

ZEMBA RFP 2 Eligible Fuel Requirements

3 April 2025

Introduction

This document includes information on ZEMBA Eligible fuel requirements for ZEMBA's second RFP. ZEMBA Eligible fuels must be used for a vessel's primary propulsion during the generation of the Sustainable Maritime Fuel Certificates (SMFc) offered under the RFP. ZEMBA may choose to adjust this definition for future RFPs as the market for alternative maritime fuels grows and more options become available.

Emissions Reduction Threshold

The RFP defines ZEMBA Eligible fuels for this tender as:

Fuels that achieve Well-to-Wake (WtW) greenhouse gas (GHG, including CO₂, CH₄ and N₂O) emission reductions equal to or greater than 90% when compared to the reference fuel, expressed as grams CO₂e per unit energy of the fuel.

Requirements for determining conformance with this threshold are as follows:

1. Calculation of WtW GHG emissions of ZEMBA Eligible fuels must be based on a Life Cycle Analysis (LCA) approach¹, as described in the ZEMBA RFP 2 Emission Intensity Calculation Requirements.
2. The reference fuel WtW emission factor is 91.6 g CO₂e / MJ (LCV = 40,500 kJ / kg)². Thus, the maximum carbon intensity for all ZEMBA Eligible fuels will be **9.16 g CO₂e / MJ**.
3. Geological sequestration of CO₂ captured at a processing unit in the supply chain processing the fuel's raw materials and finished fuel products can be deducted from the WtW emission factor of the finished fuel up to a net emission factor value of zero, as long as all other fuel requirements are met.
4. Emissions from fuel transportation and distribution must be included in the total WtW emission factor, as well as in disaggregated form.

¹ Emission factors must be based on 100-year Global Warming Potential (GWP 100) and be expressed in CO₂ equivalent units in accordance with the 5th Assessment Report of the Intergovernmental Panel on Climate Change. ZEMBA may take an additional step in bid evaluation of considering 20-year Global Warming Potential (GWP 20) in scenarios where it is deemed appropriate (e.g., in the context of an e-methane focused proposal).

² See Annex II in Regulation (EU) 2023/1805 of the European Parliament and of the Council, available at <https://eur-lex.europa.eu/eli/reg/2023/1805>. This emission factor is based on a reference fuel of Heavy Fuel Oil (HFO) (Grades RME to RMK based on ISO 8217).

Certification

ZEMBA Eligible fuels must carry a relevant sustainability certification along the full supply chain from an independent certification body accredited to one of the following sustainability standard³ holders:

1. Roundtable on Sustainable Biomaterials (RSB)
2. International Sustainability and Carbon Certification (ISCC)
3. Another standard holder recognized by the European Commission.

Fuel Pathway

ZEMBA Eligible fuels must be e-fuels, defined as fuels produced through a power-to-liquids fuel pathway, according to the following requirements:

1. The fuel's primary energy carrier must be hydrogen produced through electrolysis powered by grid electricity⁴ or renewable electricity.
2. The renewable electricity supplied for electrolysis must be a non-fossil, low-carbon energy source meeting all of the following criteria:
 - a. Market Boundary – The electricity must be supplied through direct connection, virtual power purchase agreement (VPPA), or Renewable Energy Certificate (REC)⁵, from a generating facility within the same market boundary, defined by RE100 technical criteria⁶, as the ZEMBA Eligible fuel production facility.
 - b. Incrementality – The electricity generation facility must come into operation no earlier than 36 months before the ZEMBA Eligible fuel production facility comes into operation.
 - c. Time Matching – Any electricity supplied through VPPAs and RECs must be generated within one calendar year of consumption of electricity to generate the fuel at the fuel production facility.
3. Carbon used as a feedstock may be sourced from direct air capture, waste-based biogenic sources⁷, or unavoidable emissions from industrial point sources, specifically excluding fossil-

³ Example standards include ISCC EU, RED-cert EU, CertifHy, ISCC Plus, and RSB Global. If in doubt, please contact ZEMBA to confirm whether a fuel sustainability certification meets this criterion.

