

WORK IN PROGRESS REPORT



INTRA CARIBBEAN MARITIME SHIPPING Sustainable, Competitive and Inclusive

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for



through



MARITIME SHIPPING SOLUTIONS SELECTION CRITERIA



SUSTAINABLE

ENERGY EFFICIENCY

GHG REDUCTIONS

NO_x, SO_x, PM

EMISSIONS REDUCTION



COMPETITIVE

COST REDUCTION

FUTURE READY FOR
LONG TERM CHANGES

ADDITIONAL REVENUE



INCLUSIVE

JOBS GENERATION

NEW AREAS OF
DEVELOPMENT

BETTER LIVES

ENERGY EFFICIENCY

Ship Design & Operation
Air Lubrication
Wind Assistance

EMISSION REDUCTION

Green Fuel
Shore Power
Carbon Capture

ENERGY EFFICIENCY & EMISSIONS REDUCTION MEASURES



CSA
55th ANNUAL GENERAL MEETING
CONFERENCE AND EXHIBITION
October 12 - 14 | 2025 | Paramaribo, Suriname



Operational

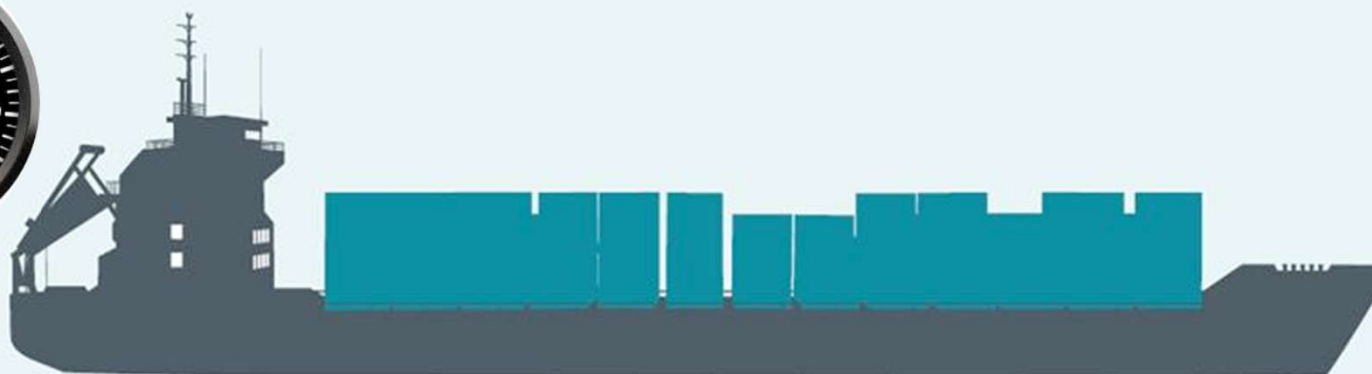
Weather routing **1-4%**
Autopilot upgrade **1-3%**
Speed reduction **10-30%**

Auxiliary power

Efficient pumps, fans **0-1%**
High efficiency lighting **0-1%**
Solar panel **0-3%**

Aerodynamics

Air lubrication **5-15%**
Wind engine **3-12%**
Kite **2-10%**



Thrust efficiency

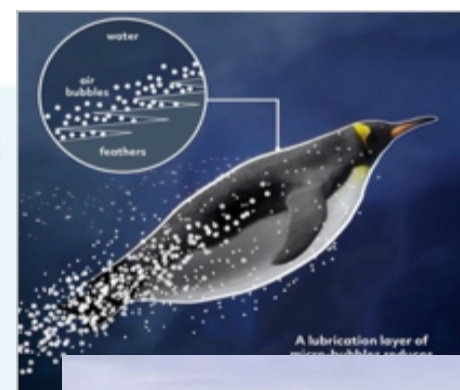
Propeller polishing **3-8%**
Propeller upgrade **1-3%**
Prop/rudder retrofit **2-6%**

Engine efficiency

Waste heat recovery **6-8%**
Engine controls **0-1%**
Engine common rail **0-1%**
Engine speed de-rating **10-30%**

