

Caribbean RoPAC

Decarbonisation Driving Short Sea Packet Shipping under 500 GT

Connecting Barbados and Trinidad with the Southeastern Caribbean and Beyond

The case for Alpha Zulu RoPAC

Champion Maritime Limited | Draft discussion | 12 September 2026

Champion Maritime Limited of Barbados, the author of this discussion note, is the developer and builder of, and is sourcing funding for, the Alpha Zulu RoPAC demonstrator described in this brief.

Projected common freight assumptions for Cabo Star, Galleons Passage and Alpha Zulu: US\$3,000 per TEU per chargeable leg; 1 TEU = 20 standard pallets; US\$150 per pallet-leg. The pallet conversion is a commercial planning assumption, subject to actual stowage.

The policy proposition

CARICOM should establish Caribbean **RoPAC** as a programme of dependable scheduled short sea cargo services using vessels under 500 GT, with the Southeastern Caribbean, Barbados and Trinidad as its initial focus and connections to Guyana and markets beyond. Maritime decarbonisation should support investment in a modern, regionally owned fleet. Alpha Zulu **RoPAC** should be advanced as a demonstration vessel, with further construction tied to independently verified operating performance and contracted cargo demand.

The sea is the Caribbean's natural highway. Its economic value depends on services that connect producers and buyers on dates they can plan around. A farmer needs to know when produce will leave, when it will arrive, what carriage will cost and whether its quality will be preserved. A published timetable, supported by reliable vessels and functioning port arrangements, turns geographical proximity into a usable market.

CARICOM has now created the opening this brief addresses. At the 51st Regular Meeting of the Conference of Heads of Government in Saint Lucia, concluded on 8 July 2026, Heads agreed to advance a pilot regional ferry service using a vessel offered by the Government of Trinidad and Tobago as an interim measure, while the private sector finalises a permanent regional ferry service, and set a September 2026 deadline for the enabling regulatory framework covering mutual recognition of insurance, licences and road taxes. Prime Minister Mottley, holding CSME responsibility, identified reducing the cost of intra-regional cargo as the central objective, with an initial focus on southern and eastern Caribbean ports, and a trial was signalled within months. Alpha Zulu **RoPAC** is proposed as a candidate for the permanent, privately delivered service the Heads have requested; the political commitment is not yet a contracted service. [14]

Decarbonisation can change the cost structure of that service. Wind propulsion and electric assistance can reduce exposure to imported marine fuel, while investment in vessels, maintenance and crew skills can retain more transport expenditure within the Community. These benefits depend on a complete energy budget, affordable capital and the ability to keep the timetable. Zero onboard fossil-fuel use does not mean zero operating cost.

What the supplied evidence supports

The references establish a persistent mismatch between small regional consignments and the services available to carry them. They also demonstrate why vessel size, directional cargo balance, port costs and scheduling must be assessed together. They support testing the Alpha Zulu proposition; they do not yet establish a bankable fleet investment. [1–6]

On a common 1,300-nautical-mile comparison loop, recalculated study assumptions indicate approximately **36,400 tonnes** of annual CO₂ for Cabo Star and **15,200 tonnes** for Galleons Passage, at 52 round trips. Cabo

Star's study charter allowance is US\$20,000 per day, or US\$140,000 per week. The attached brochure contains lower fuel-consumption figures, examined in the annex. [3, 4, 8]

For Alpha Zulu, the projected US\$150 per pallet-leg assumption gives charter-inclusive cash break-even of 183–200 paid pallet-legs per vessel-week during an assumed port waiver. These are conditional results, with a materially weaker return-load case on the direct Guyana–Trinidad shuttle. [4]

The immediate decision is to fund a bounded demonstration and its enabling port and market arrangements, with a named delivery lead and measurable conditions for expansion. The proposed European maritime decarbonisation support discussed below gives CARICOM a further reason to prepare a coordinated investment case.

