OPPORTUNITY GREEN

Advancing the maritime energy transition in the Caribbean

Opportunities for synergies with development priorities



November 2026

About Opportunity Green

Opportunity Green is a climate change NGO that tackles the gaps in global climate action. We focus on overlooked but high-polluting sectors like shipping and aviation, using law, economics, and advocacy to drive real change in investment and policy that matches climate science. Collaboration is at the heart of our approach and we believe that effective climate action must be fair and representative. We work with climate vulnerable countries to strengthen their voice in global decisions, hold big polluters accountable, and connect innovative companies with policymakers to push forward true zero-emission solutions. In short, we work from every angle to create impact where it's most needed on climate change.

About Caribbean Shipping Lanes (CSL)

The CSL Project, housed at the The Shridath Ramphal Centre for International Trade Law, Policy and Services at the University of the West Indies, works to strengthen Caribbean countries' capacity to participate effectively in international maritime decarbonisation negotiations at the International Maritime Organization (IMO). Through strategic policy advice, technical and legal research, capacity-building and direct support to national delegations, CSL seeks to ensure that the Caribbean's unique vulnerabilities, development priorities and economic interests are adequately reflected in the global shipping transition. An important component of this work is strengthening the evidence base on the economic impacts and opportunities associated with maritime decarbonisation for Caribbean Small Island Developing States.

This report forms part of these ongoing efforts, bringing together technical analysis, regional perspectives and country-specific insights to inform policy development and support evidence-based decision-making.

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- Department of Energy, Ministry of Information Communication Technologies (ICTs), Utilities and Energy, Government of Antigua and Barbuda
- Antigua and Barbuda Port Authority
- Barbados Maritime Transport Administration, Ministry of Tourism and International Transport
- Ambassador of Dominica, Permanent Representative to the IMO and advisor to the Prime Minister
- Dominica Maritime Administration

Further information

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Examples are provided for illustrative purposes only; this report does not provide an exhaustive list of possible actions or synergies between national development priorities, maritime decarbonisation and the NZF's economic element and the disbursement categories under it. They do not guarantee the eligibility of these activities for financing under the NZF's economic element, which will depend on the mechanism's governing provisions and eligibility criteria agreed in the Framework at adoption.

Cover image: Shipping cranes at the dock in Bridgetown, Barbados. Credit: bvirago (iStock)
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List of Abbreviations

BESS	Battery Energy Storage System
CARICOM	Caribbean Community
CDB	Caribbean Development Bank
DNI	Disproportionately Negative Impact
EEZ	Exclusive Economic Zone
EV	Electric Vehicle
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
IDB	Inter-American Development Bank
ILO	International Labour Organization
IMF	International Monetary Fund
IMO	International Maritime Organization
IRENA	International Renewable Energy Agency
JET	Just and Equitable Transition
LDC	Least Developed Country
LCOE	Levelized Cost of Energy
MEPC	Marine Environment Protection Committee
MoU	Memorandum of Understanding
MW	Megawatt
MWh	Megawatt hour
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution under the UNFCCC Paris Agreement
NZF	Net-Zero Framework
OECS	Organization of Eastern Caribbean States
PAGE	Partnership for Action on Green Economy
PDP	Physical Development Plan
PPA	Power Purchase Agreement
PV	Photovoltaic (solar)
SIDS	Small Island Developing States
UN	United Nations
ZNZ	Zero and Near-Zero emissions fuels and technologies

01
Executive Summary

This report explores the advancement of the maritime energy transition in the Caribbean both within and beyond the context of the IMO Net-Zero Framework (the Framework, NZF), which aims to regulate and reduce carbon emissions from the global shipping sector. As a region of island nations, shipping plays a particularly prominent role in economies – both for cargo and tourism. The Caribbean is particularly vulnerable to the impacts of climate change, most notably more intense hurricanes and sea level rise. At the same time, the Caribbean has many favourable characteristics to establish itself as a leader in the maritime energy transition, including historic climate leadership, abundant resources for renewable energy generation, and strong regional cooperation.

The report is made up of case studies on three countries, Antigua and Barbuda, Barbados, and Dominica and seeks to highlight:

1. Existing, planned and potential characteristics that increase the countries' readiness for the maritime energy transition in line with the draft NZF, including renewable energy, port upgrades and the development of synthetic fuels.

2. Potential intersections, synergies, and co-benefits between maritime decarbonisation (or decarbonised maritime development) and other national priorities.

The report illustrates how advancing the maritime energy transition, regardless of the NZF, can advance and support existing national development priorities including decarbonising national energy systems, enhancing food and water security, and ensuring that these transitions are just and equitable for the workforce. At the same time, it suggests linkages that may allow many of these activities to qualify for funding under the NZF's economic element and suggests how these revenues might be leveraged to benefit both the maritime energy transition and national and regional development priorities.

The distribution of compliance revenues collected under the NZF's economic element will be governed by Regulation 41 of the draft Framework. This report demonstrates that a broad interpretation of the Regulation is aligned with the laws and conventions of treaty interpretation. It also explains why the narrow interpretation which restricts its application to purely technical advancements in ships and fuels, despite being favoured by some, is not aligned with the purpose or wording of the Regulation. Such a narrow reading is therefore not aligned with international treaty interpretation. As such, the report offers an interpretation which includes the disbursements of compliance revenues to activities supporting a just and equitable transition of the maritime sector beyond ships, port infrastructure and fuels.



Image: Aerial view of Antigua and Barbuda (Canva.com)

Antigua and Barbuda

Antigua and Barbuda is highly dependent on tourism and very vulnerable to climate change impacts. Its overarching national priority is to build resilience to such impacts while continuing to strengthen and diversify its economy. Most of the country's energy is generated from imported fossil fuels. The country is seeking to build solar and wind generation capacity, which will require the installation of battery energy storage systems (BESS) and grid upgrades. The majority of the country's food is imported and its water is produced through desalination. The government is seeking to boost both food and water security by scaling up agriculture and electrifying its desalination plants.

The government has conducted an assessment of a just transition of the workforce, which predicts that the transition to renewable energy across the economy will generate a large number of jobs. The planned redevelopment of St John's Port on Antigua will likewise create many green jobs in construction, operation and maintenance, supporting a just and equitable maritime energy transition. The government aims to expand and modernise the port, as well as integrating the electrification of port operations and the provision of electricity to ships. It is also considering future opportunities for green hydrogen production.

Barbados

Barbados is also highly vulnerable to climate change and leans heavily on the tourism sector. Its overarching goal is to build a sustainable and inclusive future for the country through its national transformation roadmap to 2030, Mission Barbados.[1] The country generates most of its energy from imported fossil fuels; its renewable capacity sits at 29%, largely made up of distributed solar photovoltaic (PV) panels on buildings. Large-scale solar and wind farms, biomass and waste-to-energy are planned, for which grid upgrades and BESS will be required. Strengthening food and water security is a national priority, especially as Barbados is one of the world's most water-scarce countries. The government is investing in increasing the productivity and resilience of the agricultural sector and in water system upgrades to reduce the large volumes lost as non-revenue water (water that is lost or unaccounted for in the water system).[2]

Barbados' renewable energy plans are predicted to generate employment opportunities. The government has established a Renewable Energy Skills Council and is considering turning renewable energy installation skills into a regional export. The construction of a new berth was recently completed at Bridgetown Port, expanding its capacity. The port operator plans to turn Bridgetown into a world-leading port in green shipping; however, available information on the upgrade plans suggests gaps in critical areas including zero and near-zero emissions fuel (ZNZ) bunkering infrastructure. The government is considering introducing green shipping regulations, including emissions pricing and green shipping corridors.

Dominica

Dominica is also highly vulnerable to climate change. The country's overarching mission is to become the world's first climate-resilient nation.[3] Geothermal energy is critical to this: the island's first geothermal plant recently opened, significantly reducing fossil fuel use. Dominica plans to expand geothermal as well as hydropower, solar PV and wind, aiming to export energy in the future. Grid upgrades are planned to fully harness renewable generation capacity.

Agriculture is Dominica's largest export sector. The government is looking to diversify and scale up this already strong sector and create food value chains to enhance its food sovereignty and economic contribution. The island has abundant freshwater resources, but its distribution infrastructure requires upgrades and fixes, which are planned.

Dominica has undertaken a multi-sectoral capacity gaps assessment for the just and equitable transition of the whole economy. The country plans to upgrade its existing ports and build a new one. Readiness for decarbonised shipping must be integrated into these projects to enable Dominica to contribute to and benefit from the maritime energy transition. The government is also looking into the potential of developing green hydrogen.

Regional

The three case study countries share many contextual characteristics, including vulnerability to climate change, historic dependence on imports, and constraints to accessing finance. They share the common goals of increasing their adaptation and resilience to climate change and building energy and food sovereignty to reduce their import dependence. All have developed strong legislative and policy environments to support these goals.

Energy security

All three countries have made significant advancements in renewable energy, with more planned. In all three, upgrades to the energy grid and the installation of energy storage are required to enable a full transition to renewables. This report suggests that integrating these renewable energy works into port upgrade projects and demonstrably linking them to the maritime energy transition may enable them to qualify to receive funding under the NZF.

Food and water security

Food security is a core concern for all three countries, with each importing most of their food and looking to expand and diversify domestic production to strengthen food sovereignty. All three lack appropriately skilled workers, which creates a requirement for training programmes at both national and regional levels as well as a degree of intra-regional migration. This will also contribute to a just and equitable transition.

Water security is also a concern to differing degrees, with upgrades planned to water distribution infrastructure across the three countries. This report suggests a number of ways of linking water provision infrastructure to maritime decarbonisation, including as a core component of the planned green hydrogen development.

Just workforce transition

All three countries are taking steps to ensure a just and equitable transition for their workforce and each has conducted activities to identify gaps and potential actions. The transition of these countries to renewable energy and the port redevelopment plans are anticipated to generate a large number of green jobs. This report suggests that training and upskilling programmes at regional and national levels could be supported by the NZF.

Maritime development

As small island nations, all three countries depend on their ports and all have port upgrades planned or underway. It will be critical to integrate decarbonisation and the provision of ZNZs into these plans; both to enable each country to lead and benefit from the maritime energy transition, and to ensure that some elements of these projects can be eligible for financial support under the NZF.

Conclusions and recommendations

The report highlights three key recommendations that draw on the commonalities observed across the case studies:

1. Countries can leverage port infrastructure and upgrades to advance their renewable energy transition.

2. Training programmes to fill skills gaps in agriculture and renewable energy could be conducted at the regional level to facilitate knowledge sharing and economies of scale.

3. Advancing the development of synthetic fuels could strategically position these countries as green shipping hubs for the region and secure them early-mover advantages.

Figure 1 below shows activities and projects that could be eligible for funding under the disbursement categories listed under Regulation 41 of the Net-Zero Framework and how these could support the national priorities. Distribution Category 4 offers an opportunity for countries to consider integrating maritime decarbonisation as they develop National Adaptation Plans (NAPs). This diagram is intended to highlight potential linkages only and does not represent proportions or values of potential revenue flows.

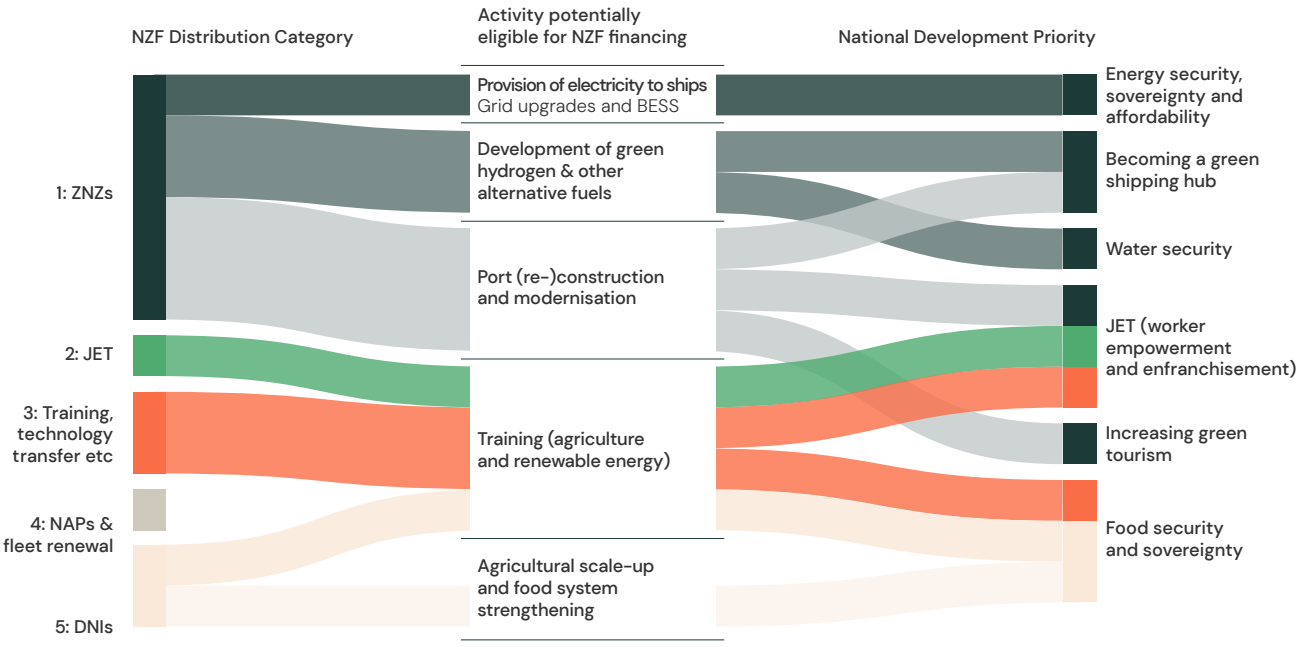


Figure 1: Potential synergies between NZF disbursement categories and national priorities

02
Introduction

The Caribbean

The Caribbean has both an urgent need and notable readiness to decarbonise and increase the resilience of its maritime sector. It is located in the path of regular Gulf hurricanes, which are becoming less predictable and more devastating as climate change intensifies, making Caribbean states highly vulnerable to storm damage. As a region comprising closely located SIDS, many with fast-developing economies, it has a high dependency on shipping and high potential for collaborative action.

Traditional metrics like GDP per capita and GNI in the climate finance landscape disadvantage the region. These metrics do not consider vulnerabilities or the small scale of SIDS economies, and can result in blocks to accessing concessional finance. At the same time, the Caribbean is internationally prominent in the areas of climate advocacy, climate justice and climate finance, and is therefore well placed to act as a global leader in driving the maritime energy transition.

Both accelerating the decarbonisation of maritime sectors and setting high ambitions for maritime decarbonisation offer opportunities for Caribbean countries to boost their economies, enhance their resilience, and advance towards their existing development goals, specifically in the areas of:

- Energy security and renewable energy.
- Food and water security.
- The maritime energy transition, particularly ensuring it is just and equitable and generates green employment opportunities for Caribbean citizens.

Through exploring three case study countries which are already advancing towards decarbonising their shipping sectors, this report identifies existing characteristics and planned developments that present synergies with the maritime energy transition and explores how these strengthen readiness for that transition. It also considers how moves towards shipping decarbonisation could support and help fill gaps in broader national development priorities, and suggests how such activities could be eligible for financial support under the Framework's financial instrument in accordance with Regulation 41.

The case study countries are:

- Antigua and Barbuda
- Barbados
- Dominica

These countries each have particular characteristics and developmental features that place them in a strong position to advance the shipping energy transition. They have different profiles and illustrate a range of pathways towards maritime decarbonisation for other countries to draw upon. For example, Antigua and Barbuda is pursuing a comprehensive renovation of its port to become a green shipping hub in the Caribbean; Barbados is a global leader in innovative environmental financial instruments to finance its energy transition; and Dominica is leading the Caribbean in the development of geothermal energy. Each of the case studies looks in depth at the following areas, which were identified as relevant across the region:

- Energy security and renewable energy.
- Food and water security.
- A just and equitable transition of the workforce.
- Maritime development.