Hydrodynamics

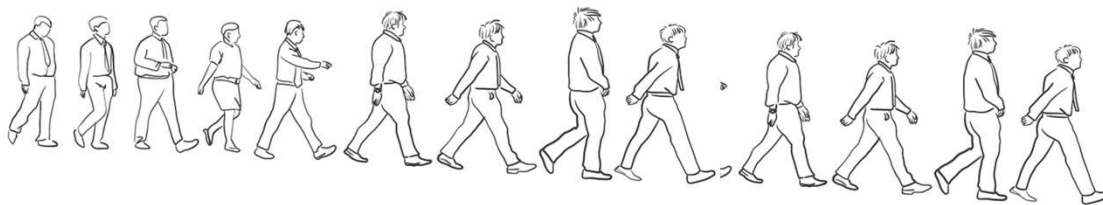
Hull cleaning **1-10%**
Hull coating **1-5%**
Water flow optimization



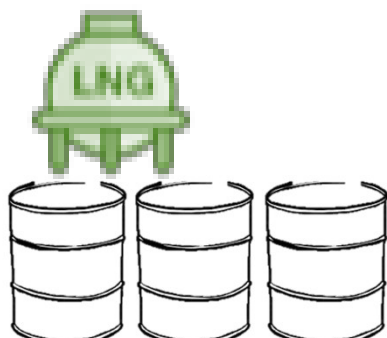
LNG + BIOLNG: CARIBBEAN GREEN MARINE FUEL



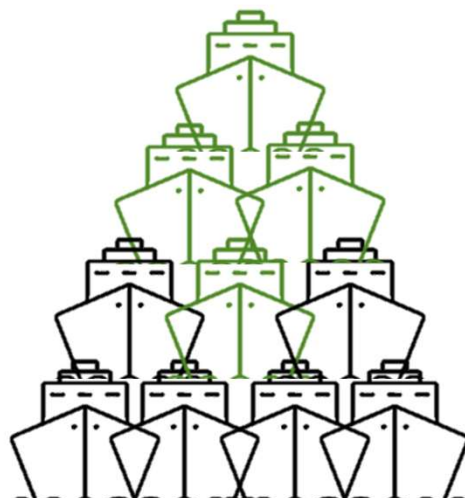
FOLLOW THE CROWD !