The evidence and the case for a packet service

The small shipment market already exists

The Association of Caribbean States describes the schooner sector as an important carrier of small parcels, break-bulk cargo and local produce. It identifies fragmented marketing, weak coordination and limited public support as constraints. Its account of the West Indies Shipping Company also shows that connectivity can expand trade while still requiring financial support. These are historical findings, not a current market census. [2, pp. 2–4]

The 2018 IDB study found that many inter-island shipments were too small to fill a container. It also found substantial existing shipping capacity and warned that additional tonnage could harm incumbent operators. Both findings matter: aggregate capacity does not establish that a small shipper can obtain an affordable, timely service on the required route. Equally, a new vessel does not establish new demand. [1, pp. 10–15]

The earlier studies leave a specific question to test

The IDB study recommended further consideration of south-to-north service reconfiguration and lower handling tariffs for less-than-container-load cargo. It did not recommend its vehicle-carrying ferry scenario. In Appendix F, it considered sail attractive for reducing cost but unsuitable for predictable schedules, while recommending further exploration of the schooner sector. [1, pp. 118, 160–161]

Alpha Zulu's proposition addresses that unresolved question: can a purpose-built, wind-primary vessel with electric assistance provide a dependable commercial timetable at a lower cash requirement? The answer requires measured performance. The 2018 assessment did not demonstrate such a service; nor does it settle the performance of a new design.

Beharry's Cabo Star study finds conditional financial feasibility for a larger Guyana–Trinidad–Barbados service. Applying this brief's projected US\$3,000 per TEU to its assumed 22,000 chargeable TEUs annually gives US\$66 million gross revenue. At that volume, the retained cost model rises from US\$24.60 million to US\$25.59 million because the stated 3% agency commission increases. These are recalculated scenarios, not the study's published revenue forecast or secured demand. Its cargo and timetable assumptions require reconciliation. [3, pp. 12–15]

The service that Caribbean RoPAC should provide

The initial product should be a weekly cargo service with bookable small consignments, published through-rates, temperature-controlled carriage and coordinated onward connections. Commercial obligations should specify departure and arrival windows, cargo cut-offs, cancellation arrangements and responsibility for spoilage or missed transfers.

Alpha Zulu **RoPAC**, meaning roll-on palletised cargo, is proposed as a smaller vessel adapted to this task. The six-route model assumes 120 standard pallets per sailing leg, including double stacking, and wind-primary propulsion with electric assistance. Certified stowage, payload, securing and refrigerated capacity must substantiate that commercial capacity. The under-500-GT focus should follow the economics of small markets; it does not remove safety and environmental obligations. [4, 5]

The accompanying strategic memorandum explains how dependable transport and credible purchase commitments could encourage production. That mechanism is persuasive, but its illustrative fleet counts and agricultural-surplus estimates are planning scenarios. Shipping must be joined to buyers, working capital, quality control and farm logistics; production gains are not automatic. [6]

Cabo Star and Galleons Passage compared with Alpha Zulu

For fuel and emissions, both conventional vessels are placed on the same assumed Guyana–Trinidad–Barbados–Trinidad–Guyana loop: 1,300 nautical miles, four arrival calls of 12 hours each and 52 round trips annually. This adopts the Cabo Star study’s route distances for comparison, not as verified navigational distances. [3, 4]

Metric	Cabo Star	Galleons Passage	Alpha Zulu
Charter allowance per week	US\$140,000	US\$50,000	US\$19,231
Charter allowance per year	US\$7.30m 365 days	US\$2.60m 52 weeks	US\$1.00m 52 weeks
Annual fossil fuel consumed	11,657 t	4,729 t	0 targeted
Annual fuel expenditure at common assumed prices	US\$7.42m	US\$4.26m	No fossil-fuel purchase; electricity and equipment costs remain
Annual onboard fuel CO ₂	36,431 t	15,162 t	0 targeted from fuel combustion

Fuel prices are illustrative assumptions: US\$600/t for residual fuel and US\$900/t for marine gas oil, not current quotations. Alpha Zulu’s figures are design objectives. Charter inputs are model allowances, not offers. Alternative Cabo Star brochure figures give 22,232–23,753 t CO₂ and US\$4.64m–4.92m fuel annually; see annex. All values are US dollars unless stated otherwise.

What the comparison means

At those fuel prices, the modelled annual fuel bill for Cabo Star is approximately US\$3.17 million higher than for Galleons Passage, and its onboard CO₂ is approximately 21,300 tonnes higher. Cabo Star is a much larger freight vessel. These absolute totals do not establish which vessel has lower cost or emissions per tonne of equivalent cargo delivered.