The Net-Zero Framework

The Net-Zero Framework (The Framework, NZF) is a proposed amendment to the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI under the International Maritime Organization (IMO), which aims to regulate and reduce the carbon emissions from the global shipping sector. In 2023, at the 80th session of the Marine Environment Protection Committee (MEPC 80), the IMO adopted a Strategy on Reduction of Greenhouse Gas Emissions from Ships (2023 IMO GHG Strategy). Through that strategy, Member States committed to reducing the greenhouse gas (GHG) emissions from global shipping to net-zero at or around 2050, in line with their commitments under the Paris Agreement to take action across sectors to limit average global temperature rise to 1.5C. The draft NZF constitutes the medium-term measures Member States will take to achieve this commitment.

The draft Framework was approved by Member States at MEPC 83 in April 2025 and was due for adoption at MEPC ES.2 in October 2025. However, last-minute changes in position by a small number of countries led to the vote on adoption being delayed until December 2026. In the intervening year, negotiations have continued on the draft Framework, with a general trend towards decreasing the ambition of both its emissions regulation and revenue-raising mechanisms.

The Framework is structured as two interconnected pillars:

- A **technical element:** The Global Fuel Intensity (GFI) standard sets limits on the permitted carbon intensity of fuels. It defines two target thresholds for the GHG intensity of a fuel, measured in grams of CO_2 equivalent emitted per tonne of fuel used (CO_2eq/tonne) on a well-to-wake basis. The **base** target allows a higher CO_2eq/tonne measure; the **direct compliance target** permits a smaller amount of CO_2eq/tonne.

- An **economic element:** The price set on emissions above these thresholds. Ships that do not meet these thresholds must purchase 'Remedial Units' (RUs) to achieve compliance with the NZF. There are two price bands ('tiers') for these RUs, aligned with the two GHG intensity thresholds, as illustrated in Figure 1:

  - Tier 1 emissions are those which meet the less stringent 'base target' for emissions intensity, but fall above the more ambitious 'direct compliance target'.

  - Tier 2 emissions are those that do not meet the 'base target'.

  - Vessels using fuels that meet the 'direct compliance target' do not need to purchase RUs. Those using fuels with emissions lower than the 'direct compliance target' may be issued Surplus Units.

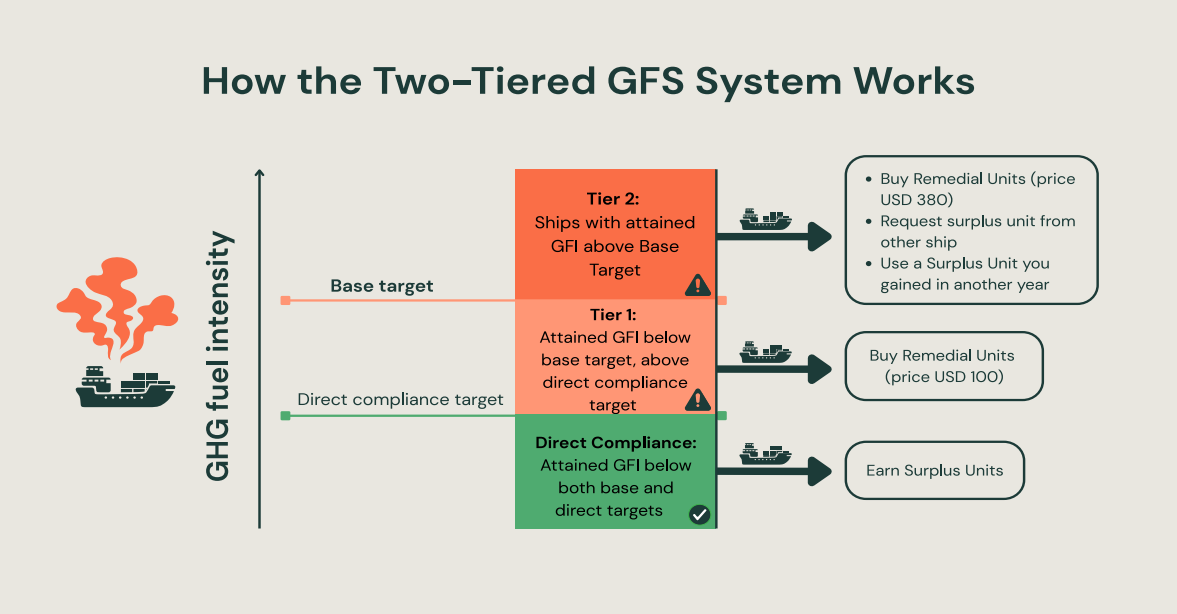


Figure 2: The Global Fuel Standard of the IMO Net-Zero Framework

All compliance revenues from this structure would be collected by the IMO and have been estimated to total up to US$10bn annually.[4] The disbursement and use of these compliance revenues is governed by Regulation 41 of the draft NZF, which is explored in detail below. As currently stands, the revenues will be leveraged towards ensuring that the decarbonisation of the shipping sector is just and equitable, and towards catalysing an accelerated transition to zero and near-zero emissions fuels and technologies (ZNZs).

Interpretation of Regulation 41 that frames this work

Regulation 41 – Disbursement of Revenue:

The IMO Net-Zero Fund shall disburse collected revenue for the following purposes, as shall be specified in its governing provisions:[i]

1. *rewards for the use of ZNZs, in accordance with regulation 39;*

2. *in the context of the implementation of this chapter and, promoting* ***a just and equitable transition*** *in States by facilitating* ***environmental and climate protection, adaptation and resilience building within the boundaries of the energy transition in shipping,*** *paying particular attention to the needs of developing countries, in particular least developed countries (LDCs) and small island developing States (SIDS), allocating sufficient revenue, for:*

    1. *researching, developing and making globally available and deploying zero and near-zero GHG emission technologies, fuels and/or energy sources, supporting the energy transition of shipping, and* ***developing the necessary maritime, coastal and port-related infrastructure and equipment****;*

    2. *enabling a* ***just transition for seafarers and other maritime workforce****;*

    3. *facilitating information-sharing, technology transfer,* ***capacity-building, training*** *and technical cooperation supporting the implementation of the regulations in this chapter;*

    4. *supporting the development and* ***implementation of National Action Plans*** *(NAPs), including* ***fleet renewal and upgrade****; and*

    5. *addressing, as appropriate,* ***disproportionately negative impacts on States****, including on* ***food security****, resulting from the implementation of the regulations in this chapter;*

3. *cover the administration and operational costs of the Fund and its Governing Board.*

* *Emphasis added to identify the wording that is discussed in the interpretation*

Interpretation of Regulation 41.1.2 for the purposes of this research project

The justice and equitability of the transition is central to the chapeau text of Regulation 1 paragraph 1.2 of the draft NZF. To properly interpret Regulation 41, the international legal rules of treaty interpretation must be applied. Article 31(1) of the *Vienna Convention on the Law of Treaties sets out the core rules as follows:*

> '1. A treaty shall be interpreted in **good faith** in accordance with the **ordinary meaning** to be given to the terms of the treaty in their **context** and in the light of its **object and purpose**.' [emphasis added]

i This text is copied verbatim from Regulation 41 of the draft Net-Zero Framework as it currently stands. As the name, structure and governing provisions of this financial mechanism are still being developed and negotiated, this report simply refers to the NZF's economic element.

As such, paragraph 1.2 of Regulation 41 allows for revenues collected into economic element to be used for all activities which 'facilitat[e] environmental and climate protection, adaptation and resilience building within the boundaries of the energy transition in shipping.'

There are three terms in the chapeau text of Regulation 41.1.2 which are critical to its operationalisation (highlighted in tan, green and pink above). It is therefore beneficial to establish a clear interpretation of these terms that informs a common understanding of their use in this report.

Just and equitable transition (JET)

Kenya (in ISWG-GHG 21/2/11) proposed that the following definition of 'just and equitable transition' be inserted into MARPOL Annex VI. As this submission was well received and no countries expressed objection to this definition, we adopt it for this report:

'Just and equitable transition' means a transition that:

1. Enables` all States, in particular developing States, least developed countries (LDCs) and small islands developing States (SIDS) to comply with and benefit from the regulations while minimizing any disproportionate negative impacts on their economies and societies.
2. Supports the creation of decent work, the protection and upskilling of seafarers and the maritime workforce.
3. Promotes fair access to finance, technology transfer and capacitybuilding.
4. Addresses, through targeted support, the disproportionate negative impacts on developing countries, LDCs, and SIDS, including on trade, transport costs, and food security.

Environmental and climate protection, adaptation and resilience-building

Following the Vienna Convention rules of interpretation, the most comprehensive way to read this term is to apply each of the three actions to both 'environmental' and 'climate'. In line with the human-centred understanding of the concept in international law, 'environment' here is understood to mean both natural environments and existing built or modified environments such as cities.[ii] For example, actions to protect cities against flooding and coastal erosion in the face of climate-induced sea-level rise are an example of adaptation.

ii The Stockholm Declaration (1972) describes both 'the natural and the man-made' as essential to human wellbeing and the enjoyment of human rights. 1 The International Court of Justice has likewise held that 'the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings' (*Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, ICJ Reports 1996, para 29).* 2 Treaty practice is consistent with this: the Espoo Convention (Art 1(vii)) 3 and the Aarhus Convention (Art 2(3))4 both treat human health, cultural heritage, landscape and physical structures as part of the environment to be assessed.

This means that 'environmental and climate protection, adaptation and resilience-building' includes all actions which contribute to the:

- Protection of the environment.
- Adaptation of environments to changes, e.g. in the climate, to survive or meet people's needs.
- Adaptation of people and behaviours to changing environments to continue meeting their needs.
- Building the resilience of the environment to changing conditions.
- Building the resilience of people to changing environments.
- Protection of the climate, i.e. reducing GHG emissions.
- Adaptation to climate change.
- Building resilience to climate change.

'Within the boundaries of the energy transition in shipping'

A question has arisen concerning the effect of the phrase 'within the boundaries of the energy transition in shipping' found in the chapeau of Regulation 41.1.2 on eligible disbursements. Neither Regulation 41.1 nor 41.3 have raised interpretive challenges. Contrary to the views of some, under the rules of treaty interpretation and statutory interpretation the phrase in question must be read to include all of the topics outlined in the subsections under the chapeau, and these topics must be interpreted in good faith in accordance with their ordinary meaning.

Regulation 41.1.2, providing for JET funding, has been argued by some delegations to narrowly restrict disbursements. Some have suggested that the underlined phrase 'within the boundaries of the energy transition in shipping' limits the meaning of Regulation 41 and the other provisions of Annex VI, including Regulation 43 on food security. Their narrow reading is that JET funding under Regulation 41.1.2 can only be used to support projects directly related to the ship fuel transition. Such a narrow interpretation limits the capacity of the economic element to support broad equity and justice in the transition, and would confine its benefits to fuel producers and shipowners transitioning to ZNZs. Broader equity concerns, such as on the maritime workforce and food security, would be excluded by such interpretations, and the economic element would therefore not be able to support a true JET, which contradicts the purpose and spirit of the economic element of the NZF, as agreed in Regulation 41.

This narrow reading is not supported by the wording of Regulation 41, the other Regulations, and the context and scope of the amendments to MARPOL Annex VI. The text of Regulation 41 itself lists several disbursement categories (sub-paragraphs one to five of regulation 41.1.2 above) that would be difficult to fit within such a narrow and constrained interpretation.



Image: Container ship on the Caribbean Sea, Barbados (Canva.com)

Examining the components of *the Vienna Convention on the Law of Treaties and applying them to Regulation 41 of the Framework reveals the following:*

1. **Good faith** – this requires the interpreter to read the text in good faith; restrictive or strict interpretations may not satisfy this requirement;

2. **Ordinary meaning** – this requires the words to be read in light of their ordinary or plain meaning (subject to the other rules, when that meaning is not clear);

3. **Context** – this requires us to read the words in their context. The phrase 'within the boundaries…' in the chapeau of Regulation 41.1.2 must be interpreted in the context of

   - not only the *other words in Regulation 41, but also*

   - *of all of the provisions of the amendments to MARPOL Annex VI, and*

   - *the overall purpose of the amendments and of the Net Zero Framework as a whole.*

   - *Reading a text in its* context also requires reference to related interpretive doctrines and canons:

     i. **Harmonious reading canon** – under this canon Regulation 41 must be read so as to be internally coherent:

        1. *all of the words in the chapeau of Regulation 41.1.2 must be given meaning, along with the words in its subsections (Regulation 41.1.2.1-.5),*

2. *the disbursement categories in subsections .1-.5 must be read so as to be compatible with the phrase 'within the boundaries of the energy transition in shipping.'*

ii. **Whole text canon** – context requires a provision to be read in light of the entire text, including the other words of the section, of surrounding provisions, and the document as a whole.

4. **Object and purpose** – requires a teleological interpretation of a treaty, meaning that the text should be read to be *consistent with the object and purpose not only of a particular section, but also of the treaty as a whole.*

- **Effectiveness** – interpreting a treaty provision in light of the treaty's object and purpose supports its effectiveness: \The principle of effectiveness, or effet utile [...] requires that a treaty is to be interpreted to give it, as a whole, and the individual provisions within it meaningful effect. The approaches of international courts reveal that the principle of effet utile means that *treaty clauses must be interpreted to avoid either rendering them superfluous or depriving them of significance for the relationship between the parties.'*[iii]

- The principle of effectiveness requires us to read Regulation 41 to be *internally consistent; subsections .1-.5 of Regulation 41.1.2 must be compatible with the chapeau, and vice versa.*[iv]

- Effectiveness is complemented by the rule against **superfluousness**, or **surplusage.**[v] All words must be given meaning.

In sum, Regulation 41.1.2 must be read to be internally consistent and coherent. All of its subsections must be read to be compatible with and fall within 'the boundaries of the energy transition in shipping'. Put simply, the disbursement categories related to 'supporting the development and implementation of National Action Plans' and 'addressing, as appropriate, disproportionately negative impacts on States, including on food security' must be read to properly fit 'within the boundaries...'

To look at this another way, the phrase 'within the boundaries' must be deemed to have been modified or expanded by the content of Regulation 41. Even if 'within the boundaries of the energy transition in shipping' might be read restrictively in the abstract, its inclusion in Regulation 41 has expanded that meaning to include all of the sub-categories of disbursement in Regulation 41.1.2.1-.5. These sub-categories themselves must be read in their ordinary meaning, in good faith, so as to make Regulation 41 as a whole effective. Any interpretation that reads the text in Regulation 41.1.2.1-.5 as being superfluous cannot be compatible with the rules of treaty or statutory interpretation.

iii Ratner SR. 'International Law Rules on Treaty Interpretation'. In: McCrudden C, ed. *The Law and Practice of the Ireland-Northern Ireland Protocol. Cambridge University Press; 2022:80-91, at 84 [emphasis added].*

iv This is called the presumption of validity in US statutory law. Brannon, supra, pp 52-57, states: 'An interpretation that validates outweighs one that invalidates (*ut res magis valeat quam pereat).' Stated another way, courts should construe statutes to have effect.*

v Under US law this rule requires Courts to 'give effect, if possible, to every clause and word of a statute' so that 'no clause is rendered 'superfluous, void, or insignificant.'' Brannon, supra, pp 52-57

Summary

The overall purpose of the NZF's economic element is to support a just and equitable energy transition of the shipping sector. All activities it supports should contribute to this and should facilitate environmental and climate protection, adaptation and resilience building. Subparagraphs 1-5 of Regulation 41.1.2 constitute the categories of activities, or disbursement categories, eligible for funding under the economic element, and all activities listed in these categories, as well as critical activities to enable and facilitate them, therefore fall within the boundaries of the energy transition in shipping. These disbursement categories are:

1. Researching, developing and making globally available and deploying zero and near-zero GHG emission technologies, fuels and/or energy sources, supporting the energy transition of shipping, and developing the necessary maritime, coastal and port-related infrastructure and equipment.