41%
2050 PROJECTED
GLOBAL MARINE
ENERGY IS LNG



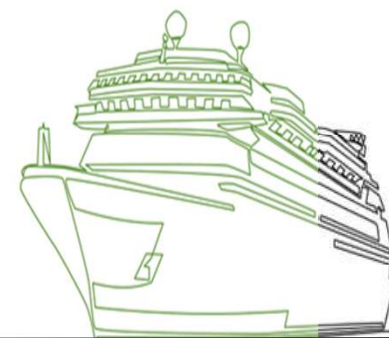
37%
GROSS TONNAGE



50%
CONTAINERSHIPS



63%
CRUISE SHIPS



LNG + BioLNG CAN PROVIDE 100% NZ FUEL DEMAND



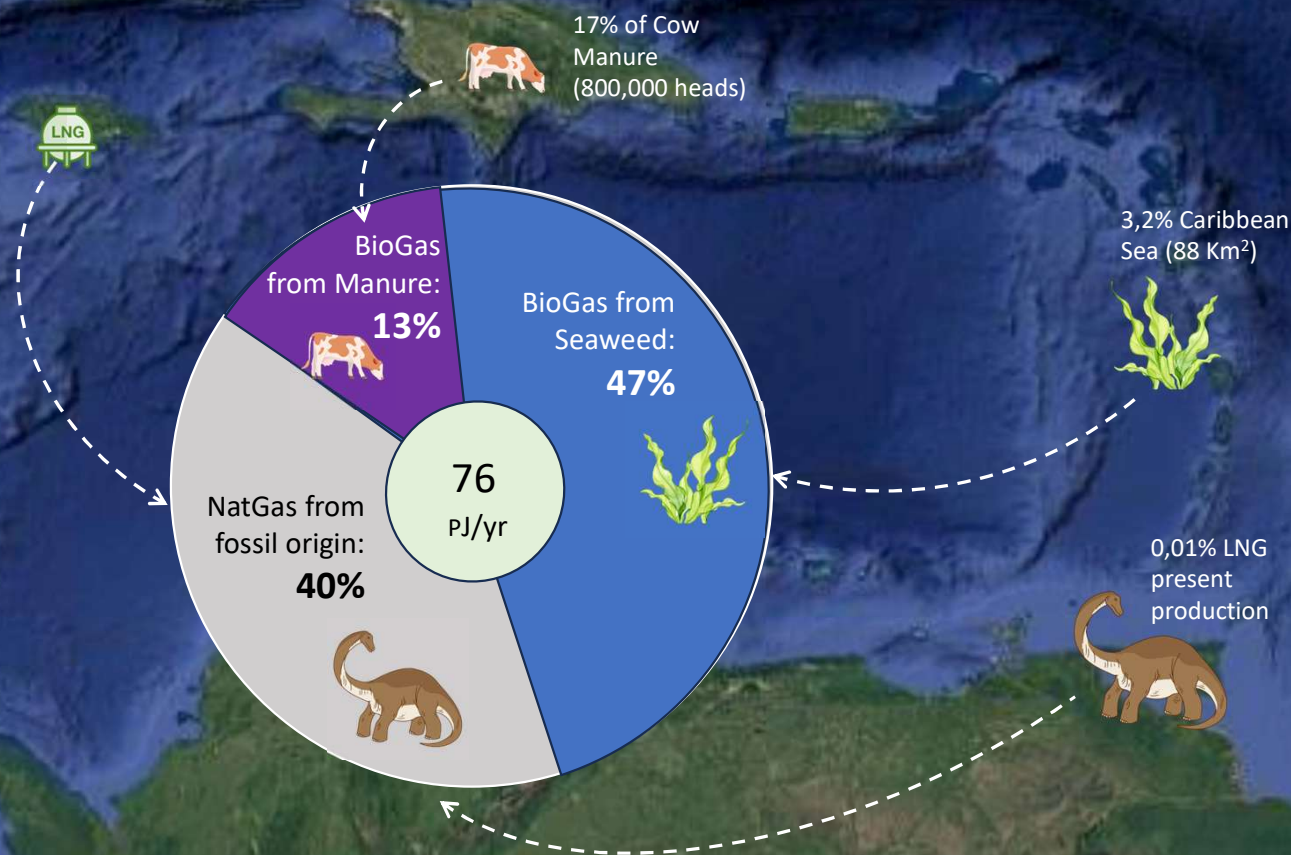
USING AVAILABLE RESOURCES AND SOLVING PROBLEMS

Caribbean Marine Green Fuels would come from 4 main regional sources:

- Imported LNG in Jamaica
- Natural Gas (TT+Guy+Sur)
- Cow Manure (R.Dom+Haiti)
- Seaweed from Caribbean Sea

Other available sources are:

- Urban waste
- Industrial waste (Rum distilleries)
- Cruises' Organic Waste
- Agricultural waste



LNG + BioLNG MEET OUR THREE MAIN CRITERIA



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Caribbean Shipping
Decarbonization
can be reached:



