Initial Findings of the UWI CAGRI (formerly CFSE)

Schooner RUTH Caribbean Sail Cargo Initiative

Initial Pilot Assessment

Revised October 2026 — supplementary logistics and port-economics findings

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1. Preliminary Findings

The initial Schooner RUTH Caribbean Sail Cargo Initiative indicates that the existing inter-island cargo system within the Windward Islands, Barbados and farther north is not adequately aligned with the needs of Caribbean communities, producers, retailers or consumers.

The Initiative was undertaken at The University of the West Indies Centres for Food Security and Entrepreneurship and Agricultural Research and Innovation, led by Professor Leonard O'Garro and Dr Michele Singh respectively; its pilot was launched in 2014 by UWI Pro Vice-Chancellor Sir Hilary Beckles, as he then was.

The principal findings are:

1. The existing system is outdated and unreliable.

Inter-island cargo movement remains fragmented, costly and dependent on irregular services. There is a significant absence of dependable, scheduled maritime connectivity designed specifically for island-scale cargo and passenger requirements.

2. Trade routes remain underserved.

Existing routes do not provide sufficient frequency, reliability or direct island-to-island service. This contributes to delays, missed commercial opportunities, inventory uncertainty and inefficient use of working capital.

3. The fossil-fuel bill is the single most prohibitive factor in maintaining intra-regional passenger packet service.

The continuing cost of marine fossil fuel places a substantial burden on vessel operators and passengers. It raises fares, increases freight rates, exposes services to international fuel-price volatility and makes profitable regular scheduled island-scale passenger and cargo operations increasingly difficult if not impossible to sustain without subsidy. A scheduled packet service must sail on the appointed day whether or not the vessel is full, and under fossil-fuel propulsion every such sailing carries a fuel cost incurred irrespective of cargo and passenger availability. Decarbonisation is therefore not simply an environmental objective; it is a commercial and operational necessity for restoring dependable regional packet service.

4. The region requires appropriately scaled cargo-passenger vessels.

A modern island-scale service carrying palletised, refrigerated, break-bulk and roll-on cargo, together with passengers, could substantially improve regional trade and reduce dependence on inefficient transshipment and foreign-controlled logistics networks.

5. Island scale is a regional design requirement, not a preference.

The geography, populations, cargo volumes, ports and economics of Caribbean Small Island Developing States differ fundamentally from those of continental and metropolitan markets. Regional connectivity is therefore better achieved through a distributed network of appropriately scaled vessels providing frequent, overlapping scheduled connections between individual islands and island groups, than through a small number of very large vessels operating principally between major centres. Island-scale vessels and island-scale infrastructure, deployed collectively, are what produce regional-scale connectivity.

6. Decarbonised service speed depends on light displacement.

Decarbonisation is not only a question of which energy source replaces diesel; it is a question of how much ship that energy must move. Wind, solar, battery-electric and green-hydrogen propulsion each deliver considerably less power per tonne of installed weight, and per unit of stored energy, than fossil fuel. The practical consequence is that a decarbonised vessel earns its service speed by being light rather than by being powerful, and that light displacement and low resistance are the precondition of commercially useful speed under renewable power rather than a refinement of it. Speed in turn is a commercial requirement, not a preference: fresh produce must be delivered at the rate at which it is consumed, on frequent, short, direct sailings paced to harvest and to market, rather than accumulated and moved slowly in bulk. Service speeds in the order of 12 to 15 knots, sustained on a published schedule, are what allow a chilled consignment to leave a packing house and reach a neighbouring market in condition to sell. Achieving that speed on renewable energy — whether wind-primary, auxiliary electric, solar-assisted, or in time green-hydrogen fuelled, and drawing on the region’s wider sustainable energy chain of wind, solar, hydro and thermal resources — requires hulls and structures built of advanced lightweight materials, principally advanced composites. Materials, propulsion and schedule are therefore a single engineering problem: the lighter the vessel, the less renewable energy it must carry, the faster and more frequently it can sail, and the more of the region’s food it can move while that food is still worth moving. The same principle applies to the cargo transport system itself: eliminating unnecessary container tare and the repositioning of empty steel containers reduces the weight that renewable propulsion must move, while direct palletised handling improves the commercial efficiency of each sailing.