2. Enabling a just transition for seafarers and other maritime workforce.

3. Facilitating information-sharing, technology transfer, capacity-building, training and technical cooperation supporting the implementation of the regulations in this chapter.

4. Supporting the development and implementation of National Action Plans (NAPs), including fleet renewal and upgrade.

5. Addressing, as appropriate, disproportionately negative impacts (DNIs) on States, including on food security, resulting from the implementation of the regulations in this chapter.

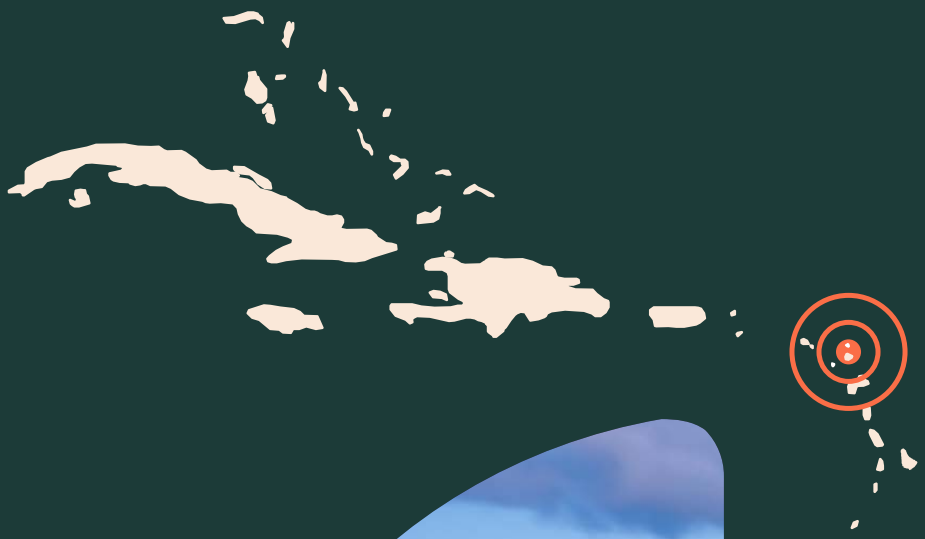
The rest of this report adopts these categories and refers to them as disbursement categories one, two, three, four and five.

Methodology

The report is compiled from desk-based research from publicly available sources. For each case study, the core strategy documents consulted are government-published national documents, including the Nationally Determined Contribution (NDC), National Adaptation Plan and national budget addresses. Overarching development priorities were ascertained from these documents. For each of the thematic priorities, more specific documents have been consulted. Many of these are national, including government policies and the websites of the national utility companies. Data has also been gathered from UN sources, documents from multilateral financial institutions funding projects such as the Global Environment Facility (GEF), Green Climate Fund (GCF) and Caribbean Development Bank (CDB); other relevant sources including the International Renewable Energy Agency (IRENA), Caribbean Community (CARICOM) and its subsidiaries, and some academic literature. Some ancillary information such as events and updates on project implementation has been gathered from national news outlets. Representatives from each country were contacted for their review and input.

Case Study

03
Antigua and Barbuda





Profile

Geography

Antigua and Barbuda is an Eastern Caribbean nation in the West Indies. It has a population of roughly 104,000 people.[5] The country is formed of two low-lying main islands: Antigua to the south, where the main population centre is located; sparsely populated Barbuda to the north; as well as several smaller, uninhabited islands. It has a land area of 442 square kilometres and its marine EEZ extends up to 111,568 square kilometres.[6]

As a low-lying island nation, Antigua and Barbuda is highly vulnerable to the economic, social, and environmental impacts of climate. Major threats include sea-level rise, extreme events such as hurricanes, higher temperatures, and food and water insecurity. 70% of Antigua's land lies less than 30 metres above mean sea level, while most of Barbuda lies just three metres above mean sea level.[7] The government has estimated the loss of up to 65 square kilometres of coastal land, including up to US$417m in assets, by 2080. Hurricanes account for an average of 8.4% of annual loss in the country's GDP; in 2017, Hurricane Irma caused loss and damage totalling 10% of GDP. As climate change increases the intensity of tropical storms, such losses are likely to increase. The annualized average climate-induced losses by 2050 have been calculated at US$160m for a stabilized warming pathway and US$175 for a high emissions pathway, and at US$190m and US$370m respectively by 2100.[8]

Economy

The economy of Antigua and Barbuda is one of the fastest-growing in the Caribbean, with a 7.4% annual GDP growth rate between 2021 and 2023 and 5% in 2025, well above the world average of 2.5-3.3%.[9] [10] Classed as a high-income nation, the economy totals US$2.34bn, GDP per capita is US$24,819, and the national debt sits at 66.7%, down from 100% in 2020.[11] [12] The country's major economic sectors are tourism, trade and construction. [13] [14] [15] [16] Despite its high-income classification, approximately 18% of the total population falls below the national poverty line, with an additional 3.7% experiencing food poverty and 10% vulnerable to poverty in the event of a significant socio-economic shock or natural disaster.[17] Like most SIDS, Antigua and Barbuda is a net-importing nation and has a high dependence on imports.[18] Overall, some 80% of the country's GDP is vulnerable to economic and natural disaster shocks.[19]

Antigua and Barbuda has historically been constrained in accessing concessional finance for development and climate action due to its high income.[20] The economy faces a triple challenge:

- Limited fiscal space to respond to extreme events due to high debt burden.
- Constrained access to concessional finance to implement its adaptation strategies, thanks to its relatively high GDP per capita.
- High dependence on the climate-sensitive tourism sector.[21] [22]

Image (p.19): St. John's, Antigua and Barbuda (Canva.com)

The country has developed a strategy to boost its economic resilience, comprised of two pillars:

- Using innovative nature-based financial instruments such as climate bonds and debt-for-climate swaps to reduce debt levels and increase fiscal space.[23]
- Diversifying the economy to reduce its climate-sensitive while continuing to invest in tourism, with an increased emphasis on sustainable tourism.[24]

Maritime

The country's main port is located in its capital city, St John's. This is the only port with the berthing capacity for foreign-going vessels, and it handles both cargo and passenger ships. Antigua and Barbuda is not a shipbuilding nation and has a national fleet of 631 ships by flag.[25] Antigua and Barbuda has ratified MARPOL Annex VI, meaning that it can vote on amendments to this treaty, including the proposed NZF.

National development priorities

The overarching priority that spans all of Antigua and Barbuda's strategies, plans and budgets is strengthening its resilience to climate change to reduce the social and economic costs of climate-induced impacts on the country, which are currently estimated at up to US$175m by 2050.[26] Hurricanes are one of the greatest threats to Antigua and Barbuda; in 2017, Hurricane Irma destroyed 95% of Barbuda's infrastructure and much of Antigua's.

The government is focusing its resilience-building efforts on a number of key areas that will help reduce the country's vulnerability to climate shocks and increase its capacity to respond to them. These are:

1. The economy.
2. **Energy security and renewable energy.**
3. Climate-resilient infrastructure and housing.
4. **Food and water security.**
5. **A just and equitable transition (JET) of the workforce to green sectors.**

The three in bold align with the focus of this report. This case study examines them in more detail.

Energy security and renewable energy

What already exists?

Antigua and Barbuda has significant potential resources for renewable energy, especially wind and solar. However only a small amount of generation capacity is currently installed and, as of 2021, renewables (all solar PV) only accounted for 3.55% of the country's energy mix, with the rest supplied by power plants from heavy fuel oil.[27] This creates a high current cost of energy, at US$0.15/KWh, as well as energy dependency and high carbon intensity of energy.[28] There is no battery storage infrastructure available on Antigua, so renewable energy can only be available to the grid while the generation conditions (sun, wind) are present.[29] A solar PV farm and battery system were installed on Barbuda as part of the Green Barbuda reconstruction project after Hurricane Irma.

Antigua and Barbuda has made significant efforts to ensure that the policy, legal and regulatory environment is supportive of the energy transition, however some outdated policies and a number of fossil fuel subsidies remain.[30] This is likely to slow the transition from fossil to renewable energy by removing or weakening the economic incentive. The government is updating relevant policies to reflect current and target energy realities, including the integration of more distributed energy generation into the grid. These updates could enable revenues spent on fossil fuel subsidies to be redirected towards advancing the renewable energy transition.[31]

What is planned?

The backbone of Antigua and Barbuda's strategy to build energy resilience, security and sovereignty is the transition away from a reliance on expensive fossil fuel imports by increasing national renewable energy generation and investing in grid upgrade and storage infrastructure. On Antigua, plans are underway to optimise the functioning of the existing solar PV facilities and install further wind and solar PV as part of an ambitious plan to establish an additional 45 to 50 MW of renewable energy generation capacity complete with battery energy storage systems (BESS).

An additional challenge to the full transition to renewable energy is that the demand continues to increase. Indeed, the existing solar and BESS system on Barbuda already requires expansion to meet increasing demand.[32] As new sectors such as road vehicles are electrified, their energy demands translate into additional electricity needs. The government's commitment to increasing EV penetration is expected to add significantly not only to the amount of electricity that must be generated, but also to the infrastructure required to facilitate this.[33] The energy demand of providing electricity bunkering and shore power to ships is expected to exceed the energy demand of the rest of Antigua, presenting both a challenge and an opportunity.[34]

Research by IRENA has shown that reaching 100% renewable energy in the electricity and transport sectors by 2030 is not only possible, but has the potential to significantly reduce the cost of energy to a minimum of US$0.09/KWh.[35] Energy efficiency improvements, which the government is exploring, will also be valuable in this process.[36] However, in some cases, the long duration of power purchase agreements (PPAs) between power plant operators and the national utility conflict



Image: The V.C. Bird International Airport solar farm, Antigua and Barbuda. Credit: mtcurado (iStock)

with the fast pace of change in the electricity sector and with the ambition of national targets. This complicates the pathway to achieving those targets.[37]

Climate change adaptation, rather than mitigation, is Antigua and Barbuda's primary focus. But despite its tiny contribution of less than 0.002% of global GHG emissions, the country is still committed to ambitious targets and measures to decarbonise its energy and transport sectors, which jointly account for 75% of its emissions.[38] At the same time, domestically produced renewables will strengthen the country's energy sovereignty and its resilience to hurricanes and other climate shocks.

Antigua and Barbuda's NDC sets targets for renewable energy and energy resilience across all sectors. This includes making 10 MW of renewable energy generation available to the grid by 2030, equipping all new homes with renewable backup generation capacity, and powering all essential public services infrastructure with their own grid-interactive renewable energy sources. Updates to fiscal policies on fossil fuels are currently underway to strengthen the regulatory environment to facilitate the transition to 100% renewable energy in the transport sector.[vi] [39] This will strengthen incentives for shipping to transition away from fossil fuels.

Opportunities for synergies between maritime decarbonisation and national development priorities

To harness the full potential of renewable energy, Antigua and Barbuda's transition plans require significant upgrades to the electricity grid and storage. The 2026 budget includes allocations for strengthening electricity grids and studies are being undertaken to determine needs and the best approach, however there are currently no concrete plans for implementing grid upgrades.[40] [41]

vi Government subsidies to fossil fuels totalled nearly US$6 million per year 2022-2024 (Prime Minister Gaston Browne Budget Speech: Creating a Resilient, Harmonious and Prosperous Nation)

Upgrading the island's grid and installing energy storage systems are necessary to achieve the country's energy security goals and to facilitate the provision of renewable electricity to ships at St John's Port. This synergy can be harnessed to allow co-benefits from the maritime energy transition to penetrate into the wider economy: by integrating the generation capacity at the port into the national grid, sections of the grid upgrade that can be directly linked to providing electricity to the port – as well as the installation of battery storage at the port – could be eligible for financing under disbursement category one under Regulation 41. The generation and battery storage installed at the port should be able to meet the peak demand anticipated to allow for growth in electrified shipping, and should also be integrated into the island's power grid. This means that there will be excess storage capacity most of the time, which can be used to stabilise electricity supply across the island.

The government and port authority are currently investigating how to operationalise such a synergistic system. [42] A feasibility study further exploring the potential and requirements of this nexus development would be beneficial, and could be eligible for financing under disbursement category one.

Food and water security

What already exists?

Antigua and Barbuda relies on imports for most of its food, largely from the USA, other Caribbean countries and Europe. This is both expensive and a vulnerability, as climate shocks can cause disruptions in transport, which in turn can trigger price shocks and food insecurity. [43]



Image: Desalination plant, Antigua and Barbuda. Credit: ABS TV Radio

The country does produce a small amount of food domestically. Its major agricultural products are vegetables including root crops, hot pepper, okra, sweet potato, tomato, and herbs; fruits including mango, melon, pineapple, citrus, soursop and guava; and small-scale meat, fish and seafood, with fishing contributing around half of the country's agricultural GDP.[44] [45] [46] The 'National Backyard Gardening Programme' contributes to this by encouraging citizens to grow food in their own gardens.

The majority of the country's water is produced from seawater and brackish water in eight reverse osmosis plants, which is an expensive and energy-intensive process. Some additional supply comes from water treatment plants and a small amount from groundwater.[47] When supplies of water from these sources run short, the country relies on expensive imports of water from other islands.[48]

What is planned?

Antigua and Barbuda has set an ambitious 'Agricultural Vision 2030', which aims to revitalise the country's agricultural sector: boosting its economic contribution from 2% in 2025 to 5% of GDP by 2030, while improving food sovereignty, economic resilience and environmental sustainability.[49] [50] This target seeks to reduce the country's reliance on imports and support rural development, food security and exportation opportunities. The government is seeking to actively engage youth in this expansion and make agriculture a growing employment and innovation sector for young people.[51]

Antigua and Barbuda aims to achieve this goal through reallocating subsidies towards agriculture, investing in infrastructure to support farmers, boosting productivity and diversifying crops.[52] The government has acquired new heavy-duty farming equipment to increase production and is planning to develop an agro-industrial park and mushroom cultivation. Beyond strengthening food security and sovereignty, these are opportunities to increase the value of agriculture and agribusiness, as well as to attract investment.[53]

The government is also seeking to make water supply stronger and more resilient, with the NDC goal of powering water supply infrastructure with renewables by 2030. One new water desalination plant is already planned as part of the St John's Port upgrade works and will be powered by solar PV. In late 2025, the government agreed a deal with a Japanese corporation to install additional water recycling systems.[54] [55]

Opportunities for synergies between maritime decarbonisation and national development priorities

Increased generation capacity and connectivity of renewable electricity present an opportunity to electrify the existing desalination plants, to enhance water sovereignty and reduce the cost of water provision. This would also reduce the cost and water strain of providing water to ships. It may also be worth considering the construction of water treatment plants, as a significant amount of greywater is produced by ships and could enhance the country's water security and agriculture goals rather than becoming a burden for the country to dispose of.[56] The plants could be set up to operate at peak generation hours, when energy output exceeds demand, to optimise efficiency and reduce the need for battery storage. This would

be a secondary benefit from maritime decarbonisation measures and not directly financeable under the NZF's economic element. However, if the electrification of desalination infrastructure were convincingly framed as enabling the provision of water input for green hydrogen development, it may qualify under disbursement category one.