avoiding 4,100,000 tCO₂/yr

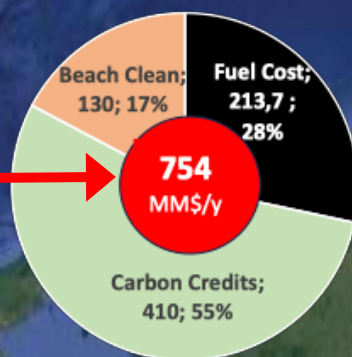


generating 100,000 New Green Jobs

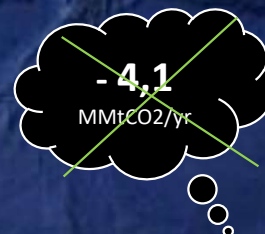


saving 754 MMUSD/yr

62% of present
Caribbean
Shipping Fuel Cost



17,000 JOBS



69,000 JOBS



14,000 JOBS

CARIBBEAN FLOATING BIOREFINERIES (CFB): LOW COST, FLEXIBLE & SCALABLE FULL SOLUTION

NET ZERO REGIONAL FUEL AT A LOW AND STABLE COST, SOLVING THE SARGASSUM PROBLEM

HARVEST

Existing small seaweed collecting vessels

PRE TREATMENT

Second hand off-market barge equipped w/ drying and compacting systems

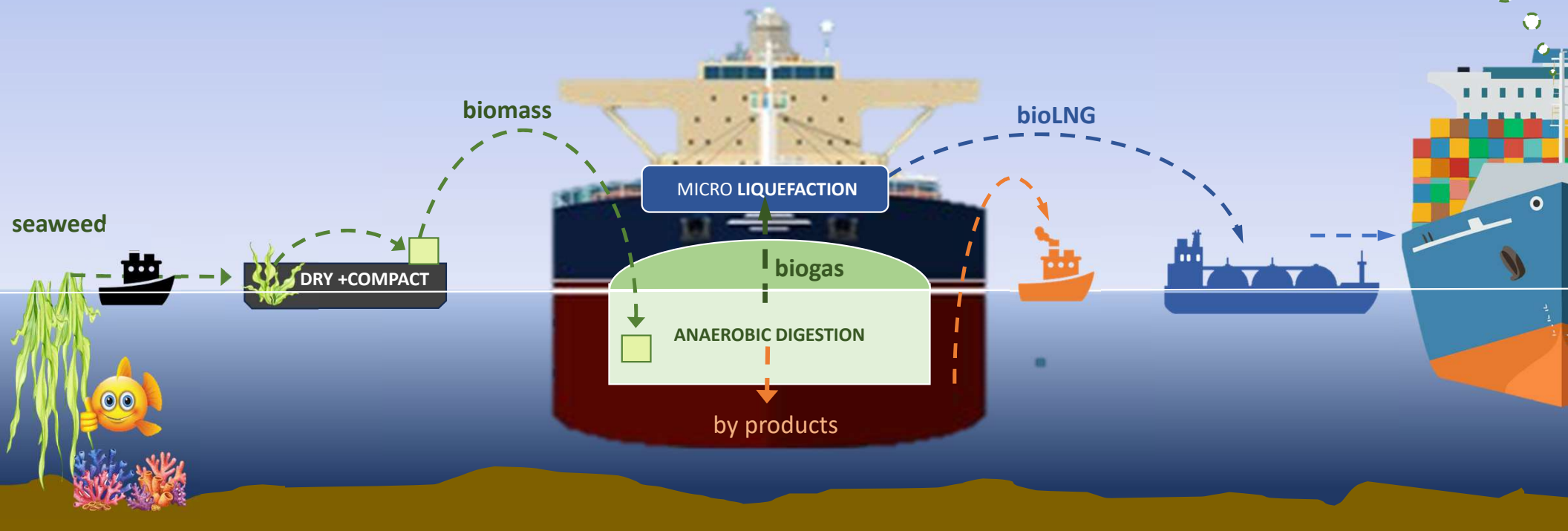
BIOGAS / BIOLNG PRODUCTION

Second hand off-market conventional Panamax bulk carrier retrofitted to accommodate standard Anaerobic, Upgrading, Micro Liquefying systems, cryogenic tanks and by products storage and offloading systems.

NET ZERO FUEL BUNKERING

Small LNG bunkering barges to service LNG powered Cruises and Container ships calling nearby Caribbean ports

ZERO CO₂



CARIBBEAN FLOATING BIOREFINERIES (CFB) BASIC ECONOMICS

CAPEX: 34 MMusd / CFB para OUTPUT: 600,000 GJ/yr = 17,000 T Diesel eq/yr

AMORTIZ @ 7%, 30YR 4,6 usd/GJ

OPEX: 9,7 usd/GJ

SUB TOTAL: 14,3 usd/GJ

- CO2 Credit -5,4 usd/GJ

TOTAL COST: 8,9 usd/GJ

+ 15% Bunk: 1,3 usd/GJ

FINAL COST: 10,2 usd/GJ

Fuel Cost Saving -40%

FUEL COST: 16,8 usd/m³
(600 usd/m³)