7. Container tare imposes a substantial non-productive weight burden on regional maritime transport.

The conventional ISO container system carries a structural weight penalty that is particularly consequential for island-scale maritime trade. A standard 20-foot steel container weighs approximately 2.3 tonnes empty, against an international average cargo payload of approximately 10 tonnes. Nearly 19 per cent of the combined loaded weight is therefore container tare rather than commercial merchandise. For vessels whose economic performance depends upon light displacement, low resistance and efficient use of renewable propulsion energy, transporting steel containers introduces weight that contributes nothing to the quantity of food or merchandise delivered. Direct palletised carriage avoids this recurring container tare, although the weight of pallets and permanent cargo-handling arrangements must be included in the vessel’s design. The reduction in transported mass is therefore both an economic and a decarbonisation opportunity, particularly for lightweight, shallow-draught, wind-primary vessels.

8. Persistent import-export imbalances compound container tare through empty-container repositioning.

The structural inefficiency of containerised transport is compounded by the substantial imbalance between imports and exports in several Caribbean island economies. Where import-to-export container ratios reach 5:1 or 10:1, and assuming equivalent container sizes and no alternative equipment utilisation, approximately 80 to 90 per cent of imported containers must eventually be repositioned empty. At 2.3 tonnes per TEU, this represents considerable non-revenue-generating transport weight, together with additional stevedoring, terminal handling, equipment management and shipping costs. Under illustrative two-way trade conditions, container tare may account for approximately 28 to 30 per cent of the combined weight of cargo and containers transported. These ratios describe transported mass rather than propulsion-energy consumption and must be distinguished from trade imbalances expressed in monetary value. Direct palletised carriage removes the requirement to reposition ISO containers within the service, offering a particular advantage to the smaller, import-dependent markets of the Windward and Leeward Islands.

9. Conventional Less-than-Container-Load logistics impose avoidable handling, storage and distribution costs.

The established Less-than-Container-Load system requires small consignments to be received, consolidated, stuffed into containers, handled through container terminals, transported, unstuffed, sorted and redistributed at destination. These successive operations introduce costs, delays, opportunities for damage and additional working-capital requirements that are disproportionate to the modest consignments characteristic of island-scale trade. Preliminary logistics modelling suggests that direct palletised transport may avoid approximately US$34 to US$174 per pallet in net conventional LCL handling and associated costs, depending upon port arrangements, shipment characteristics and services displaced. These estimates require validation against actual regional freight and terminal invoices. The operational principle is nevertheless clear: where individual pallets can be accepted directly from approved packing houses or shippers and delivered directly to consignees, the intermediate container freight station and its associated handling operations may be substantially reduced or eliminated. Temperature-controlled cargo offers additional benefits through fewer intermediate transfers, improved traceability and reduced exposure to cold-chain interruption, provided temperature integrity is maintained from packing house to final delivery.

10. Port tariff reform and dedicated pallet-handling arrangements are necessary components of scheduled regional maritime infrastructure.

The economics of direct palletised carriage depend not only upon vessel design but upon the charges, operating procedures and institutional arrangements governing cargo movement through regional ports. Barbados Port Inc.’s published tariff, effective June 2025, provides for shallow-draught dry-cargo discharge at BBD $32 per tonne and loading at BBD $16 per tonne, compared with higher conventional deep-water breakbulk and container-handling charges. These published distinctions establish a practical basis for examining simplified palletised cargo operations, although the precise tariff classification and eligibility require formal determination. In the context of the Government of Barbados’ recognition and endorsement of the Alpha Zulu RoPAC initiative as a strategic maritime development undertaking, coordinated implementation should include Barbados Port Inc. and the relevant customs, agricultural inspection and maritime authorities. Existing CARICOM and shallow-draught concessions should be applied wherever eligible, with additional enduring concessions and predictable tariff arrangements established where necessary. Dedicated berthing windows, direct vessel-to-truck transfers, appropriate temperature-controlled handling, simplified cargo release and harmonised regional procedures are essential to reducing the total delivered cost of goods. Port concessions should therefore be understood not merely as financial incentives to a vessel operator, but as enabling infrastructure for dependable regional trade, food security and maritime economic integration.