Due to the low level of agricultural production in Antigua and Barbuda's recent history, only a small number of people are farmers. Therefore, there is a significant knowledge gap facing plans to ramp up agricultural production. If sufficient justification were given that programmes to train farmers and food producers mitigated DNIs by boosting food security, they may be eligible for support under disbursement category five of the NZF. Such programmes should focus on climate-smart and resilient agriculture to ensure that they boost Antigua and Barbuda's food security and sovereignty in the long run. Such programmes would also have a positive impact on youth employment and sustainable land practices.

There is also a technology gap, as scaling up agricultural production will also require a scale-up of agricultural equipment and technology, including irrigation systems. This could be eligible under disbursement categories 3 (technology transfer) or 5 (addressing DNI), including on food security, on States. It would also be valuable to consider collaborating with other Caribbean countries with similar goals, to explore what could be coordinated at the regional level and what economies of scale could be generated.

A just and equitable transition (JET) of the workforce to green sectors

What already exists?

Antigua and Barbuda is taking steps to ensure that the green transition does not negatively impact its workforce. In 2021, the government produced a report ('Towards a Just Transition of the Workforce') showing awareness and a proactive approach to this challenge; in 2022, in collaboration with the International Labour Organization (ILO) and United Nations Development Programme (UNDP), it held a capacity-building workshop for labour unions and employers on the transition to a green economy. [57] [58]

The country is investing in developing a workforce skilled in green sectors of the future. In 2024, the government launched the new Centre of Excellence for Oceanography and the Blue Economy (COBE) in collaboration with the University of the West Indies (UWI), the Commonwealth Secretariat and the Association of Commonwealth Universities, which seeks to build institutional capacity and research and innovation expertise to 'harness the vast economic potential of their marine environment and maritime sectors whilst preserving and protecting the ocean's resources and ecosystems'.[59] Antigua State College has also introduced vocational certificates in environmental science and green engineering. [60]

What is planned?

A priority for Antigua and Barbuda is including and benefitting the whole population in the green transition. Its NDC notes that transitioning away from fossil fuels can be a strong driver of job creation, job upgrading, poverty eradication, social justice, and reducing youth unemployment; it also reiterates the country's commitment to ensuring a just transition of the workforce. Its Inclusive Renewable Energy Strategy also aims to create investment opportunities for all citizens. The planned growth of a sustainable agricultural sector will also be a source of new green jobs.

The country's National Adaptation Plan (NAP) outlines 'building human and institutional capacity' as one of its key strategies, and the 2026 budget lists 'education and human capital' as one approach under its 'social resilience' pillar, which can be seen reflected in the new COBE and vocational certificates.[61] [62] Antigua and Barbuda intends to develop a technical and labour environment which motivates young people to train in these areas and which creates an attraction for skilled professionals and experts to work in the country.[63]

The 'Just Transition of the Workforce' report predicts that jobs in fossil fuel-dependent industries will decline sharply after 2025, but will be more than replaced by new jobs created through the country's green energy transition. It forecasts 1,200 jobs in the energy sector in 2037 in an energy transition scenario, compared with fewer than 800 in a business-as-usual scenario.[64] Although shipping transport is not covered by the report, the interlinkages and similarities of these adjacent sectors give a clear view of the employment impacts of the green transition, and the 'Maritime Development' section below gives more detailed information on job creation specific to the planned port upgrades. The report also notes that long-term planning and training is required to provide sustainable green employment beyond the installation phase of the transition.[65]

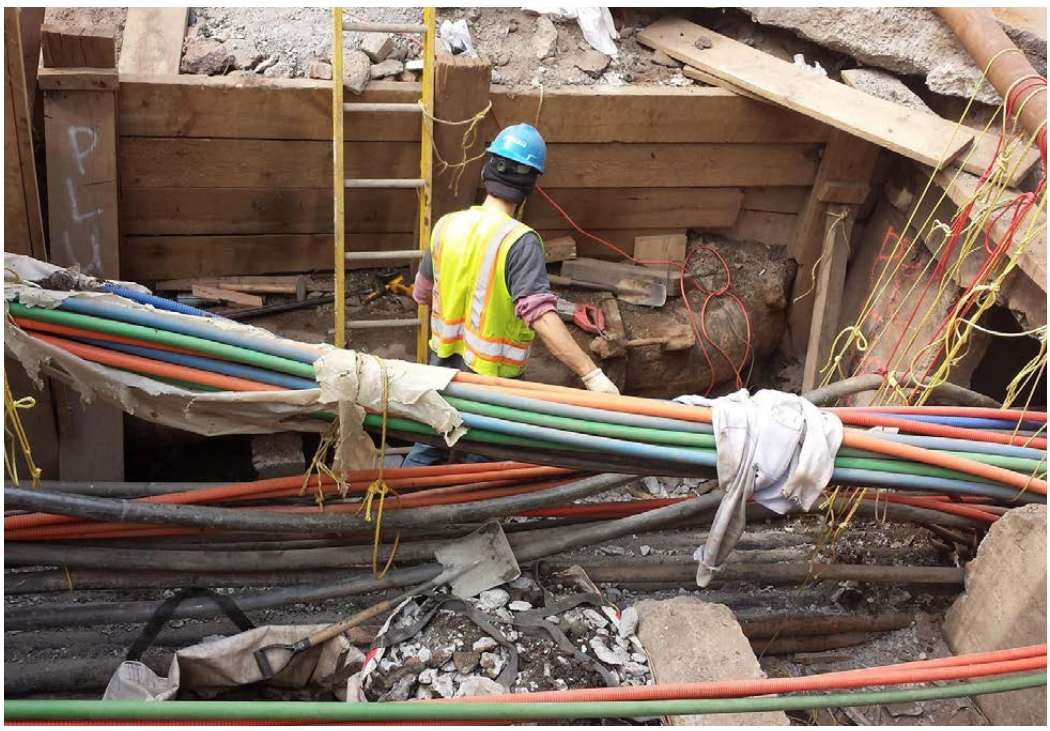


Image: Works underway laying cables under the ground. Credit: Marc Krekler (Pixabay)

In June 2026, the government launched a request for proposals to update the report with an aim to 'identify the most relevant workforce vulnerabilities, likely transition opportunities, and priority skills gaps associated with the electric mobility ecosystem and related low-carbon transition activities.'[66]

Opportunities for synergies between maritime decarbonisation and national development priorities

The decarbonisation of shipping and the emergence of Antigua and Barbuda as a green shipping hub have the potential to create a large number of green jobs for Antiguans and Barbudans in renewable energy generation, green hydrogen production, port upgrades and operations at an expanded port as a green shipping hub. Many elements of this transformative plan could be eligible for finance from the NZF's economic element under Regulation 41, including training programmes to equip workers with the new skills they need. It is worth noting that disbursement category four supports the implementation of countries' NAPs, so actions to build human and institutional capacity and enhance education and human capital, as included in Antigua and Barbuda's NAP, may qualify for financial support under the NZF.

The new COBE would be well placed to offer courses in maritime decarbonisation, which could benefit from revenues from the NZF's economic element under category 2 or 3, supporting its secure establishment in the region. The skills taught through these programmes could be applicable to the energy transition beyond maritime applications, and thus support a just and equitable transition of Antigua and Barbuda's entire energy system.

Maritime development

What exists?

St John's Port handles approximately 1,300 vessels including container ships, bulk carriers and oil tankers, and approximately 1.4m tonnes of cargo and 673,000 passengers annually, and is the country's main site of tourism and trade activity.[67] [68] It is operated by the Antigua and Barbuda Port Authority (ABPA), a private company. A new container terminal was recently built at St John's Port, the first of its kind in the Caribbean, and a sixth berth added to its cruise terminal.[69]

What is planned?

ABPA has ambitious and pioneering plans to become a leader in green ports and shipping, not just in the Caribbean but across the world, through a comprehensive port redevelopment which will bring together all four elements of renewable energy: generation, storage, bunkering and shore power. The port will also green its own operations by transitioning to electrical infrastructure such as e-cranes. The port aims to establish itself as both a transshipment and green refuelling hub in the Caribbean.[70]



Image: Aerial view of St. John's, Antigua and Barbuda (Canva.com)

By aligning its plans with the IMO 2023 GHG Strategy, the port is positioning itself ahead of the NZF measures.[71] It will therefore be well placed to benefit from the NZF measures when a large number of ships are transitioning to low-carbon fuels and few ports across the region are able to offer the facilities they require.[72] The potential additional revenues just from providing shore power are significant, and this would increase many times with bunkering of electricity and synthetic fuels.[73]

The port transformation is estimated to cost $210m. An innovative blended performance bond has been developed to provide this finance. The bond combines private, public and concessional loans and includes insurance for climate risks. It aims to set a replicable model which is adaptable to other SIDS and which helps to close the global net-zero funding gap of some US$6tn per year.[74] The port redevelopment is anticipated to provide a broad range of benefits to the country, beyond expanding its trade and tourism capacity. These include:

- Jobs and training, supporting a just transition of the workforce.
- A solar-powered desalination plant to support water security.
- Significant additional revenue of up to 37.6% of current GDP.
- Environmental and resilience benefits from nature-based solutions.[75]

Renewable electricity will be the first green energy offered at Antigua and Barbuda's port, but green hydrogen may not be far behind. In August 2025, the government signed a Memorandum of Understanding (MoU) with Veer Group, a green ship designer, to advance the development of world's first and only zero-emission container ship capable of traversing the ocean, powered by green hydrogen and wind propulsion[76]. The plans for this partnership include building a green hydrogen production, storage and fuelling hub at St John's Port.[77] A contract is expected to be signed in October 2026 with Drift Energy, which plans to bring 80 vessels into waterways using electrolysis to generate green hydrogen and deliver it to the port.[78]

Opportunities for synergies between maritime decarbonisation and national development priorities

The transformation of St John's Port to become a green shipping hub for the Caribbean has the potential to generate wide-reaching co-benefits for the economy and society. For example, electrified shipping would reduce air and noise pollution for maritime workers and communities living near the port and reduce marine pollution. Many of the transformative actions planned for the port are eligible for financing under disbursement category one of the NZF.

Although Antigua and Barbuda plans to pursue green hydrogen production, no project to develop this is yet underway. Producing green hydrogen would further bolster the country's position as a green shipping hub in the region. As St John's Port is connected by shipping routes directly to Miami, as well as other major Caribbean ports like Bridgetown and Port of Spain, providing green hydrogen before other regional ports would position the country well to benefit from shipping decarbonisation when the NZF comes into force, or even without it, and support the country's goal of becoming a homeport and transshipment hub.[79]

Producing green hydrogen would therefore further bolster the country's position as a green shipping hub, progressively increasing the volume of ships calling at St John's as the number of decarbonised vessels grows. As regulations come into effect and other ports look to offer hydrogen bunkering, green hydrogen could also become an export, supporting the diversification of the Antiguan economy. Furthermore, research by IRENA found that an energy system which includes green hydrogen and the integration of EVs enables the country to meet its net-zero goal by 2030 with the lowest levelized cost of energy (LCOE) at US$0.09/KWh, generating savings for households across the country.[80] The development of green hydrogen generation capacity could also fall under disbursement category one under Regulation 41.

Summary

Antigua and Barbuda is already advancing in its renewable energy transition and in readiness for decarbonised shipping. The port transformation is a critical project in leading the maritime energy transition in the region, and has the potential to generate notable co-benefits for the country's existing development plans and priorities. The project as planned could increase water security, diversify the economy and create new green jobs, and may also be leveraged to support the goals of electrification and renewable transition countrywide, especially the required grid upgrades and battery storage.

There are opportunities for synergies between the Antigua and Barbuda's goals for water security and the renewable energy transition, both maritime and broader. The country's plans to scale up its agricultural sector to boost food sovereignty face a skills gap. Linking the training of a new generation of farmers to the mitigation of DNIs arising from the NZF could generate revenue for programmes to fill this gap, which would also support the country's emphasis on enhancing education, human capital and institutional capacity. Recent educational developments to support the maritime energy transition position the country well to benefit from early mover advantages and may also secure financial support under the NZF.

Priority actions to harness synergies between the maritime energy transition and existing national priorities might be:

- Researching how best to integrate the electricity generation and storage capacity planned at the port with the national grid for mutual benefit.
- Leveraging this interconnection to advance critical grid strengthening.
- Advancing the revision of fossil fuel subsidies and redirecting the revenues towards synergistic actions that support the decarbonisation of the maritime sector and wider economy.
- Transitioning the desalination plants to run on electricity and setting up operating systems which allow them to stabilise variable renewable output and reduce the need for battery storage.
- Developing training courses in decarbonised shipping, especially at the new COBE.

Figure 3 below shows Activities and projects that could be eligible for funding under the disbursement categories listed under Regulation 41 of the Net-Zero Framework and how these could support the national priorities identified. This diagram is intended to highlight potential linkages only and does not represent proportions or values of potential revenue flows.

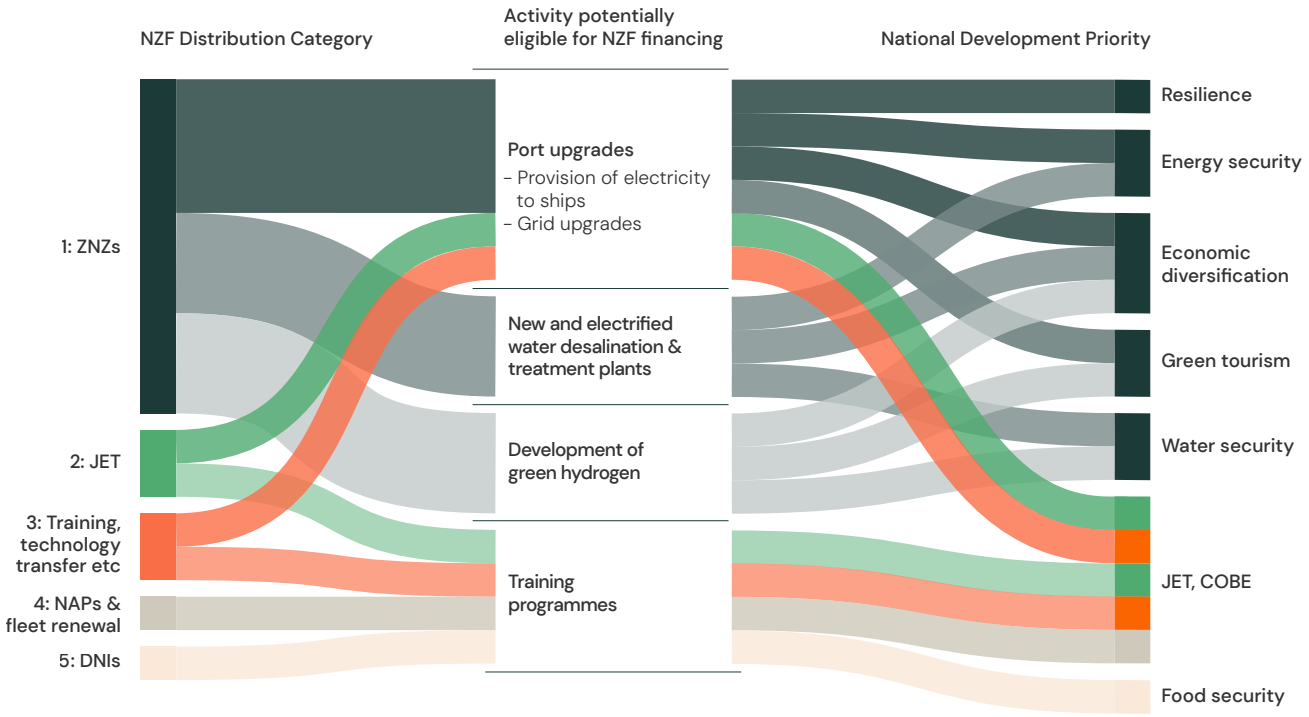


Figure 3: Potential synergies between NZF disbursement categories and national priorities (Antigua and Barbuda).