-5,4 Usd/GJ Credit = 100 usd/T CO₂ (IMO NZF) x

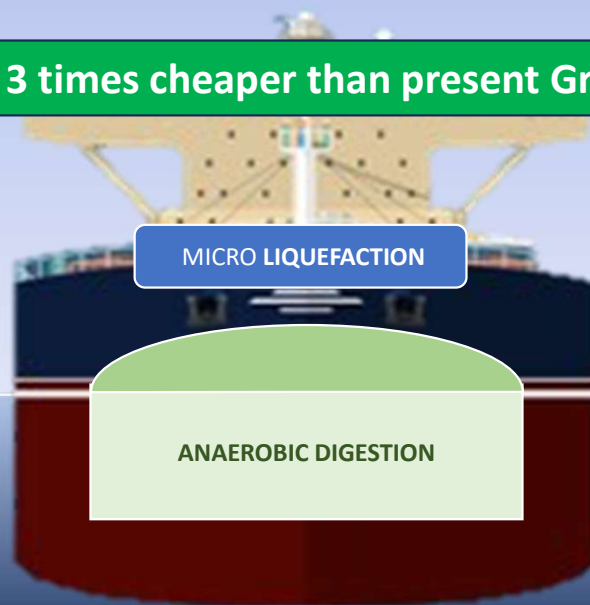
0,054
T CO₂/GJ

ZERO
CO₂

3 times cheaper than present Green H₂ solutions

MICRO LIQUEFACTION

ANAEROBIC DIGESTION



IMO NZF @ CARIBBEAN: 2 SIDES OF THE SAME COIN

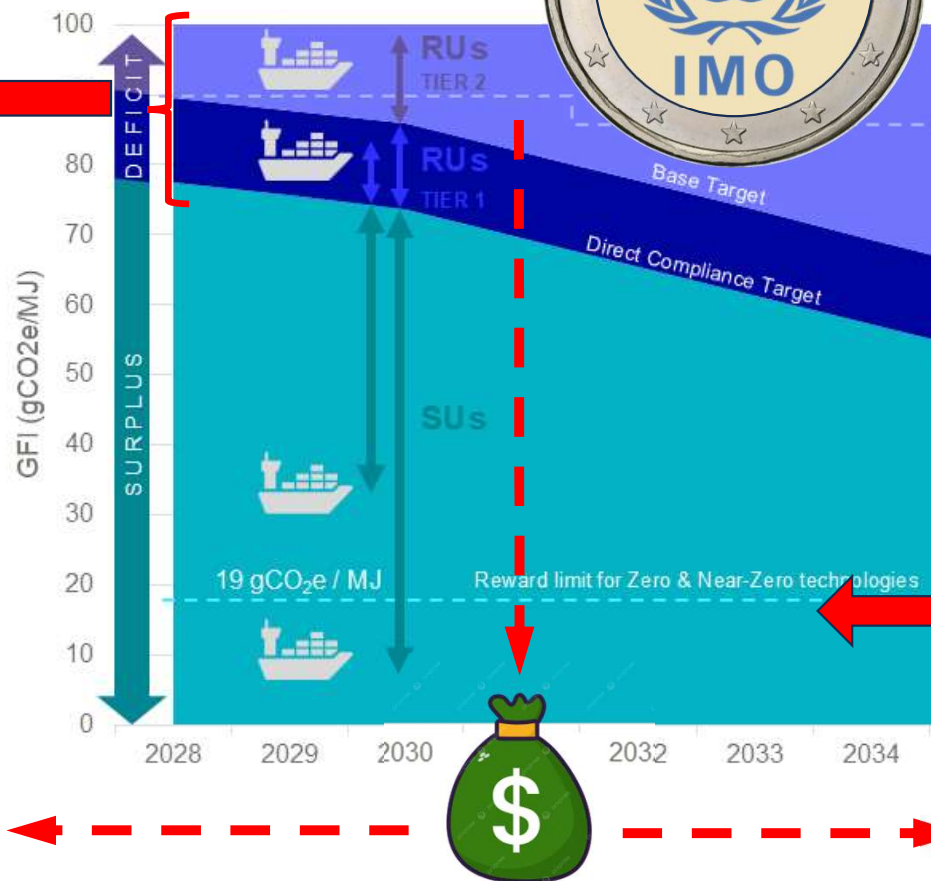


Higher Imported Goods Cost in the Caribbean Economy

IMO measures are pivotal for global decarbonization but pose significant economic challenges for small and vulnerable economies as CARICOM states very dependent on food imports that would have a cost increase, with very negative social impact.

Net Zero Funds shall be used to mitigate the negative impacts in the Caribbean economy

IMO Net Zero Framework



\$/tCO₂

380

100

IMO GHG Emission Pricing Mechanism would generate a huge **Net Zero Fund** of **10/15 B USD /yr** to reward ships that use green fuel as the **BioLNG** proposed for the Caribbean Shipping Decarbonization.

Lower CAPEX & OPEX for Green Fuels & Green Ships in the Caribbean Shipping