11. Improved maritime infrastructure is required in Barbados.

The pilot identified the need for a full-service shipyard and advanced-composites manufacturing capability capable of designing, constructing, maintaining and upgrading small commercial vessels for Caribbean service.

12. Caribbean maritime industrial capability should be developed across the region, not concentrated in a single state.

A distributed regional fleet requires distributed commissioning and through-life maintenance capacity. Existing Caribbean maritime industrial assets — among them the Ottley Hall facility in Saint Vincent and the Grenadines — could be configured to support the building, commissioning and maintenance requirements of an island-scale regional fleet. Member States would thereby participate not merely as destinations within a transport network, but as contributors to the industrial capability required to sustain it, creating pathways for skills development, employment, technology transfer and gender-inclusive participation in the blue and green economy.

13. Maritime training must be strengthened.

The development of a regional cargo-passenger fleet will require expanded training in seamanship, vessel operations, marine engineering, composite construction, cargo handling, logistics, safety, security and vessel management. The deficit is documented and long-standing: the Centre recorded in 2015 that, among Caribbeanowned vessels — most of which originate in the Windward Islands — over 80 per cent of serving seafarers lacked formal training for their work. The Initiative was accordingly conceived from the outset to function as a training platform as well as a cargo service, and that purpose remains central to it.

That purpose is given effect in dedicated seagoing training berths. Sea time, not tuition, is the constraint upon which certification depends, and qualifying seagoing service is the one element of a seafarer’s qualification that no institution can supply and only a shipowner can offer. Schooner RUTH carries two trainee berths, of which one is permanently dedicated to a woman, providing approximately 100 qualifying sea days each year directed toward boatmaster and engineer certification under the IMO Code of Safety for Small Commercial Vessels Operating in the Caribbean. Every vessel of the Alpha Zulu Class commissioned will carry one dedicated berth, providing approximately 150 qualifying sea days each year toward certification under the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers. The obligation is written into the class design licence and into every contract of sale and charter, and binds any third party who purchases or leases a vessel of the class; a ship that ceases to carry the berth ceases to be entitled to the class name. The commitment therefore survives the present ownership. Placements are intended to be long rather than short: a small number of seafarers carried through to certificated competency is of greater value to the region, and to the individual, than a larger number given brief exposure, and only sustained service generates the sea time that certification recognises.

14. Food-handling and cold-chain competence must extend from the packing house to the quay and the ship.

Perishable cargo is unforgiving of the weakest link in its handling chain, and that chain runs from the farm gate through the packing house and across the quay before it ever reaches a hold. Training must therefore extend beyond the ship's crew to stevedores, dock workers, packing-house staff and, critically, the supervisors who verify their work. The competencies required are specific: hygienic handling, and the cleaning and sanitation of holds, containers, pallets and food-contact surfaces before loading; pest and contaminant exclusion; pre-cooling at source, since refrigerated equipment maintains a temperature but cannot efficiently remove field heat already carried in the load; the distinct carriage temperatures and humidity ranges that different commodities require, including the chilling-injury thresholds of tropical produce such as breadfruit, mango, banana and sweet potato, which are damaged by temperatures entirely correct for temperate crops; the segregation of ethylene-producing from ethylene-sensitive cargo and of odour-transferring commodities; stowage that preserves airflow through and around the load rather than blocking return air; and the continuous monitoring, data-logging and recording of hold and reefer temperatures in transit, with defined corrective action when a limit is breached. Supervisory training matters as much as operative training, because it is supervisors who verify pre-loading condition, authorise acceptance or rejection, maintain the temperature and traceability records upon which phytosanitary certification and buyer confidence depend, and act when readings drift. Competence of this kind is not an adjunct to the service; it is what converts carriage into marketable delivery, and its absence is measured directly in spoilage, rejected consignments, lost market access and the reluctance of producers and buyers to commit to regional trade at all.