Case Study

04
Barbados





Profile

Geography

Barbados is the easternmost island in the Caribbean. It is a single-island nation of 282,300 people and is one of the most densely populated in the region.[81] [82] The capital city, Bridgetown, is in the Southwest of the island. The land area of Barbados is 432 km2 and its EEZ is 185,000 km2.

It is a largely flat island; its highest point, Mount Hillaby, rises to 336 metres above sea level.[83] [84] This makes Barbados vulnerable to sea-level rise, tidal and storm surges, and coastal erosion. Other climate impacts foreseen for the island are rising temperatures, intensifying tropical storms and other weather events, and changes in rainfall patterns increasing the incidence of both floods and droughts – projections indicate a 9% decline in annual rainfall by 2050.[85] [86] These risks are especially critical in Barbados, as over 25% of the population and much of the key infrastructure lie within an identified key risk zone within 2km of the coastline or flood plain.[87] Water security is one of Barbados' key vulnerabilities , as it ranks in the top 20 most water-scarce nations globally.[88]

These physical vulnerabilities also translate into social vulnerabilities through damage to communities, health, livelihoods, food security and loss of life, as well as economic vulnerabilities. Such impacts require proactive investment as well as reactive disaster response and often cause economic shocks. Hurricane Beryl in 2024 caused damage equivalent to 1.4% of Barbados' GDP, and a World Bank report estimates average annual losses due to climate-induced natural hazards reaching Bds$207m (US$103.5m), equivalent to 0.74% of GDP without resilience-building measures. [89] [90]

Economy

Barbados' economy has demonstrated consistent and stable growth over the last half-century. In 2025, the economy surpassed US$8 billion with a GDP per capita of US$28,365 with a real GDP growth rate of 2.7%, making it a high-income country.[91] [92] [93] [94] Its major sectors are:

- **Tourism:** Like many Caribbean islands, tourism is key to Barbados' economy, with a direct contribution of 17.5% and a contribution of 31% including indirect effects.
- **Real estate:** This sector contributed 12.3% of GDP in 2023.[95]
- Financial services: The country's second-largest source of foreign exchange, after tourism, contributing 10% of the country's GDP.[96]

Barbados is an import-dependent country. By far its largest import by value is fossil fuels, followed by food products, consumer goods and construction materials.[97] [98] Fossil fuels are also its top export, followed by liquor. Medicaments and foodstuffs are also major imports and exports. Barbados' trade deficit for 2023 ran at US$1.7 billion.[99]

The country's dependence on imported foods is growing as its agriculture and food production sectors shift away from traditional production practices, seeing both the percentage of food relative to total imports and the total cost of food imports rising. Barbados has significant agricultural potential, with 9,100 hectares of super-

Image (p.32): Bridgetown, Barbados (Canva.com)

prime soils and 2,500 tonnes of fisheries output per year.[100] However, between 1991 and 2013, land use conversion and rewilding reduced the available agricultural land, including many areas of super-prime soils, by 53%, reducing agricultural production capacity and fragmenting agricultural lands. Barbados' latest Physical Development Plan (PDP) amendment actively seeks to move the country towards food security, sovereignty and a viable food and agricultural sector to address scarcity and reduce import dependence and related costs.

Although Barbados has a high debt to GDP ratio which constrains fiscal space, the country is known globally as a leader in developing innovative environment-based instruments to open up access to financing.[101] Barbados spearheaded the Bridgetown Initiative to reform the international financial architecture[vii] to be more just, equitable and effective, and especially to unlock climate and development finance. In 2022 and 2024, Barbados completed two trailblazing debt restructures: the debt-for-nature conversion (DFNC) in 2022 and the debt-for-climate transaction (DFCT) in 2024, which jointly opened up US$150m in fiscal savings. These revenues are being reinvested in marine conservation and water resilience projects.[102] Barbados is also one of the first countries to include a natural disaster clause in its debt instruments and maintains close engagement with multilateral institutions and development partners including the GCF, IMF and IDB, managing to invest close to 3% in climate resilience without adding to its debt burden.[103]

Such environment-based financial instruments and reducing import dependence to strengthen its balance of payments form a core tenet of Barbados' economic strategy looking forward. The country is also looking to broaden and green its tourism sector from largely beach-based tourism to include conservation, cultural and natural heritage tourism.[104]

Maritime

Barbados' main port is located in its capital city, Bridgetown. This is the only port with capacity for handling large vessels and is one of the major ports in the Eastern Caribbean. However, the government is developing a smaller harbour at Speightstown, in the north of the island, as a port for smaller luxury cruises.[105] Bridgetown Port recently opened a new berth, which allows for the separation of its cargo and tourist traffic, which comprises approximately 1m tonnes of cargo and half a million passengers annually, bolstering its position as a multi-functional maritime hub within the Eastern Caribbean.[106] [107] Barbados has a national fleet of 341 ships by national flag and no significant shipbuilding. Nearly 4,000 people in Barbados are seafarers, representing 1.4% of the population.[108]

Barbados has made legislative steps towards decarbonising its maritime sector, with the Marine Transport (Emissions Control) Act passed in August 2024, the Marine Transport (Emissions Control) (Cold Ironing) Regulations in 2025, Facilitation of International Maritime Traffic Act, 2024, and the Seaport Industry (Management, Operations and Development) Act, 2025.[109] Barbados has integrated MARPOL Annex VI into its domestic legislation through the Marine Transport (Emissions Control) Act, 2024 and the Facilitation of International Maritime Traffic Act, 2024.[110] This means that any amendments to MARPOL Annex VI automatically become Barbadian law. [111]

vii This is understood here to mean the way funds are managed by and flow through the Bretton Woods institutions, multilateral financial institutions including the GEF and GCF, and multilateral development banks, as well as their implementing and executing entities.

Barbados has ratified MARPOL Annex VI, meaning that it can vote on amendments to this treaty, including the proposed NZF.

National development priorities

The central pillar of Barbados' development strategy is 'Mission Barbados', which spans 2023-2030 and comprises six national missions aiming to build a sustainable and inclusive future for the country:

1. Sustainable development
2. Social cohesion and national identity
3. Food and water security
4. Public health and public safety
5. Worker empowerment and enfranchisement
6. Digital transformation

Although the missions are cross-sectoral and mutually supportive, those most relevant to the maritime energy transition for the purposes of this report are missions one, three and five.

Energy security and renewable energy

What already exists?

Barbados is making notable progress towards its NDC goal of 95% renewable energy by 2035, with 102.62 MW of installed electrical generating capacity, representing 29% of the country's total electricity generation capacity.[112] However, the operationalisation of this capacity is constrained by the island's lack of electricity storage capacity, meaning that only a small proportion of this capacity can be utilised. In 2024, 14.4% of Barbados' total energy sales were generated by renewable sources. Of this, the vast majority (13.1%) was generated by distributed infrastructure, largely rooftop PV systems, and the remaining 1.3% by the utility-owned 10 MW solar PV plant.

Barbados offers an example of remarkable success of decentralised, domestic energy production following the introduction of renewable energy rider and feed-in-tariff programmes in the mid-2010s.[113] These programmes aimed to support the goal under the Barbados National Energy Policy (BNEP) to deploy 105 MW of distributed solar by 2030. By 2024, over 100 MW had already been installed.[114] Renewable energy has been particularly successful in replacing fossil fuels in domestic water heating.[115] Despite this progress, the island currently remains heavily dependent on imported fossil fuels to meet its electricity and transport needs, at a cost of US$552.7m annually – roughly 7% of GDP.[116]



Image: Christ Church, Barbados. Credit: peeter (iStock)

Barbados has also constructed a strong enabling legislative and regulatory environment for the renewable energy transition. The BNEP provides the direction of the country's energy horizon to 2030, with goals of maximising local participation in renewable energy generation and storage, minimising the outflow of foreign exchange for energy, and creating a regional centre of excellence in renewable energy research and development.[117] The BNEP is supported by a dedicated implementation plan and bolstered by a number of policies, legislation and fiscal incentives for renewable energy generating equipment. [118] [119] [120] [121]

In addition, the Barbados Energy Transition and Investment Plan (ETIP) analyses the least-cost energy transition pathways to net-zero and develops an optimised roadmap of Barbados' energy transition.

What is planned?

In order to meet its 2035 targets, Barbados plans to reach 310 MW of solar PV across centralised and distributed generation, and install 150 MW of onshore wind, 150 MW of wind, particularly offshore wind, and 15 MW of biomass and waste-to energy. The government has already begun the financing process for a 30-50 MW onshore wind farm, and launched a project to expand the island's capacity to turn agricultural waste into bioenergy, in partnership with UNDP and GEF.[122]

A priority of Barbados' energy strategy is to remove the critical barrier of storage capacity by installing 200 MW of battery storage capacity.[123] The renewable energy currently being generated is already nearly exceeding the carrying limit of the grid, which can cause outages.[124] Progress is already underway: an Energy Storage Framework and Tariffs has already been drawn up by the country's Fair Trading Commission in 2024 to remunerate storage services provided to the grid, and in early 2026 the government launched a tender for the development of 60 MW of

battery storage.[125] [126] [127] This will ease the constraint of the grid's capacity and allow the connection of more domestic PV to users who have been waiting, as well as open up investments in developing more renewable energy infrastructure.

In its 2025 NDC, Barbados committed to achieving 100% of new vehicles being electric or alternatively-fuelled by 2030, and the EV market is showing signs of growth.[128] The BNEP supports this commitment by laying out plans for a renewable energy charging network, an electric or alternatively fuelled public transport system, energy efficiency in the transportation sector, and establishing standards in both electricity and charging infrastructure as well as biofuels for supply to vehicles.

Barbados also has plans for offshore natural gas exploration, with a view to selling it to attract foreign exchange and raise revenues for their own renewable energy transition.[129]

Opportunities for synergies between maritime decarbonisation and national development priorities

At present, Barbados' goal of a complete renewable energy transition by 2030 is constrained by the lack of storage capacity. Although a tender is underway for 60 MW of battery storage, it is likely to be several years until this is operational, and 60 MW represents only 16.9% of the island's installed generation capacity, so it will only ease the bottleneck slightly.[130] Much more storage capacity is urgently needed for Barbados to be able to pursue its renewable energy transition plans in line with its NDC target of 95% renewable energy by 2030.

Installing battery storage and electricity bunkering infrastructure at Bridgetown Port could be eligible for funding under disbursement category one. If installed with capacity to meet anticipated future peak demand at the port, these battery storage systems would have extra capacity most of the time and could be used to stabilise renewable electricity supply more broadly across the island and feed the renewable EV charging network planned under the NDC.

Grid upgrades are also critical to unlock Barbados' full energy transition. If sufficient evidence were provided that grid upgrades are required to facilitate electricity bunkering at Bridgetown Port from Barbados' highly distributed renewable energy generation, then such upgrades could potentially also be eligible under the same category.

Food and water security

What already exists?

Barbados faces ongoing challenges of food import dependence and water scarcity. The contribution of agriculture to its economy, as well as the agricultural land available, have both declined steeply in recent decades, to only 1.6% of GDP in 2024.[viii] [131] [132] Climate-related challenges could cost Barbados' agricultural sector US$5-45m this decade.[133] Although Barbados produces some foods including sweet potatoes, onions, milk and fish, it is dependent on imports for most of its

viii This is the combined total economic contribution of agriculture, fishing and forestry

fresh and processed foods, with food as a percentage of total imports rising to an unsustainable level of 25% in 2011.[134] [135] [136] This reliance exposes the country to supply disruptions and price volatility.

Water security is a major challenge for Barbados, as one of the most water-scarce countries globally. The Barbados Water Authority, the public water utility, is responsible for freshwater and wastewater on the island. Increasing tourism, unsustainable development (especially within groundwater protection areas), and a warming climate continue to exacerbate this. 90% of Barbados' water is supplied from underground aquifers, which are already under stress, and the remainder by desalination plants. [137] [138] [139] Non-revenue water is a significant problem in Barbados, with 62% of distributed water not accounted for, increasing the strain on water provision systems.[140] Additional challenges are posed by the large quantities of wastewater produced by the tourism sector, as Barbados does not have sufficient water treatment facilities to manage this load.

The ongoing GCF project 'Water Sector Resilience Nexus for Sustainability in Barbados' aims to increase water security through the installation of photovoltaic solar and backup natural gas power for pumping stations, while implementing climate resilience actions including a water sector master plan, enhancing infiltration, reducing non-revenue water, and improving overall water management.[141]

What is planned?

Increasing domestic agricultural production to fortify food sovereignty and reduce foreign exchange payments is a priority for the Barbadian government. In 2025, the Ministry of Agriculture pledged Bds$2m (nearly US$1m) to revitalise agriculture and reduce food import dependence, and in May 2026, the Barbados Agricultural Development and Marketing Corporation launched a new data-driven platform



Image: Fresh tropical fruits displayed at a local market stall, Barbados (Canva.com)

to improve coordination in farming, boost production and cut the country's food import bill.[142] [143] In June 2026, Barbados also hosted a high-level Food Systems Investment Forum to mobilise equity capital for resilient food systems in the Caribbean.[144]

Barbados' agricultural sector is guided by its National Agricultural Policy and Agriculture and Climate Change Policy, which integrates climate resilience, mitigation and adaptation to provide a roadmap for a more resilient Barbadian agricultural sector.[145] [146] It emphasises mainstreaming climate adaptation into all agricultural programmes, including water management practices, digital tools for precision farming, farmer training, and improved labour conditions, especially in the context of climate change. It seeks to enhance the climate adaptation and resilience of the agricultural sector, as well as the introduction of container farming and protective structures to increase productivity and reduce chemical fertiliser use.

The government recently launched the Onion Escalation Project, which aims to scale up and stabilise the local production of 16 strategic crops to counter the volatile impacts of climate change on local farming.[147] It is also working with the GEF on a project to accelerate the transition to resistant agrifood systems, enhancing the resilience of Barbados' agricultural production systems and farmers' livelihoods to climate change, and reducing GHG emissions.[148]

The US$150m generated by the 2022 and 2024 nature-based debt restructures is being invested in marine conservation and water resilience, including a wastewater reclamation project due to produce 3.05m cubic metres of water per year and integrate 7 MW of solar PV generation capacity with battery storage.[149]

Opportunities for synergies between maritime decarbonisation and national development priorities

Barbados has plans to develop biofuels from agro-energy crops.[150] Such endeavours could be eligible for financing under disbursement category one of the NZF's economic element. It is critical that the cultivation of such crops must not appropriate water, land or labour from agriculture that contributes to food security, nor cause additional conversion of natural ecosystems to agricultural land. If pursued strategically and sustainably, the development of a limited number of agro-energy crops for biofuels could create synergies or co-benefits with agriculture for food, such as training farmers, intercropping and infrastructure efficiencies; however, caution is advised against positioning biofuels, especially from virgin feedstocks, as a major pillar of the shipping energy transition. Additionally, investments to drive agricultural scale-up could be eligible for funding under disbursement category five under Regulation 41.

Increasing the number of reclamation and desalination plants would enhance Barbados' water security and ease the strain on its natural water resources. This would also help overcome the challenge of limited water resources to the country's agricultural expansion plans and avoid potential trade-offs between food and water security.

If the construction of new water provision plants were integrated into Barbados' strategy to produce green hydrogen, i.e. to produce the water as the primary ingredient for hydrogen production, there would be grounds for funding the construction of such plants under disbursement category one of the NZF's

economic element. It is important to note that all water used in the production of synthetic fuels should be additional to what already exists and generated by the new infrastructure funded under the NZF, and should not appropriate existing water resources. Excess water produced by these plants above what is needed for hydrogen could be fed into the national supply. These plants could also boost water security by providing water to the national supply in emergencies, such as if other water production infrastructure is damaged by a hurricane.

