p>	<p>Aeroplane operators of ICAO Member States Participating in CORSIA</p> <p>The project's pilot phase (2021-2023) and first phase (2024 to 2026) is voluntary</p>	<p>For CORSIA participating operators to meet voluntary compliance commitments</p> <p>For the second phase from 2027, all States with an individual share of international aviation activity in year 2018 above 0.5% of total activity or whose cumulative share reaches 90% of total activity, are included. Least Developed Countries, Small Island Developing States and Landlocked Developing Countries are exempt unless they volunteer to participate^{xviii}</p>
COMPLIANCE MARKET - EUROPEAN UNION EMISSIONS TRADING SYSTEM			
<p>Emissions Allowances (EUAs)</p>	<p>The purchase and surrender of EUAs</p>	<p>Public or private entities within the jurisdiction of the EU ETS.</p> <p>Likely to include shipping in the future</p>	<p>Regulatory compliance</p>



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