Onboard renewable refrigeration is, moreover, demonstrated rather than hypothetical. Onboard refrigeration and onboard electrical solar support were installed aboard Schooner RUTH through the Global Affairs Canada–WUSC PROPEL grant in 2015–2016, and their operation in Caribbean service demonstrated the efficiency of renewable energy for both the ship's electrical requirements and cargo refrigeration; that early practical demonstration underpins the cold-chain design of the Alpha Zulu class. Building on it, onboard co-refrigeration is under study, in which waste heat from the hydrogen power system is recovered and exchanged to provide air-conditioning and refrigeration, so that cooling is delivered as a by-product of propulsion energy rather than as an additional electrical load.

15. Advanced-composites design and fabrication training must be established and sustained regionally.

If the region's vessels are to be light, they must be built of advanced composites; and if they are to be built in the Caribbean, they must be built by Caribbean hands. That requires a trained cadre of designers, laminators, mouldmakers, fabricators, inspectors and repair technicians, together with the supervisory and quality- assurance competence that classification societies and insurers require of composite structures. Programmes in advancedcomposite design and fabrication at The University of the West Indies, at community colleges and at polytechnic and technical-vocational institutions should accordingly be promoted and expanded — as this Initiative has consistently advocated — and coupled directly to the shipyard and manufacturing capability described above, so that training leads to employment and employment sustains the skill. Composite competence is transferable well beyond shipbuilding, into renewable-energy structures, transport equipment, construction and repair, which makes it among the higher-return industrial skills investments available to the region; and because it is learned at the bench rather than inherited, it can be built comparatively quickly wherever training places and real work exist together.

16. Existing seafarer capacity must be maintained, not only created.

Training alone is not sufficient. The region must also retain the seafarers it already has and keep them in continuous employment at sea. Caribbean seafaring capacity — masters, mates, engineers, ratings, and the practical trading knowledge that accompanies them — has diminished with the decline of regional tonnage, and it is far more easily lost than rebuilt. Every vessel withdrawn from regional service removes berths, sea time and the qualifying service upon which certification depends; seafarers unable to obtain that sea time in the region either leave the sector or take employment on foreign-flagged vessels, and their experience departs with them. A scheduled, Caribbean-owned and Caribbean-crewed service is the instrument that preserves this capacity: continuous employment, qualifying sea time for cadets and ratings working toward certification, career progression aboard vessels trading in home waters, and a means of transferring the knowledge of the region's remaining experienced seafarers to the next generation before it is lost. The pull away is real and well documented: the global shipping industry reports its own persistent shortfall of trained seafarers, and a Caribbean seafarer unable to obtain qualifying sea time at home will readily find a berth abroad. Retention is therefore not an alternative to training but its necessary companion — without regional tonnage to employ them, the region trains seafarers for other nations' fleets.

17. Autonomous and AI-assisted operation increases maritime employment ashore.

Autonomous and AI-assisted operation is commonly assumed to reduce maritime employment. In an island- scale regional network the opposite applies, because the binding constraint on frequency is not cargo but the cost and availability of crew for many small vessels. Decision-support systems — digital twins, weather, wave and current routing, energy management, condition monitoring and predictive maintenance — together with

shore-based remote assistance, allow a larger number of hulls to be operated safely and affordably. More hulls mean more sailings, more port calls, more cargo handled and more people employed, the greater part of them ashore. The occupations created are new to the region and are year-round: remote operations and fleet-monitoring centres; voyage, energy and schedule optimisation analysts; digital-twin and data engineers; predictive-maintenance and condition-monitoring technicians; marine electrical, electronic, power-electronic and battery-systems specialists; cyber-security and communications staff; remote survey and classification support; cold-chain monitoring; and the cargo coordination, agency, stevedoring, packing-house and inspection work that additional port calls generate. These are shore-based, higher-skilled and comparatively well-paid roles, accessible to people who cannot or do not wish to serve at sea — which materially widens participation, including by women and by those with family responsibilities, and supports the programme's gender-participation commitment. Sited regionally, an operations centre also keeps the data, the decisions and the employment within the Caribbean rather than exporting them. Shipboard employment is complemented rather than displaced: the seafarer's role shifts toward systems management, and certification pathways should evolve accordingly to include digital, remote-operations and energy-systems competencies. Early operations would in any event be crewed, with automation confined to decision support, and any later autonomous function introduced progressively under the IMO MASS Code as applied by the flag and coastal States — a pathway the Barbados Merchant Shipping Act 2024 expressly anticipates.