Cabo Star’s US\$20,000 allowance is per day. Its published fuel bill of US\$6.88 million is separate from charter and represents the study’s historical price basis. The common-price recalculation above produces US\$7.42 million for fuel alone. Neither amount is the total cost of operating the service. [3, pp. 12–14]

Galleons Passage’s 896 kg/hour main-engine and 55 kg/hour generator consumption figures are retained, unverified model inputs. The supplied comparison flags an inconsistency in the machinery-power calculation behind them. The resulting **15,162 tonnes** is therefore a scenario estimate, not an audited emissions inventory. [4]

Alpha Zulu cannot be credited with avoiding all of a larger vessel’s emissions simply because it enters the same market. The comparison must establish how much equivalent freight and passenger service it replaces, how many vessels and sailings are required, and whether conventional operations actually fall. Additional clean capacity can deliver useful connectivity without constituting complete vessel replacement.

Alpha Zulu route break even requirements

The projected common rate is US\$150 per pallet-leg across all three vessels, equivalent to US\$3,000 per TEU using the assumed 20 standard pallets per TEU. For Alpha Zulu this replaces the source's US\$185 blended yield. Chilled/frozen premiums and passenger income are excluded. The six-route model retains one vessel per route, 50 revenue-operating weeks and 120 pallets per leg, equivalent to six TEUs for this comparison. [4]

Route and approximate distance	With charter US\$/week	Paid pallet- legs with charter	Utilisation with charter	Pallet-legs operating only
AZ1 Guyana–Barbados–Dominica–Barbados– Guyana 1,112 nm	28,631	191	39.8%	63
AZ2 Trinidad–Grenada–SVG–Saint Lucia– Barbados–Trinidad 493 nm	27,981	187	31.1%	59
AZ3 Barbados–Dominica–Antigua–Dominica– Barbados 562 nm	28,631	191	39.8%	63
AZ4 Barbados–Saint Lucia–SVG–Grenada–SVG– Saint Lucia–Barbados 448 nm	27,331	183	25.3%	54
AZ5 Guyana–Trinidad–Grenada–SVG–Guyana 887 nm	28,631	191	39.8%	63
AZ6 Guyana–Trinidad–Guyana 612 nm	29,931	200	83.1%	72

SVG means Saint Vincent and the Grenadines. The unconfirmed port waiver, seven-hour calls and approximate map distances are retained. Operating-only thresholds exclude charter, financing and capital recovery. Whole pallet-leg requirements are rounded up; utilisation uses unrounded costs and thresholds.

A pallet-leg is one pallet carried over one sailing leg. Carrying it over two legs earns two charges only if the agreed through-rate supports that revenue. A connecting shipment is counted once as market demand, while its occupied space is allocated to each carrying leg.

The six-vessel fleet requires approximately US\$171,135 weekly with charter, equivalent to 1,141 paid pallet-legs at pooled break-even, or 38.0% of modelled fleet capacity. Covering each route separately requires 1,143 after rounding. Without the waiver, every vessel needs 209 paid pallet-legs weekly with charter; operating-only coverage requires 80. [4]

AZ6's assumed 120 outbound and 12 return pallets earn US\$19,800 weekly at the projected rate. That is approximately US\$10,131 below charter-inclusive cost. With a full outbound sailing, at least 80 paid return pallets are needed, compared with the assumed 12. This is a priority commercial test before committing that route.

The charter allowance uses 12.5% annually on US\$8 million. An illustrative US\$12 million valuation at the same rate increases pooled charter break-even to approximately 1,526 pallet-legs, or 50.9%. Capital-cost changes must therefore be carried through the model. Two non-operating weeks, replacement reserves, working capital and relief-vessel provision require a complete annual budget.

Comparing the revenue required to cover costs

All three vessels use US\$3,000 per TEU per chargeable leg, 20 standard pallets per TEU and US\$150 per pallet-leg. These replace the original source freight yields. TEU equivalents below are commercial comparisons, not certified container stowage. The assumed 400-pallet Galleons Passage capacity equals 20 TEUs per leg; Alpha Zulu's 120 pallets equal six. Costs and service capabilities still require vessel-specific validation.