⁴ When using grid electricity for fuel production, the utility mix of the delivered electricity must be sufficiently renewable for the ZEMBA Eligible fuel to meet the Emissions Reduction Threshold described in these requirements.

⁵ Or equivalent electricity attribute certificate such as a Guarantee of Origin (GOO).

⁶ RE100 Technical Criteria available at <https://www.there100.org/technical-guidance>.

⁷ ZEMBA currently aligns with the International Civil Aviation Organization (ICAO) Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) feedstock categories, available at https://www.icao.int/environmental-protection/Pages/SAF_Feedstocks.aspx. For the purposes of ZEMBA's tender, feedstocks designated by CORSIA as waste, residues, or by-products will be considered waste-based biogenic sources.

fueled electricity generation facilities and fossil fuel production or refining facilities⁸. If carbon feedstock is sourced from waste-based biogenic sources or industrial point sources, the source facility may not also claim emission reductions for the feedstock.

Scalability

ZEMBA Eligible fuels must be sufficiently scalable to make a meaningful contribution to the decarbonization of the maritime shipping industry as determined by ZEMBA.

For e-fuels, the primary scalability concerns are the provision of adequate renewable energy and the source of carbon used as a feedstock for those fuels for which carbon is necessary. Safeguards to ensure the scalable production of renewable energy for the purposes of ZEMBA Eligible fuel production have been applied in the fuel pathway requirements. In addition, ZEMBA Eligible fuel suppliers must demonstrate the long-term scalability of feedstock source, and if applicable, their plans to transition to more scalable sources of carbon.

Fuel Deployment and Fuel Use Disclosure

Requirements for Principal Fuels in Main Engines

The fuel, excluding pilot fuel, used in a vessel's main propulsion engine(s) must meet all of the emission reduction, pathway, certification, and scalability requirements listed in this document.

Requirements for Fuels in Auxiliary Engines

The fuel used in a vessel's auxiliary engines, (e.g., fuel used in diesel generators for electricity generation) do not need to meet the emission reduction, pathway, and scalability requirements for ZEMBA Eligible fuels, but bidders are strongly encouraged to consider low-emission fuels for auxiliary engines where feasible.

Requirements for Pilot Fuels in Main Engines

Pilot fuels used in a vessel's main propulsion engine(s) are not required to meet the emission reduction, pathway, and scalability requirements for ZEMBA Eligible fuels, but bidders are strongly encouraged to consider low-emissions pilot fuels where feasible.

Pilot fuel used in a vessel's main propulsion engine(s) may not exceed 10% (for fuels other than e-ammonia, and 20% for e-ammonia) of the total energy content of all fuel consumed in a vessel's main

⁸ ZEMBA considers "unavoidable emissions" in this context to be those emissions resulting from industrial processes not related to the combustion or production of fossil fuel that would otherwise be infeasible to replace with a low- or zero-emission alternative before 2027. Qualification as "unavoidable" will be evaluated by ZEMBA on a case-by-case basis. ZEMBA also acknowledges medium- to long-term scalability concerns associated with industrial carbon capture. Accordingly, ZEMBA has limited the eligible sources of carbon to industrial facilities in hard-to-abate sectors to be assessed on a case-by-case basis. Proposals for fuels utilizing carbon captured from waste-based biogenic sources or direct air capture will generally be evaluated preferentially on the sustainability qualities of the bid over those sourcing carbon captured from industrial sources.

propulsion engine(s) during the generation of SMFc across a verification period. This cap on pilot fuel consumption applies to the span of the entire seagoing (versus at port) portion of a voyage.⁹

Disclosure of Information about Fuel Usage

Emissions information for pilot fuel and fuel used for auxiliary power must be submitted in disaggregated form. Emissions from fuel used for auxiliary power and pilot fuel will still be considered in the overall transportation service emissions profile as described in the ZEMBA RFP 2 Emission Intensity Calculation Requirements. Use of lower carbon alternatives to fossil fuels will result in a lower transportation service emissions profile and will be reflected in the evaluation of proposals.

⁹ For further information, see the *ZEMBA RFP 2 Emission Intensity Calculation Requirements*, available at <https://shipzemba.org/rfp2-zemba-emission-intensity-calculation-requirements>.