18. Maritime decarbonisation is the region’s most effective instrument for gender mainstreaming in shipbuilding, design, operations and crewing.

Decarbonisation does not merely permit gender mainstreaming in the regional maritime sector; it is the most effective instrument available for achieving it, because it creates occupations that have no incumbent workforce and no inherited pattern of exclusion. Advanced-composite design and fabrication, marine electrification and energy storage, digital operations, energy management and remote monitoring are new to the Caribbean. Roles that do not yet exist can be designed inclusive from the outset — in recruitment, training places, and advancement pathways — rather than reformed against established custom decades later. The character of the work reinforces this: composite fabrication, and electrical, electronic and systems work, depend far less upon sustained heavy manual handling than steel construction and engine-room practice, removing a barrier that has historically excluded women in fact and still more in perception. Aboard, a wind- primary vessel with regenerative electric propulsion has no engine room in the conventional sense, no bunkering and no fuel handling, and its shipboard roles are correspondingly oriented to systems management. The operating pattern matters as much as the technology: an island-scale packet service runs weekly loops in home waters with regular home-port turnarounds, rather than the six- to nine-month deep- sea contracts that have done more than any formal barrier to keep Caribbean women out of seafaring careers; shore-based operations, monitoring and analysis roles extend that accessibility further. And because the vessels are new, crew accommodation, sanitary arrangements and privacy can be designed for mixed crews from the first drawing, rather than retrofitted into tonnage never intended for them. The programme accordingly sets a floor rather than a target: not fewer than 40 per cent of positions across shipbuilding, design, vessel operations and crewing are held by Caribbean women. That floor is not an undertaking of intent but a design parameter of the programme, certified under the MARIFEM scheme established by Part X of the Merchant Shipping Act, 2024-28 (Barbados) and independently audited, and made attainable by dedicated training places, dedicated seagoing berths, recruitment, mentorship and progression. A participation floor without a training pipeline is a quota with no supply; the berths described at finding 13 are what make this floor achievable rather than declaratory.

The verification mechanism matters as much as the commitment. MARIFEM is a Barbadian-origin statutory scheme whose declared aim is to support women and young females to achieve representation, visibility and equality in the maritime sector, and whose scope extends beyond vessels to shipping companies, shipbuilding, ship repair and ship recycling facilities, ports, and training and educational institutions. It measures participants on the representation of females aboard and in shore-based employment, on pay equity, and on maritime training and career opportunities for females, and it certifies at three ascending levels, of which the highest requires demonstrated leadership by women rather than representation alone. A participation commitment submitted to that scheme is a regulated undertaking rather than a self-declared one, and the region would be well served if certification of this kind became the ordinary condition of public support for maritime projects rather than a distinction attaching to a few.