Vessel and cost basis	Gross revenue at break-even	Cargo needed at US\$150 per pallet-leg
Cabo Star Volume-adjusted source budget [3]	US\$387,155/week US\$20.13m/year at 52 trips	2,582 pallet-leg equivalents/week 129.1 TEU equivalents
Galleons Passage Common 1,300 nm loop [4]	US\$276,852/week during assumed waiver	1,846 pallet-legs/week 92.3 TEU equivalents 115.4% utilisation
Alpha Zulu Four-call charter case [4]	US\$28,631/week during assumed waiver	191 pallet-legs/week 9.55 TEU equivalents 39.8% utilisation

Galleons Passage retains US\$50,000 weekly charter, US\$145,000 other costs and US\$900/t fuel. Alpha Zulu retains US\$12,000 overhead less four US\$650 call waivers, plus charter. Cabo Star retains the study's fuel-price basis; cargo handling and commission vary with billed volume. Whole pallet-leg thresholds are rounded up. Utilisation uses unrounded thresholds and four-leg capacities.

At US\$150 per pallet-leg, Galleons Passage exceeds its assumed 1,600-pallet-leg weekly capacity even with the waiver. Without it, the source's unverified US\$15,000-per-call allowance adds US\$60,000 and raises coverage to 2,246 pallet-legs, or 140.4%. Alpha Zulu rises to 209 pallet-legs, or 43.4%. These are conditional cargo-only results; port quotations and the underlying budgets require validation. [4]

Cabo Star's recalculation holds US\$17,737,797 of annual costs fixed, varies handling at US\$266.78 per TEU and charges 3% agency commission, now US\$90 per TEU. At US\$3,000 revenue, the contribution is US\$2,643.22 per TEU. Dividing fixed costs by that contribution gives approximately 6,711 TEU equivalents annually. The table converts the unrounded annual result to weekly revenue and then rounds pallet-leg requirements up. This is a model calculation, not a demand forecast. [3]

The Galleons Passage allowance of US\$145,000 in other weekly costs is particularly material and requires an itemised review. All three cases need consistent treatment of crew, insurance, maintenance, port services, cargo handling, energy, financing and replacement capital. Passenger income could improve the ferry case, but it cannot be assumed without its associated demand and costs.

A further limitation is time. At Alpha Zulu's assumed 12 knots, the common 1,300 nm loop plus 48 hours in port consumes 156.3 hours of a 168-hour week, leaving only 11.7 hours before weather and other delays. The four-call cost row is illustrative; it does not validate that long loop. The six proposed Alpha Zulu routes require their own weather and port-window assessment.

Proposed European support for Caribbean decarbonisation

The European proposal strengthens the financing rationale for Caribbean **RoPAC**. Decarbonisation could help attract investment into vessels and the systems needed to keep a timetable, alongside reducing the fleet's exposure to imported fuel. CARICOM should prepare a coordinated investment case while the proposed support arrangements are being developed.

The proposed allowance reservation

The Commission's July 2026 proposal contains two distinct provisions. Article 3gaa would establish Sustainable Maritime Alternative Propulsion support, including electric and wind-assisted propulsion. Article 3gab would separately reserve 0.9 million allowances annually until 2035 for maritime decarbonisation in UN-defined SIDS/LDCs, excluding states whose GDP per capita equals or exceeds the EU average. Detailed use and access procedures would follow through delegated acts. [11]

One allowance represents one tonne of CO₂-equivalent emissions. At the illustrative value of €75 per allowance used in the sponsor's correspondence, 900,000 allowances represent €67.5 million annually. This is an illustration of the proposed reservation's market value, not a fixed project payment per tonne avoided or an allocation to the Caribbean. [10, 11]

The wider SMAP provision links support to specified EU-connected voyages and includes technology-origin conditions. Its rules must be distinguished from the separate SIDS/LDC reservation. Adoption and project eligibility remain unsettled. [11]

The case CARICOM should put forward

CARICOM and participating governments should seek an accessible funding route for regionally owned packet vessels under 500 GT, including services operating wholly within the Caribbean. The submission should ask how vessel construction, electric propulsion, wind systems, shore charging, cold-chain equipment and performance verification could be supported. It should also seek clarity on country eligibility, application channels, eligible expenditure and the treatment of Caribbean-built vessels using imported equipment.

Alpha Zulu should be presented as a demonstration of the relationship between cleaner propulsion and dependable regional connectivity. Its investment case should combine independently reviewed engineering with signed cargo commitments, port agreements and a funded maintenance plan. The proposed support is a reason to prepare a competitive application and shape workable implementation rules.