Further research would be beneficial to better understand these potential synergies and to develop safeguards. Such research could explore potential resource conflicts and find ways to ensure that the scaling up of agriculture and potential development of synthetic fuels have a positive, or at the very least neutral, impact on Barbados' water security.

A just and equitable transition (JET) of the workforce to green sectors

What already exists?

Although just 1.4% of Barbados' population are seafarers, there are still opportunities to leverage the maritime decarbonisation to enhance justice and equity for workers.[151] The government is actively working towards a just transition to a green and blue economy focusing on renewable energy and sustainable development, supported by the ILO's Partnership for Action on Green Economy (PAGE).[152] Under this partnership, Barbados held a Just Transition National Symposium in 2024, which the resulting ILO Decent Work Country Programme for Barbados will build on.

What is planned?

The net-zero transition in Barbados is expected to create 1,500 new jobs by 2035 compared to business-as-usual, representing a 55% increase in direct and indirect employment.[153] One of the outcomes of the Just Transition National Symposium was a plan to establish a Renewable Energy Skills Council.[154] The aim of this council is to bring together the public, private and third sector to work collaboratively towards a just transition in the energy sector, and to implement the recommendations developed during the symposium on designing a just transition for the renewable energy sub-sector. In the maritime sector specifically, Barbados has a small but skilled and expanding workforce, and it is looking to increase the number of highly skilled jobs in the green maritime transition.[155]

The Barbadian Minister of Energy has suggested that, as a regional leader in developing renewable energy, the country could scale up technical training to turn green energy installation into a viable export to the rest of the Caribbean.[156] This could create more jobs in Barbados and could catalyse positive JET impacts across the region. Such an initiative could qualify for funding under disbursement category three of the NZF's economic element as information sharing and technical cooperation. Meanwhile, the Minister of Tourism and International Transport has committed to working with stakeholders and educational institutions to build 'a competent and skilled cadre of maritime professionals' to position Barbados at the forefront of the Caribbean's maritime industry, while protecting workers.[157]



Image: University of the West Indies in Cave Hill. Credit: Meg Stewart (Flickr)

At the Antigua and Barbuda Agenda for SIDS in 2024, the international community agreed to support SIDS through the establishment of the SIDS-SIDS Green-Blue Economy Knowledge Transfer Hub at the UWI Cave Hill campus in Barbados with a focus on enabling SIDS-SIDS cooperation, capacity-building and knowledge exchange. This would aim to strengthen institutional capacity to pursue JET opportunities and could be a platform for training programmes to fill critical knowledge gaps at the regional level.[158]

Barbados Port Inc. (BPI), the publicly owned company that runs Bridgetown Port, is planning a corporate restructuring, which will generate divestment to port workers among the targeted shareholders in the subsidiary companies.[159] This would improve the security and equity of their labour status.

Opportunities for synergies between maritime decarbonisation and national development priorities

Disbursement category three under Regulation 41 could support training programmes, including for the regional renewable energy installation-as-an-export suggested by the Minister of Energy. This new industry would help to boost and diversify the economy in a sustainable and climate-resilient direction, as many Caribbean countries will be advancing towards a renewable energy transition over the coming years, making building this skills product a highly strategic action. Including the maritime sector in such training programmes would add national and regional value as many Caribbean countries look to transition their maritime sectors over the coming years. Disbursement category five (DNIs) could support training farmers to operationalise the upscaling of Barbadian agriculture.

It is also important to ensure that BPI's development and restructuring plans encompass decarbonising the port's operations and upgrading it to support decarbonised shipping. Not only will this position Barbados to benefit from the shipping energy transition, with or without the NZF, but will also have co-benefits including enhanced economic activity, improved air and marine water quality, reduced noise pollution and a boost to the sustainable tourism sector. Many of the required upgrade works could be eligible for financing under disbursement category one under Regulation 41.

Fishers in Barbados are seeing their profits margins squeezed by the soaring prices of diesel. The Caribbean Regional Fisheries Mechanism is currently conducting fishing fleet decarbonisation assessments to develop a regional strategy and action plan for fishing decarbonisation.[160] Elements of this strategy could be eligible for funding under disbursement category two under broad interpretations of Regulation 41.

Maritime development

What already exists?

Bridgetown Port handles traffic comprising approximately 1m tonnes of cargo annually. [161] In 2025, cruise passenger numbers reached a record of 738,935 arrivals aboard 422 ships.[162] 52% of cruise calls to the port of Bridgetown are homeporting calls, with the number of cruise lines basing themselves in Barbados growing.[163] The port is operated by BPI, a private company.

Major works completed in mid-2026 on the construction of a new berth (Berth 6) at Bridgetown Port, which PM Mia Mottley described as 'the most significant expansion of our port infrastructure since the Deep Water Harbour was first constructed more than 65 years ago'.[164] It strengthens economic activity through the port and, for the first time, separates the port into dedicated cargo and cruise spaces. This forms part of Barbados' plans to become a transshipment and logistics hub by increasing its cargo handling capacity.[165]

What is planned?

BPI has set out its vision to be 'the most innovative, green maritime hub in the world by 2030'.[166] Its plans include the expansion of solar PV, for which a tender has been awarded for a 2 MW project, and the construction of a waste-to-energy incinerator to generate the port's electricity, which was delayed by a lack of successful bids for the contract.

But this ambitious vision faces a physical constraint: the port is surrounded by the capital city and therefore unable to expand. This makes it difficult to install large renewable infrastructure, such as BESS and bunkering capacity for electricity and new fuels.[167]

The Marine Transport (Emissions Control) Act foresees Barbados imposing carbon-intensity requirements on Barbados-registered vessels and foreign-registered vessels in Barbadian waters, aligned with IMO requirements and to be superseded

by any future updates of such IMO standards and measures.[168] It also invites the shipping sector to submit proposals for strategies and initiatives to drive the sustainable economic development of the maritime sector, in accordance with MARPOL Annex VI and MEPC guidelines, and offers the opportunity of incentives for such strategies and initiatives. Moreover, the Act contains provisions for the government to develop and implement a plan for market-based measures to regulate emissions from marine transport, the development and implementation of which would be in accordance with the NZF and support its implementation.[169] [170]

Barbados is also actively exploring the possibility of establishing green shipping corridors with other countries. The Act contains a provision for this and sets out the criteria that such a corridor would require. The IMO has commissioned a pre-feasibility study, which will highlight opportunities for Barbados to engage in green shipping corridor partnerships; identify the two most promising candidate routes for zero-emissions shipping operations; and produce a roadmap, policy and regulatory pathways to support implementation.[171] In addition to green corridors, the Act also contains a provision for designating emissions control areas.

Looking to harness the potential of its blue economy, Barbados is exploring green hydrogen production, with aims to lead the Caribbean's green hydrogen transition.[172] Barbados Investment and Development Corporation (BIDC) has signed MoUs with the Seabased Group and Wavepiston to develop wave power parks (shown in image below) as part of Barbados' efforts to advance the research and development of green hydrogen. The project will begin with a 2 MW pilot, with plans to expand it beyond 10 MW.[173]

Barbados is also developing innovative alternative fuels. Researchers at UWI Cave Hill have pioneered a biofuel that repurposes wastewater from a rum distillery and sargassum seaweed, an invasive species which has been declared a national emergency due to its negative effect on Barbados' beaches.[174] The resulting biofuel has successfully powered a car and upscaling of its production is planned. This will create co-benefits for UWI and the agricultural sector, as upscaled production is expected to generate value for the university and fertiliser as a biproduct.[175]

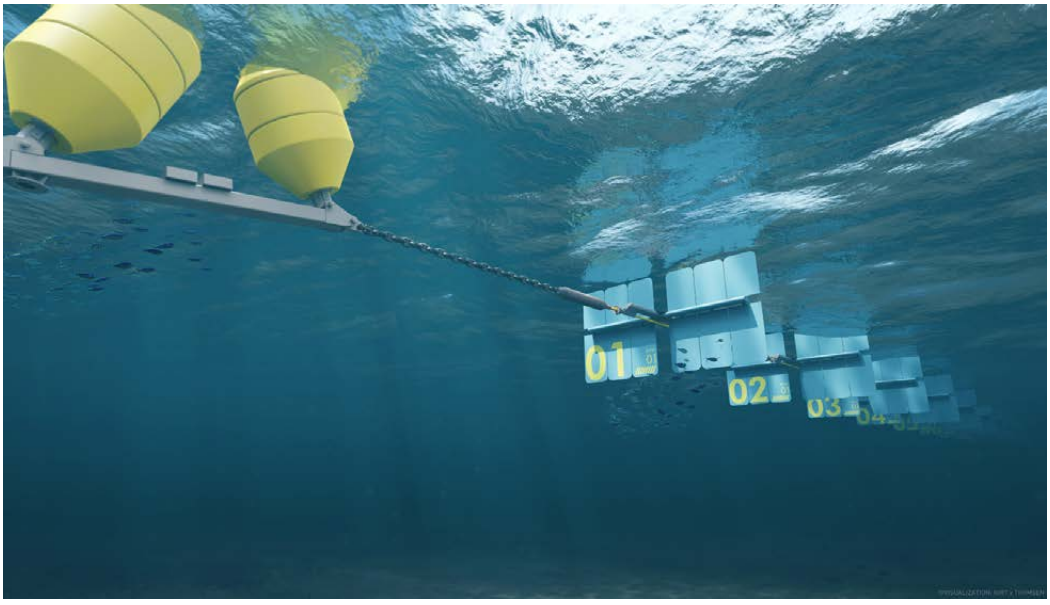


Image: Wavepiston system illustration. Credit: Wavepiston



Image: Shipping Containers in Bridgetown, Barbados (Canva.com)

Opportunities for synergies between maritime decarbonisation and national development priorities

A gap currently exists between the BPI's plans and its vision of becoming the most innovative, green maritime hub in the world by 2030. This gap is fertile ground for the investment of revenue under disbursement category one of the NZF's economic element. Despite its expansion constraints, the port can progress in decarbonising its own operations, such as ensuring new cranes procured are electric. Compliance revenues under this disbursement category could also help BPI explore and develop innovative solutions to the expansion constraints, such as procuring a specialised vessel to conduct ship-to-ship bunkering of electricity and/or synthetic fuels, and/or an offshore bunkering platform. Regardless of NZF financing, these developments could help BPI realise its vision and benefit economically from the provision of decarbonised shipping services. Decarbonising its shipping sector would have positive impacts for Barbados' economy, coastal and marine ecosystems, maritime workforce, and communities living near the port. Given the port's location in central Bridgetown, this is a significant consideration.

As the number of tourists and the number of cruise operators homeporting in Bridgetown increases, Barbados is in a unique position to both nudge and lead the cruise sector towards decarbonising. To do this, it must chart a clear path forwards, supported by the necessary infrastructure and incentives. This may satisfy the 'supporting the energy transition of shipping' under disbursement category one under Regulation 41, and would also favourably position Bridgetown as a desirable homeport for cruise lines advancing or exploring transitioning to ZNZs.

Barbados' consideration of a green shipping corridor and a market-based mechanism to regulate shipping emissions in its ships and waters would also have wider benefits for the country. Reducing polluting fuel use in its waters would have positive impacts on the health of its marine ecosystems, while the market-based mechanism could establish a new source of revenue and provide an example for other ambitious countries to follow.

Developing green hydrogen for use in shipping using wave energy would be a major innovation and the first such development in the region. This endeavour could be eligible for financing under disbursement category one (ZNZs), and successful production would support Bridgetown Port's goals of becoming an innovative green shipping hub. Producing green hydrogen could also support the country's energy security and resilience goals beyond the shipping sector.

The scaling up of both the sargassum and wastewater-based biogas could also be eligible for financing disbursement category one if linked to the shipping energy transition. This would also have a positive impact on ecosystem health and tourism, as it would help address the problem posed by sargassum. Scaling up the production of this biofuel to the scale of shipping could also boost the local rum industry. Such financing could be used to de-risk private investment in these initiatives.

Summary

Barbados is already advancing its renewable energy transition with a unique distributed model, demonstrating the power of effective policy. It also plans to increase centralised renewable energy distribution. The major challenge of storage capacity has been identified; however, the current pace of battery storage installation may delay the timeline for full electrification of the island's economy. Linking this urgent need to the planned port upgrades by installing electricity bunkering and shore power for ships, supported by a battery storage system with additional capacity beyond maritime demands, could both accelerate the achievement of sufficient battery storage, and enable it to seek support under the NZF. Moreover, ensuring the port upgrades integrate shipping decarbonisation will have benefits for Barbados's position in Caribbean shipping and its economy more broadly.

There are also opportunities to link Barbados' plans to address its significant food and water security challenges to shipping by seeking synergies across agriculture for food and biofuels, and by developing additional water provision capacity for the joint purpose of water security and green hydrogen production.

Priority actions to harness synergies between the maritime energy transition and existing national priorities may include:

- Incorporating BESS systems and the future development of electricity bunkering capacity into existing port upgrade plans, ensuring that capacity can meet anticipated peak demand for shore power in the immediate term.
- Integrating port upgrades with the national grid, which could then be leveraged to advance critical grid strengthening.

- Pursuing the development of green hydrogen and integrating a renewable-powered water desalination and/or treatment plant into the plans to provide additional water for the production of hydrogen.
- Advancing the upscaling of the sargassum and wastewater-derived biogas as an alternative shipping fuel in the short-term and its biproduct as an agricultural fertiliser.
- Including the maritime sector in training programmes to develop renewable energy installation as an export
- Working with cruise and cargo lines to understand needs and challenges and collaboratively advance the maritime energy transition in the Caribbean.

Figure 4 below shows Activities and projects that could be eligible for funding under the disbursement categories listed under Regulation 41 of the Net-Zero Framework and how these could support the national priorities identified. Distribution Category 4 offers an opportunity for Barbados to consider integrating maritime decarbonisation in the development of its National Adaptation Plan (NAP). This diagram is intended to highlight potential linkages only and does not represent proportions or values of potential revenue flows.