19. Ship, passenger, crew and operator security must be treated as essential infrastructure.

Reliable regional shipping requires effective measures to protect vessels, crews, passengers, cargo and shipowners from criminal activity, unlawful interference and other maritime security risks. The exposure is asymmetric, and falls most heavily upon the carrier: a vessel used without its operator's knowledge for the movement of narcotics, firearms or undeclared persons may be detained, fined or forfeited, its insurance withdrawn, its class and flag standing placed in question and its trade destroyed — for conduct in which neither owner nor crew took part. A scheduled service carrying the region's food cannot therefore treat security as a compliance formality; it is a condition of the service's survival. A specific gap must also be addressed. The International Ship and Port Facility Security Code applies to passenger ships, and to cargo ships of 500 gross tonnage and above, engaged on international voyages; a cargo vessel of this class — under 500 GT and certificated for twelve passengers or fewer — accordingly falls outside its mandatory scope. The region should adopt a proportionate security standard for small commercial vessels: a ship security plan, designated ship and company security officers, defined access control, search and incident procedures, calibrated to vessels of this size rather than imported wholesale from deep-sea practice. In practice security begins ashore and before loading — consolidation at controlled premises, cargo packed and sealed under supervision with tamper-evident seals, verified weights, a documented chain of custody from packing house to hold, advance cargo and passenger manifests, pre-arrival reporting and coordinated inspection with customs and border agencies — the same disciplines that serve phytosanitary compliance and cold-chain integrity. Crews and shore staff require vetting proportionate to their access, and equally require protection: seafarers and dock workers are themselves targets for recruitment and coercion by criminal networks, and need confidential reporting channels, employer support, and assurance of fair treatment should an incident occur. Passengers require controlled boarding, an accurate manifest, and the emergency, evacuation and search-and-rescue readiness that the carriage of persons demands. Digital systems require equivalent attention: vessels operating with digital twins, remote monitoring and networked cargo and temperature data are exposed to interference with navigation and position signals, to tampering with the records upon which certification, claims and phytosanitary compliance depend, and to attack upon shore systems; these should be managed under recognised maritime cyber-risk guidance. None of this can be achieved by an operator alone. It requires standing arrangements with national coast guards, port authorities and customs administrations, and with the regional security architecture — among it the Regional Security System and CARICOM IMPACS — so that information, inspection capacity and response are shared across the routes the network serves. Security so constructed protects four interests at once: the passenger, who must arrive safely; the seafarer, who must not be placed between a criminal network and a livelihood; the cargo owner, whose

goods must arrive intact and uncontaminated; and the shipowner and operator, whose licence to trade depends upon never becoming the instrument of another's crime.

20. Scheduled connectivity can stimulate production.

Reliable maritime transport is not merely a response to existing demand. It can increase demand by giving farmers, manufacturers, artisans, retailers and consumers greater confidence that goods can be moved predictably and economically between islands.

21. Intra-regional phytosanitary compliance must be streamlined.

Efficient regional food trade requires practical and coordinated phytosanitary procedures. Training in fresh-food handling, temperature control, cargo preparation and stowage must remain at the forefront of vessel operations so that produce can move safely, compliantly and with minimal loss from farm gate to point of sale.

22. Administrative harmonisation is as decisive as tonnage.

Vessels alone do not create connectivity. Dependable scheduled service also requires streamlined customs and immigration procedures at each port of call, and the mutual recognition between Member States of vehicle licensing and insurance where roll-on traffic is carried. These arrangements determine turnaround time, cost and reliability as directly as the vessel itself, and their resolution is a necessary companion to any permanent regional service.

23. CARICOM should consider reserving the carriage of strategic supplies to fossil-fuel-free, Caribbean- owned vessels, on the precedent of established cabotage law.

Several maritime states secure their domestic shipping capability by reserving domestic carriage to their own vessels and crews. The United States does so under section 27 of the Merchant Marine Act 1920, commonly the Jones Act, which requires merchandise moving between United States points to be carried in vessels built in the United States, owned by United States citizens and crewed predominantly by United States citizens and residents. Canada does so under the Coasting Trade Act 1992; Nigeria under the Coastal and Inland Shipping (Cabotage) Act 2003, which additionally established a financing fund to build the national tonnage the Act requires; and the European Union under Council Regulation (EEC) No 3577/92, which reserves maritime cabotage to Community shipowners operating vessels registered in and flying the flag of a Member State. The Caribbean, uniquely dependent upon the sea and uniquely exposed to the cost and reliability of its carriage, has no equivalent instrument. The Community should therefore consider whether strategic supplies — including food produced within the region, and such other commodities as may be precisely scheduled — should progressively be reserved for carriage in fossil-fuel-free vessels built, owned, operated and crewed by CARICOM nationals and residents. A measure of that kind would achieve what no subsidy can: it would create the dependable demand against which regional tonnage can be financed, regional yards commissioned, and regional seafarers employed and certificated, while binding the region’s food security to vessels that cannot be withdrawn, repriced or immobilised by a fuel supply chain originating outside it.

Such a measure would require careful construction. It should begin with public procurement and funded pilot routes; apply to a precise and published schedule of commodities rather than to trade at large; take effect progressively as qualifying capacity and demonstrated affordability allow, with transitional waivers where no

qualifying vessel is available; and its ownership, build-origin and crewing conditions require examination against the Revised Treaty of Chaguaramas and the Community’s external trade obligations before adoption. Properly phased, however, it is among the few policy instruments capable of converting the region’s connectivity deficit into a Caribbean-owned industry.