Keep the financial model explicit

The existing break-even tables should retain their stated assumptions. Any prospective European support should appear in a separate financing scenario until an award, disbursement terms and eligible uses are confirmed. Capital support could reduce the amount that must be recovered through charter or debt service; that benefit should be calculated from the actual funding terms. Fleet emissions reductions must not be multiplied by €75 and entered as assured annual operating revenue.

Autonomous shipping and Caribbean RoPAC

Caribbean RoPAC should include a planned pathway towards autonomous shipping. For Alpha Zulu, the proposed starting point is a crewed vessel with integrated automation and decision support, followed by trials of selected remote or autonomous functions. The objective is dependable service, efficient use of wind and electricity, and stronger Caribbean maritime capability.

Begin with crewed vessels

Early applications should include weather routing, arrival-time planning, sail and electric-power management, machinery condition monitoring, cold-chain alarms and digital cargo records. An onboard master and trained crew should retain command, navigational watchkeeping and the ability to intervene. Benefits should be measured through schedule performance, energy consumed, cargo condition, workload and downtime.

Subsequent trials could assess remote technical support and selected autonomous functions on defined route segments. Harbour manoeuvring, sail handling, mooring, cargo work and emergency response each require their own assessment. Any reduction in onboard personnel should follow demonstrated performance and approved manning arrangements; passenger care must be addressed wherever passengers are carried.

Provide for future autonomy

The design brief should reserve power, space, cabling and interfaces for additional sensors, computing and communications. Each proposed function needs defined weather and traffic limits, human override, secure data logging and tested responses to loss of communications or equipment failure. Radar, cameras and satellite connectivity form only part of the system. Its safety case must demonstrate the complete arrangement, including shore operators and recovery procedures. [13]

Agree the regulatory pathway

IMO adopted its non-mandatory Maritime Autonomous Surface Ships Code in May 2026, effective from 1 July 2026. Its principal scope is cargo ships under SOLAS Chapter I; governments are also invited to apply it, as far as practicable, below 500 GT. Cargo high-speed craft under SOLAS Chapter X are excluded from its scope. Barbados and the selected classification society should therefore settle the applicable pathway for Alpha Zulu, with the relevant coastal and port authorities. [12, 13]

The Code retains human oversight and the master's overall responsibility, including where the master is ashore. Enhanced automation alone does not confer MASS status. Approval should address the intended functions, operating limits, shore arrangements and applicable certificates. [12]

Build regional capability and test the economics

European technology cooperation should include system integration, simulator training, cybersecurity, maintenance skills and a CARICOM-based fleet support centre. Regional ownership should extend to operational knowledge, access to vessel data and the ability to maintain the systems. Caribbean seafarers should have pathways into advanced onboard and shore roles.

The feasibility comparator should retain its present crewed operating basis. A separate projected autonomy scenario should price equipment, software, communications, shore staffing, training, certification and insurance, then compare verified savings and service improvements. Automation can support decarbonisation through better operation; zero onboard fossil-fuel use still depends on the vessel's energy system.

[12] IMO. Autonomous shipping FAQ. Regulatory status and human oversight, consulted 13 September 2026. [IMO guidance](#)

[13] IMO. Resolution MSC.595(111), MASS Code, 2026. Scope and Chapters 5–9, 14, 16–18. [MASS Code](#)

A policy package that makes scheduled service deliverable

Commission a defined service

Participating governments should jointly specify a small number of initial corridors and appoint one accountable programme lead. Contracts should purchase published frequency, affordable small-consignment access, temperature control and verified emissions performance. Any public-service payment should be capped, budgeted and linked to delivery, with published review and termination provisions. A vessel charter alone does not purchase those outcomes.

Connect shipping to production and port reform

Cargo commitments should identify the buyer, product, weekly quantity, origin, destination and return-load opportunity. Producers, processors, wholesalers and institutional purchasers can anchor demand through enforceable agreements where commercially justified. The same cargo pool must not be pledged independently to AZ1, AZ5 and AZ6. Port agreements should cover berth windows, proportionate handling charges, pre-arrival documentation, food inspections and powered cold storage. [1, 4, 6]

Use decarbonisation finance to build productive assets

The financing proposal should separate development grants for engineering and verification, investment in vessel and shore assets, operating working capital and any payment for socially necessary service. The supplied executive summary identifies concessional finance, private capital and guarantees as potential components. These are proposed sources, not commitments. Debt should be sized against conservative net cash flow after maintenance and replacement allowances. [5]

Regional ownership, crewing and shipbuilding should be explicit development objectives. Incumbent small-vessel operators should be offered practical routes into training, cargo aggregation, investment and fleet renewal. Transparent performance requirements and an open transition process will support wider adoption of qualifying vessels alongside Alpha Zulu.