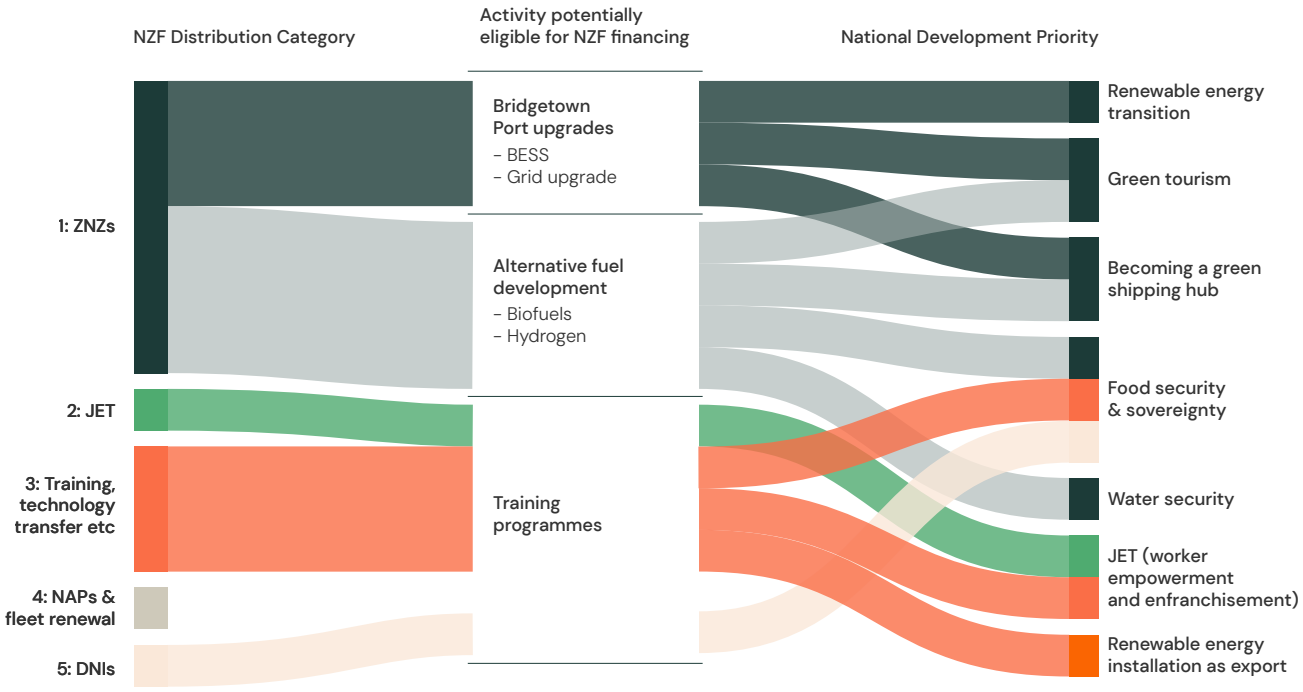
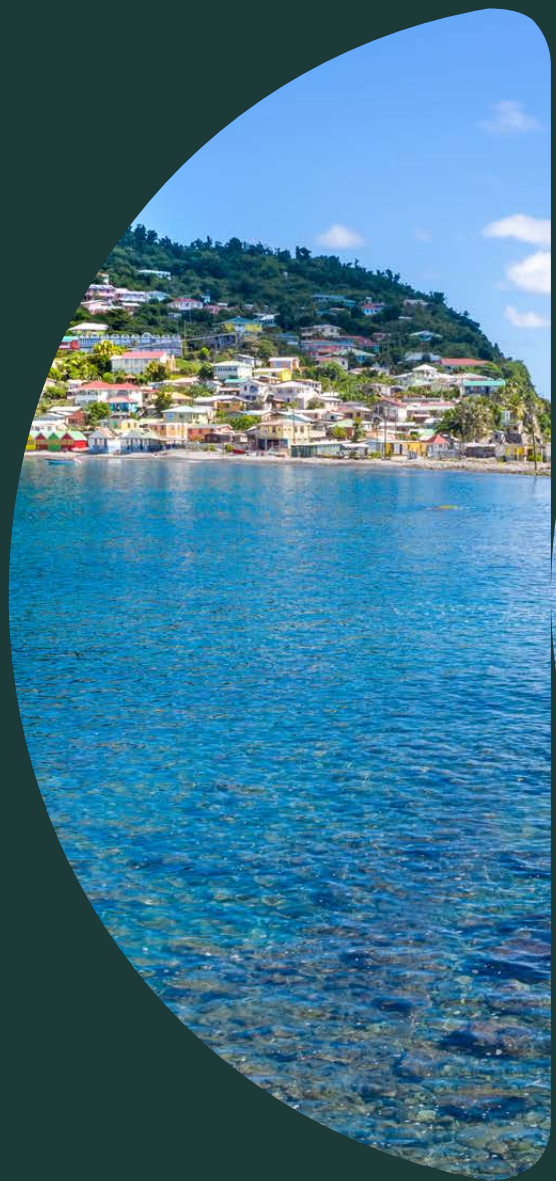


Figure 4: Potential synergies between NZF disbursement categories and national priorities (Barbados).

Case Study

05
Dominica







Profile

Geography

Dominica is a single-island nation in the West Indies. It has a population of 65,871, a land area of 750 square kilometres, and an EEZ of 28,530 square kilometres.[176] [177] [178] It is one of the most mountainous and forested islands in the Caribbean, with a ridge running north to south, and 63.8% of its land covered by forest. Dominica is the only island in the Caribbean that has a distinct indigenous community, the Kalinago, who largely reside in the Kalinago Territory in the east of the island.[179] [180]

The country has a high vulnerability to climate change and related natural hazards including hurricanes, changes in rainfall patterns and sea level rise, as well as contingent social and economic vulnerabilities including on infrastructure, trade, and economic activity.

This vulnerability was demonstrated by the devastation wreaked by two recent hurricanes. Tropical Storm Erika hit the island in 2015, causing damages worth US$483m – equivalent to approximately 90% of the country's GDP. This was closely followed by Hurricane Maria in 2017, the most extreme hurricane ever recorded on the island, which destroyed over 90% of its infrastructure and homes and 85% of its forest cover. The damages from Hurricane Maria amounted to 226% of the country's GDP, which resulted in a 14.7% decline in GDP growth in 2017. Together, the hurricanes destroyed all progress that Dominica had made towards achieving the SDGs and Paris Agreement, and marked a turning point at which Dominica resolved to become the world's first climate-resilient nation, passing a Climate Resilience Act and establishing a Climate Resilience Execution Agency for Dominica.

Without action to reduce its climate vulnerability, Dominica has estimated the cost of climate-related loss and damage to be 34.3% of GDP by 2050, 54.4% by 2075 and 77.3% by 2100.[181]

Economy

Dominica's GDP is growing steadily at a rate of 3.1% per annum, having recovered from the dips caused by Hurricane Maria and Covid-19. It totalled US$723.89m in 2025, equating to US$10,989 per capita, placing it in the upper-middle income category.[182] The country also has a large debt burden, at 82.4% of GDP.[183]

Dominica is dependent on external trade for much of its GDP, with imports totalling US$301m and exports US$22m, leaving a trade deficit of US$79m. The country's largest import is fossil fuels.[184] Unlike many islands in the region, the country's largest sector is agriculture, with exports of bananas, cereal and pellets, tropical fruits, cassava, citrus, beer, pasta, spices, vegetables, and coconut and its byproducts including soap. The country is also actively looking to expand its tourism sector and is also developing geothermal energy production.[185]

Dominica is establishing an architecture to maximise its access to and efficient utilisation of climate and nature financing, including setting up a National Conservation Trust Fund and a Climate Change Trust Fund, and engaging with

Image (p.47): The village of Scotts, Dominica (Canva.com)

Jamaica on the development of a Caribbean Green Bond Listing. The country is also planning to establish climate change and disaster risk management insurance for vulnerable communities and livelihoods. Dominica also receives finance from multilateral institutions including the GCF, GEF, UNDP, CDP, CTF, and from foreign direct investment, noting that its Citizenship by Investment (CBI) program has provided vital funds for a number of projects towards SDG achievement and climate mitigation, adaptation and resilience.[186]

Dominica's plans to build economic resilience rest largely on increasing sustainable tourism, increasing climate-smart agricultural practices and transitioning to renewable energy, of which geothermal is the cornerstone.[187]

Maritime

Maritime traffic to Dominica comprises cargo vessels, cruise ships and ferries. Dominica's maritime infrastructure is spread across the capital, Roseau, and Portsmouth in the north of the island. Its main port is at the deepwater harbour at Woodbridge Bay, just outside Roseau, which serves cargo and cruise ships. Central Roseau also has a single berth for cruise ships and an adjacent ferry terminal. Longhouse Port in Portsmouth serves cargo vessels, and there is another single berth near Portsmouth that serves both cruise ships and ferries. All ports are managed by Dominica Air and Sea Ports Authority.[188]

There is no commercial shipbuilding activity in Dominica. The country has a national fleet of 69 vessels by flag, and a seafarer workforce of 1,168 people.[189] Dominica is in the process of ratifying MARPOL Annex VI.

National development priorities

Dominica has set the goal of becoming become the world's first climate-resilient country and is working to ensure that its key pillars of national policy can survive in the face of increasing climate impacts. These pillars are:

1. Economic diversification
2. Sustainable and inclusive growth
3. Employment creation and revenue generation
4. Social development
5. Social protection and poverty reduction
6. Environmental management and cultural preservation

Dominica has developed an institutional and regulatory landscape to support this goal, with close to twenty mutually supportive legislations, policies, plans and strategies related to climate, resilience and renewable energy.

The implementation plan for Dominica's NDC focuses on capacity building for key sectors, most of which are relevant for shipping decarbonisation. These are:

- Energy
- Agriculture
- Forestry
- Transport
- Waste

The major challenges that the country faces in achieving this vision are natural hazards, sufficient financing, technology transfer and capacity development.[190]

Energy security and renewable energy

What already exists?

Dominica has historically been dependent on imported fossil fuels for its energy needs. This has resulted in expensive energy tariffs averaging US$0.41/kWh in 2012, and a supply chain vulnerable to shocks.[191] [192] However, a major pillar of Dominica's low-carbon and climate-resilient development strategy is the exploitation of its geothermal energy. The country's first geothermal plant opened in Q2 2026 with a 10MW generation capacity and is expected to supply 23,000 homes, enhance the country's energy resilience, and reduce its reliance on fossil fuels, and consequently energy bills.[193] It is the first geothermal plant in a Caribbean Community (CARICOM) country and second in an Organisation of Eastern Caribbean States (OECS) country. Dominica is part of the GEOBUILD Programme, supported by the CDB, which aims to expand geothermal energy development in the Eastern Caribbean.

The sole provider of electricity in the country is the nationally owned utility company DOMLEC.[194] In 2024, 78.4% of its energy was derived from diesel, totalling 24.5m litres. The remaining 21.6% came from 'run-of-the-river' hydropower generation – a series of small, minimally ecologically-disruptive turbines integrated into natural rivers – and some distributed solar panels for domestic water heating.[195] [196] [197] [198]

Following the opening of the geothermal plant, the share of renewable energy supplied by DOMLEC increased to 68%: 43% from the geothermal facility and the remaining 25% from hydro. With the geothermal plant now online, it is projected to produce 50% of Dominica's energy in 2026 and 60% by 2027 with a full year of production, almost entirely replacing diesel from the country's electricity generation within 4 years.[199] The price of electricity generated by the geothermal plant has been fixed for the first year through a PPA signed between DOMLEC and the private operator of the plant in 2025, making steps towards nationally-produced energy translating into lower bills for consumers.[200]

Unlike renewables such as solar and wind, geothermal generates a steady supply of electricity from the stable heat from the Earth's core and mantle. This means that geothermal can provide baseload power to the grid 24/7, reducing the need for battery storage.[201] Nonetheless, in 2025 DOMLEC commissioned a 6MW Battery Energy Storage System (BESS) to strengthen grid stability and support the integration of multiple types of renewable power into the energy system to replace diesel.

What is planned?

Dominica has set its NDC target as achieving 100% renewable electricity by 2030 while extending electricity access to all citizens and communities. It also intends to reduce its road transport emissions by 20%.[202] The core of the country's energy strategy is the further development of its geothermal resources, in line with its Geothermal Energy Development Bill, with a further 5MW plant planned[203]. This will be supported by widespread energy efficiency improvements across all sectors, noting that nearly half of Dominica's electricity sales are to the commercial sector. The country also plans to develop other forms of renewable energy including more hydropower, as well as wind, solar, biomass and waste-based energy, including the use of distributed systems and mini-grids for isolated communities.[204] [205] [206]

A GCF-funded project ('Sustainable Energy Facility for the Eastern Caribbean') is underway to address challenges that Dominica faces in implementing these ambitious plans.[207] Financial challenges include the availability and high cost of insurance for such a large and pioneering project, as well as high mobilisation costs for specialist equipment and supplies. Technical challenges include the difficulty of transporting equipment to the project site due to the island's topography and road conditions; civil works costs; lack of economies of scale concentrating operation and maintenance costs; and the constraints of electricity transmission infrastructure.[208]



Image: Geothermal plant in operation in Dominica. Credit: DOM767

Historically an energy importer, Dominica has ambitious plans to become an energy exporter. From 2027, the country foresees producing sufficient geothermal energy to meet their own needs as well as export some 200Gg annually to its neighbouring islands of Martinique and Guadeloupe, helping to enhance regional energy sovereignty, security and resilience.[209] [210]

Opportunities for synergies between maritime decarbonisation and national development priorities

The current electricity grid system is unable to carry all 10 MW of electricity produced by the geothermal facility and distribute it around the island. This is a capacity constraint which means that the geothermal facility in the south will not be able to operate at full capacity, while diesel generation will continue to supply electricity in the north. Phase one of a multi-phase project to transform and interconnect Dominica's grid across the whole island to enable maximum exploitation of renewable capacity is currently underway.

If future phases of the grid upgrade project are linked to the planned port upgrades and supply an electrified port with decarbonised operations and renewable energy bunkering capacity, relevant portions of this work may be eligible for support under disbursement category one of the NZF's economic element. Fully connecting the island's power grid and integrating the ports would also be critical for the country's NDC emissions reduction targets, and its aims of exporting energy, and of becoming a green shipping hub. It would also improve air and marine water quality for communities living near the port. Running the country's ports on its domestically produced energy would also significantly enhance the resilience of its key sites of economic activity.

Food and water security

What already exists?

Agriculture is critical to Dominica's economy. It is the primary export sector, represents 17% of the country's GDP and employs 21% of its active workforce.[211] Nonetheless, Dominica is a net food importing nation, opening it to supply chain vulnerabilities and high food costs.[212] Banana production has always been one of the most important activities in Dominica's economy and remains its primary agricultural export, totalling US$42.77m in 2023.[213] As demand has declined over the last three decades, Dominica has diversified its cultivation to include citrus fruits, vegetables and root crops, coffee, cocoa, coconuts, herbal oils, extracts, patchouli, aloe vera, cut flowers, mangoes, guavas, and papayas. Most of Dominica's agriculture is tree crops due to its mountainous terrain. Small arable and fishing sectors produce meat and fish largely for domestic consumption, but meat also remains a top import.[214] [215] The government has supported the delivery of 54 fishing vessels, invested in fisheries infrastructure, and built a Fish Purchasing Facility at Roseau.[216]



Image: Banana tree growing in Dominica (Canva.com)

Dominica has developed a regulatory and institutional framework to support the strengthening of its agricultural resilience, including a National Agricultural Policy 2021-2030 (NAGP), Agriculture and Food Systems Transformation Roadmap, Agriculture Disaster Risk Management Framework (ADRMF) and a Food and Nutrition Policy Plan of Action, as well as a National Agricultural Labour Task Force.

As the wettest island in the Caribbean, with an average annual rainfall of 1,900mm in coastal areas and more than 10,000mm in some high areas, Dominica has abundant natural water supply.[217] However, the country's water distribution infrastructure was damaged by Hurricane Maria in 2017 and has declined since then, impacting the quality of water and causing intermittent shutdowns.[218] The entity responsible for water provision across the island is the state-owned utility DOWASCO, which runs a number of freshwater treatment plants across the island where water is treated for delivery to consumers. DOWASCO also runs one sewage treatment plant on the island.[219]

What is planned?

Dominica plans to scale up and diversify its agricultural sector to reduce its dependence on imported foods. Its NAGP centres on three pillars: the sustainable intensification of production systems; developing competitive and innovative agricultural chains to boost food security and economic contribution; and strengthening food security and nutrition. The ADRMF also has three key objectives: to enhance food and nutrition security, poverty reduction and climate change adaptation.