24. Decarbonisation should be applied as an instrument of economic development.

Decarbonisation is most valuable to the region when pursued as a driver of economic growth, regional integration and gender mainstreaming, rather than as an environmental objective in isolation. The wind is indigenous, renewable and without commodity cost; progressively removing purchased fossil fuel from the operating equation reduces exposure to external energy-price shocks and incrementally lowers both the cost and the volatility of inter-island transport and commerce — improving market access, enabling greater movement of people and goods, strengthening food security and advancing the practical integration of Caribbean economies.

25. Zero-fossil carriage preserves the green identity of Caribbean products to the point of sale.

The Initiative's founding premise, recorded by the Centre in 2015, extends beyond the vessel to the goods it carries. Caribbean countries are establishing green economy productive sectors built upon the sustainable utilisation of biodiversity and other selected natural-resource and environmental assets — organic and agroecological produce, cultivated and wild-harvested botanicals, heritage and artisanal foods, and the manufactured goods derived from them. The value of such products in export markets rests upon their environmental provenance. That provenance is diminished at the moment the goods are loaded aboard a fossil-fuelled vessel: produce grown without synthetic inputs, and harvested in a manner that sustains the ecosystem which produced it, arrives in the importing market carrying the carbon of its carriage. A zero-fossil- fuel marine transport system extends the low-carbon footprint chain into the marketplace of the country of import, and thereby preserves the green identity of the product from origin to point of sale. As markets increasingly require verified environmental provenance across the whole supply chain, and as carbon accounting extends to transport emissions, decarbonised carriage ceases to be merely a public good and becomes a commercial attribute of the cargo itself — the means of protecting the premium that biodiversity- based Caribbean production is capable of earning, and of ensuring that the region's green economy sectors are not undone in transit.

26. A proof of concept and the permanent solution must advance together.

A proof-of-concept service using an available vessel can demonstrate demand, establish reliable schedules, resolve customs and immigration procedures, address mutual recognition of vehicle licensing and insurance, and allow producers, distributors and passengers to become accustomed to dependable inter-island transport. Equally importantly, it provides the time and market evidence necessary for the Caribbean private sector to organise the permanent vessel solution. The question is therefore not simply whether a proof of concept can work, but what follows it. The logical progression is: prove the concept, establish the market, deploy purpose-designed islandscale vessels, develop Caribbean commissioning and maintenance capability, and progressively establish a distributed regional fleet.

27. Maritime decarbonisation is not a burden to be borne, but the most cost-effective instrument available for building Caribbean connectivity.

The findings above converge on a single conclusion. Decarbonisation has too often been presented to Small Island Developing States as a cost — an obligation accepted at the region's expense in service of a global objective. On the evidence of this Initiative, the opposite holds in maritime transport: removing purchased fossil fuel from the operating equation is the most cost-effective means available of restoring the dependable, scheduled, island-scale connectivity the region has lacked for decades. It lowers the cost floor beneath which no fossil-fuelled service can go; it makes a published schedule affordable irrespective of how full the vessel sails; it opens access to concessional climate and blue-economy finance that conventional tonnage cannot reach; and it does so using a fuel that is indigenous, free at the point of use and subject to no external supplier. What follows from that connectivity is the larger prize: the functioning physical integration of the CARICOM Single Market and Economy, in which goods, produce and people actually move between Member States on dates they can plan around; the strengthening and expansion of the Caribbean Community as a working economic space rather than a policy framework; and a measurable increase in regional sovereignty — over the region's food supply, its energy exposure, its transport, its industrial capability and its seafaring workforce. Maritime decarbonisation should therefore be pursued by the region not in deference to external expectation, but as an instrument of its own integration, resilience and self-determination.

This report is authored by Ian Dash, Director of the Caribbean Sail Cargo Initiative, who is solely responsible for its contents.

Supplementary findings 7–10 comprise subsequent logistics and port-economics analysis; their numerical assumptions were not measured directly during the original pilot. The original findings have been renumbered accordingly.