Develop a practicable ZeroFF carriage standard

The supplied executive summary proposes a 2035 regional ZeroFF carriage standard. This brief recommends beginning with funded pilot services and public procurement, then extending obligations as qualifying capacity and affordability are demonstrated. Its proposed HS Chapters 01–24 scope should be replaced by a precise commodity list: those chapters extend well beyond fresh produce. Ownership, build-origin and carriage restrictions require legal review before adoption. [5]

Verification should distinguish zero onboard fossil-fuel combustion from emissions across electricity supply, fuels and equipment life cycles. Neither avoided emissions nor an illustrative carbon price creates automatic carbon-credit income. EU ETS liability depends on qualifying ships and voyages involving EU/EEA ports; the wholly non-EU comparison loop generates no EU ETS allowance saving. That does not settle access to the separately proposed SIDS/LDC support. CII generally applies from 5,000 GT, while Annex VI and EEXI applicability must be examined separately for a vessel around 400–499 GT. [8–11]

Take a bounded decision now

Within 90 days of programme authorisation, commission one integrated validation package: signed cargo indications, port terms, an independently reviewed vessel and energy design, a complete financial model and a trial protocol. Select the first route from that evidence. Use a properly authorised RUTH demonstration where suitable, followed by Alpha Zulu trials. Expansion should follow measured reliability, paid load factors, delivered cost, cargo condition and emissions performance; construction and service dates should follow funding and certification readiness. [4, 5]

Annex on fuel calculations and evidence limits

Cabo Star calculation

The study's fuel table uses 210 m³ for main engines and 16 m³ for port auxiliaries per round trip. At 52 trips this is 11,752 m³. Its TT\$3,920/m³ price and implied TT\$6.70/US\$ conversion reproduce the reported US\$6,875,797 annual fuel bill. The study does not clearly include auxiliary consumption during sailing. [3, p. 13]

The recalculation uses $1,300 \div 13.5 = 96.30$ sailing hours; main-engine consumption of 50 m³/day gives 200.62 m³ per trip. Adding one auxiliary at 4 m³/day while sailing gives 16.05 m³, plus the study's 16 m³ in port. At 52 trips: residual fuel 10,432.10 m³ and marine gas oil 1,666.57 m³.

Assumed densities are 0.98 t/m³ for residual fuel and 0.86 t/m³ for marine gas oil. Applying IMO combustion factors of 3.114 t CO₂/t residual fuel and 3.206 t CO₂/t diesel/gas oil gives **36,431 t** CO₂ annually. Applying those densities and factors to the study's original volumes gives 35,619 t. Density and grade must ultimately come from bunker delivery records. [8]

At illustrative residual/gas-oil prices of US\$450/700, US\$600/900 and US\$800/1,200 per tonne, the recalculated annual fuel bill is US\$5.60m, US\$7.42m and US\$9.90m respectively. At 50 rather than 52 trips, the central case is approximately US\$7.14m and 35,030 t CO₂.

The lower brochure consumption case

The brochure reproduced on printed page 9 lists 36 m³ HFO plus 3.8 m³ MGO at 17 knots, and 44 m³ plus 3.8 m³ at 19 knots. Interpreting these as daily rates, retaining four calls and 16 m³ port fuel, gives approximately 22,232–23,753 t CO₂ and US\$4.64m–4.92m fuel annually at the common prices. The excerpt does not explicitly state the time denominator. These alternatives conflict with the study's 50 m³/day at about 13.5 knots and must be reconciled against machinery and voyage records; they are not a statistical confidence interval. [3]

Galleons Passage calculation

Sailing time is $1,300 \div 14 = 92.86$ hours. Fuel per trip is $(0.896 + 0.055) \times 92.86 + 0.055 \times 48 = 90.947$ t. At 52 trips this gives 4,729 t fuel and **15,162 t** CO₂ using 3.206 t CO₂/t. Annual fuel costs US\$4.26m at US\$900/t or US\$6.38m at the source's US\$1,350/t. Its assumed machinery consumption remains unverified. [4, 8]

Boundaries and source reconciliation

All CO₂ totals cover onboard fuel combustion, excluding upstream emissions, non-CO₂ gases and unmodelled layover or dry-dock consumption. Port power and additional refrigerated loads must be checked. The Cabo Star study also alternates between four and five calls, uses inconsistent voyage times, and has mismatched tonnage and TEU totals in Table 3. The separate Cabo Star note contains differing particulars. These inconsistencies warrant targeted validation, rather than treating any one model as an operating record. [3, 7]

References and status of evidence

The seven supplied references form the substantive basis of this brief. Institutional studies are used for their stated findings; sponsor documents are used for proposals and explicit model assumptions. New calculations are identified in the text. None of the cited organisations is represented as endorsing Alpha Zulu or committing finance.

[1] CPCS with Trevor Hamilton & Associates. Short Sea Shipping Network and Finance Model for the Caribbean. Inter-American Development Bank, IDB-TN-1419, 2018. Supplied PDF. Relevant pages: 10–15, 118, 160–161. Historical network study and conditional scenario analysis.

[2] Association of Caribbean States. The future of the informal shipping sector in the Caribbean. Supplied eight-page web printout, captured 12 September 2026; original publication date not shown. Relevant printout pages: 2–4. Historical institutional commentary.

[3] Adrian J. Beharry, University of Trinidad and Tobago. An Economic Model of a Short Sea Shipping Service in the Southern Caribbean. Supplied Cabo Star webinar paper, filename dated 8 April 2024. Relevant printed pages: 7–15; PDF pages 8–16. Conditional economic model with reproduced vessel brochure.

[4] Alpha Zulu Six Route Cash Break Even Comparison. Weekly route economics and full network requirements. Prepared for Mr David Simpson, Chartered Accountant, September 2026. Supplied file Alpha_Zulu_Feasibility_Comparison_Six_Weekly_Routes copy.docx. Costs retained; this brief recalculates freight coverage at the sponsor's projected US\$150 per pallet-leg assumption. Not audited feasibility.

[5] Champion Maritime Limited. Executive Summary Caribbean Maritime Decarbonisation. Evidence Pack Annexes A through E; CARICOM ZeroFF Carriage Standard. May 2026 discussion paper supplied as ExecutiveSummary CaribbeanMaritimeDecarbonisation copy.docx. Policy and financing proposals, including earlier vessel specifications.

[6] Strategic Memorandum Regionally-Owned Maritime Decarbonisation as Leverage for Crop Yields, Regional Markets, and Import Substitution. Supplied working draft Strategic Memo Maritime Decarbonisation Leverage copy.docx. Directional planning model with stated agricultural and routing limitations.

[7] Cabo Star vessel note. Supplied cabo Star.docx. Short secondary specification summary with unresolved reference markers; not relied upon to resolve conflicting machinery, capacity or deadweight particulars.

[8] International Maritime Organization. Resolution MEPC.391(81), 22 March 2024. 2024 Guidelines on Life Cycle GHG Intensity of Marine Fuels, Appendix 2, printed pages 49–50. Source of combustion factors; densities in this brief are separate assumptions.

IMO marine fuel emissions factors

[9] International Maritime Organization. EEXI and CII ship carbon intensity and rating system. Official guidance on general tonnage thresholds and applicability, consulted 12 September 2026.

IMO guidance on EEXI and CII

[10] European Commission. FAQ Maritime transport in EU Emissions Trading System. Official guidance on ship scope, voyage scope and emissions reporting, consulted 12 September 2026.

European Commission maritime ETS guidance

[11] European Commission. COM(2026) 616 final, 17 July 2026. Proposed EU ETS revision, Article 1(5)–(6), inserting Articles 3gaa and 3gab. Legislative proposal; implementation and project access remain conditional.

Commission proposal for SMAP and the SIDS and LDC reservation

[14] Outcomes of the 51st Regular Meeting of the Conference of Heads of Government of CARICOM, Saint Lucia, 6–9 July 2026, as reported by the CARICOM Private Sector Organisation and regional press: pilot ferry service using a Trinidad and Tobago government vessel as an interim measure; September 2026 deadline for the enabling regulatory framework; permanent regional ferry service to be operated by the private sector. Political commitments, not contracted arrangements.