Dominica plans to become a Global Centre for Agricultural Resilience: a model for best practice regionally and internationally, working across the value chain from farmers to consumers to increase food security, reduce food import dependency by 40% and increase agricultural exports by 100% by 2030.[220] The country plans to transform its agriculture and food systems sector to achieve goals across climate mitigation, adaptation and resilience by practising Climate-Smart Agriculture (CSA), an integrated approach to achieving these goals, as well as food security.[221]

The Dominica Community Resilience Enhancement Project (DOMCREP) is supporting over 500 food producers to adopt climate-smart agricultural practices including improved irrigation, greenhouse technology and agroforestry in order to boost productivity, livelihoods and food security. The government is also exploring crop insurance as a mechanism to create financial support for farmers and their families in the event of climatic disasters.[222] The country's agricultural plans also aim to fortify the buffer of domestically produced food to ensure nutritional security when shipping or overseas supply are disrupted.[223]

As well as improving food security and the sustainability of its food systems, Dominica is looking to boost the competitiveness and value of its food production sector by increasing the production of a number of priority crops and processing raw agricultural output into value-added products such as jams and soaps.[224] [225] The government is investing in agro-processing facilities to support this, as well as encouraging the commercialisation of locally manufactured products.[226]

Dominica's plans for water focus on improving the treatment and delivery infrastructure and its institutional capacity for water management. The country is also exploring opportunities to export water to other Caribbean nations to enhance water security across the region.[227] [228] DOWASCO is currently implementing the country's Water Sector Strategic Development Plan (WSSDP). The project aims to build a resilient and efficient water supply and sanitation system, and to strengthening Dominica's institutional capacity for resilient water resources management.[229]

Opportunities for synergies between maritime decarbonisation and national development priorities

The National Agricultural Policy notes that there is insufficient labour currently in the agricultural sector to facilitate the government's ambitious plans. To address these shortages, Dominica has established a National Agricultural Labour Task Force to assess labour needs, improve data collection, and implement strategies to attract and retain agricultural workers.[230] Schemes and courses to train new agriculturalists and actions to enhance domestic and regional food production and security, such as the construction of the agro-processing facility, could qualify for support under disbursement category five as contributing to mitigating DNIs by boosting food security. Food processing and value-addition facilities for export products could be integrated into port (re-)development plans to create an export industrial zone. This may qualify for funding under disbursement category five, and in any case may share synergies with other infrastructure built as part of the port redevelopment, creating economic efficiencies.

This would also create new green jobs for Dominicans and potentially nationals of other Caribbean countries such as Haiti, as well as further increasing the economic contribution of Dominican agriculture. Although the primary intention of this agricultural upscaling is to fortify domestic food security, there may also be opportunities for the successful upscaling to increase the export of agricultural and value-added food products, boosting foreign exchange.

A just and equitable transition (JET) of the workforce to green sectors

What already exists?

Although Dominica's maritime workforce is small, at 1,168 or just 2% of the population, it is still important to ensure that these individuals are not negatively impacted by the maritime energy transition. Indeed, Dominica's development and resilience-building plans offer many positive opportunities for employment creation. Dominica seeks to ensure that its transition towards an inclusive and low-carbon economy is 'just and fair, while at the same time maximising opportunities for economic prosperity, social justice, rights and social protection for all, leaving no one behind.' To facilitate this aim, the country has undertaken a multi-sectoral capacity gaps assessment for the whole of the economy, supported by an assessment of the funding required to achieve this.[231]



Image: Trafalgar Hydroelectric Plant in Dominica. Credit: Pako Images (iStock)

What is planned?

Dominica's plans to expand its renewable energy and climate-smart agriculture sectors and its ports will naturally require an increased workforce skilled in these areas. This will spark an increase in green jobs beyond the shipping sector. The demand for such skilled labour may exceed what is currently available in Dominica. The country is therefore considering expanding its migrant workforce, especially from the diaspora and other Caribbean countries such as Haiti, where much of Dominica's agricultural workforce has historically come from.[232]

Dominica has structured support programmes available for farmers, as well as formal recruitment programmes and regulated permit systems which attract skilled workers, ensure due diligence, and provide technical assistance and labour protections. By expanding such productive sectors of its economy, Dominica is boosting the number of green jobs not only within its borders but also across the Caribbean region, supporting a just and equitable transition of Caribbean labour.

Opportunities for synergies between maritime decarbonisation and national development priorities

The country's plans to expand its ports and marinas will create new jobs in the construction, maintenance and operation of the expanded facilities. Integrating the decarbonisation of Dominica's shipping sector, including the electrification of port infrastructure and the provision of ZNZs to ships, into these plans will ensure that a maximum number of these new jobs are green. A maritime skills gap assessment would be beneficial to understand the country's needs and design appropriate training programme. Investment in such an assessment and the necessary training and upskilling of workers to operate and manage decarbonised ports and shipping could be eligible for funding under disbursement category two of the NZF's economic element.

Maritime development

What already exists?

Woodbridge Bay Roseau, the island's main port with two berths, handles approximately 369,000 tonnes of cargo annually, while the single cargo berth at Portsmouth handles approximately 289,000 tonnes each year.[233] [234] 375,646 cruise passengers visited Dominica in the 2025-6 season on approximately 189 ship calls.[235]

What is planned?

Through its NDC, Dominica has committed to reducing emissions from the shipping sector by 100%. It has also committed to reducing overall transport emissions, the island's largest and fastest-growing source of CO2, by 20%. It aims to achieve these targets through initiatives for the road and maritime sub-sectors.[236] Although the level of these emissions is reasonably low due to the small volume of shipping traffic, achieving this goal requires concerted actions to decarbonise the island's shipping operations.



Image: Roseau viewed from the cruise terminals (Canva.com)

Dominica foresees achieving its maritime emissions reductions first through providing shore power to ships, leveraging their abundant geothermal energy. The country is also considering the future development of synthetic fuels including green hydrogen, green ammonia and biofuels. Research and funding are required before such development can be pursued.[237]

Ports are a key site of resilience for the country, with many of its resilience-building strategies setting a target for ports to be functional for people and goods within one week of a major climate event. Upgrading infrastructure, procuring additional equipment and developing a Specific Government Continuity Plan to guide the disaster response for ports will be critical to achieving this goal.[238]

Dominica is planning to construct a new smart cargo port at Canefield, close to Woodbridge Bay and Roseau city, to handle the anticipated trade increases. According to government plans, the new port will be resilient to climate impacts and equipped with smart technology to improve efficiency and reduce clearance times.[239] The government is also advancing its plans to expand the cruise pier and build a 'cruise village' at Woodbridge Bay, Roseau, with the intention of becoming a major sea homeport as part of the economic strategy to boost its tourism sector, with discussions ongoing with cruise lines.[240] [241] A yachting marina is also being built at Cabrits, in the north of the island, to increase tourism and stimulate economic growth and the blue economy.[242]

Opportunities for synergies between maritime decarbonisation and national development priorities

Despite its target to reduce shipping emissions by 100% by 2030, Dominica's port development plans do not explicitly include provisions for decarbonised shipping, such as electricity and green fuel bunkering. Linking the country's geothermal electricity production to its ports, installing equipment to provide electricity for

both shore power and bunkering, and laying the foundations for the later provision of synthetic ZNZs would support the country to meet its NDC commitment and position it favourably to become a homeport for green cargo and cruise lines. This would also be important for the country's long-term plans to export electricity.

A feasibility assessment is required to examine variables such as the demand and compatibility of vessels, grid capacity, equipment required, resilience, and cost and sources of financing.[243] This study could identify challenges and solutions, and develop a defined and costed project proposal for shore power and maritime training that could be eligible for funding under disbursement category one of the Net-Zero Framework's economic element. This assessment and proposal would also be valuable in seeking other funding to advance this development NZF financing does not become available.

Research and development of synthetic fuels would also be eligible under this disbursement category and would further cement the country's position as a key energy producer in the region as decarbonisation advances across the shipping and energy sectors. Decarbonising port and shipping operations would also have positive health impacts for maritime workers and communities living near the port, as well as on coastal and marine ecosystems near the port and shipping routes. Offering decarbonised shipping facilities would attract green cruise and tour operators, supporting the country's objective of expanding sustainable and nature tourism.

Summary

Dominica's development is driven by its ambition to become the world's first climate resilient country and bolstered by its abundant geothermal power. Supported by a strong and cohesive legislative and institutional environment, the country is pursuing cross-sectoral plans to reduce carbon emissions and enhance resilience to climate impacts, especially in the energy and agriculture sectors. Integrating its renewable energy expansion into its plans to upgrade and modernise its ports would not only help the country to meet its NDC targets, but would also provide green employment opportunities and position the country favourably as a destination for green shipping. This could be a key area for support under the NZF's economic element. Necessary grid upgrades to remove capacity constraints, securing sufficient financing, and ensuing sufficient supply and appropriate training of workers are all challenges that must be addressed to achieve these objectives.

Priority actions to harness synergies between the maritime energy transition and existing national priorities might be:

- Ensuring that capacity to provide shore power in the short term and electricity bunkering in the medium-term features in the planned port construction and upgrades.
- Leveraging this development to advance the grid upgrades and interconnection that will enable full utilisation of geothermal generation potential.

- Conducting a needs and feasibility assessment for decarbonised shipping and grid interconnection to identify what is required to enable the above actions.
- Integrating the construction of agro-processing and value addition facilities into plans for port upgrades and construction to benefit from synergies, and strategically consider how these facilities can boost food security to mitigate potential DNIs from the NZF.
- Conducting a maritime skills gap assessment to identify needs and pathways to ensure that the maritime energy transition is just and equitable.

Figure 5 below shows Activities and projects that could be eligible for funding under the disbursement categories listed under Regulation 41 of the Net-Zero Framework and how these could support the national priorities identified. Distribution Category 4 offers an opportunity for Dominica to consider integrating maritime decarbonisation in the development of its National Adaptation Plan (NAP). This diagram is intended to highlight potential linkages only and does not represent proportions or values of potential revenue flows.

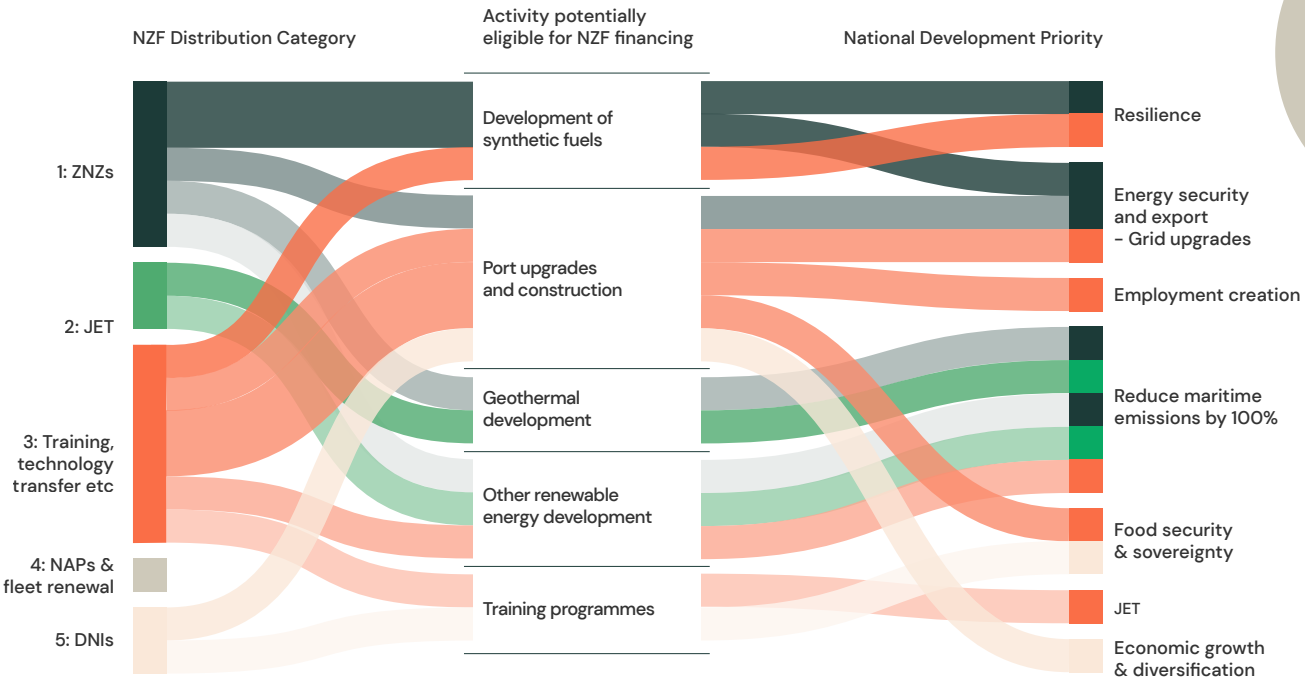


Figure 5: Potential synergies between NZF disbursement categories and national priorities (Dominica).

06
Regional observations

The countries studied in this report share some characteristics as well as each having unique features. The Caribbean has long been known as a region of ambition, leading climate action at the global level. In their own ways, Antigua and Barbuda, Barbados, and Dominica demonstrate this by pioneering a particular avenue towards decarbonising their economies as well as adapting and increasing their resilience to climate change.

Context

Countries across the Caribbean are highly vulnerable to the impacts of climate change, including worsening hurricanes, sea level rise, changes in rainfall patterns leading to drought and/or flooding, and heatwaves. Many also have economies which rely heavily on climate-sensitive sectors like tourism. Climate-induced natural disasters have had a heavy toll on the population and economy of all the countries studied within the last decade, and climate-induced loss and damage for all the countries is projected into the hundreds of millions of dollars annually by mid-century without significant adaptation and resilience-building actions, which can reduce but not entirely neutralise these figures.

As island nations, these countries all have a historic dependence on imports, especially for food and energy, the latter in the form of fossil fuels. Their ports are a key site of economic activity – both for imports of critical goods, and for exports which bring in valuable foreign exchange. Import dependence makes nations vulnerable to supply disruptions caused by natural or political events, as well as to elevated base prices exacerbated by price instability. The major import partner for the region is the USA, which has presented particular challenges and volatility in recent years, and some countries are now seeking to diversify their import partners and shift their primary trade relationships to within the Latin America and Caribbean region.

Securing the scale of finance required to implement national plans for the energy transition is a challenge across the countries studied and the wider Caribbean – symptomatic of the staggering gap in climate and development finance globally. Despite the financial commitments made by Annex I (Global North) countries to Non-Annex I (Global South) countries in the Paris Agreement, which were increased to US$300 billion per year by 2035 in the New Collective Quantified Goal (NCQG) in 2024, climate finance flows globally still annually fall US$6tn short of what is required to meet international climate commitments.[244] Specific regional features add further challenge to the task of securing finance, including the island nations' severe climate vulnerability and consequent high investment risk profile, as well as relatively high incomes per capita which limit or block access to concessional finance. The small size of the countries also prevents economies of scale from being realised, making many projects and investments more expensive than they would be elsewhere.

All the countries studied displayed strong legislative and regulatory foundations to support their development strategies, which have largely been built and updated in recent years to support sustainable development and the renewable energy transition. Countries noted that they would benefit from institutional strengthening, including capacity building, to ensure efficient implementation of their plans and strategies and to take maximum advantage of system improvements and upgrades across sectors. Strong regional institutions including CARICOM, OECS and CDB can be valuable in advancing regional priorities, collaboration and economies of scale.

Development plans and priorities

Building resilience to climate change is a key priority across all the countries studied, with enhancements planned and taking place across systems and processes, institutions, land use and infrastructure. The renewable energy transition is advancing faster in the Caribbean than in many other regions, especially developing regions. Climate ambition, abundant natural resources and strong regional cooperation all support this.

Energy security and renewable energy

Enhancing energy security, sovereignty, affordability and sustainability is a priority for all the countries studied, and each one is advancing renewable energy generation according to their particular geographical strengths and distribution model. Across the board, upgrades to the energy distribution grid and the installation of energy storage capacity, primarily batteries, are required to enable maximum generation and utilisation of renewable energy.

There are two reasons for this. First, energy output from many renewable sources fluctuates according to weather conditions. Second, optimised renewable grids allow electricity to flow both ways: from grid to consumer, and from consumer to grid. This allows national grids to take advantage of small-scale generation, for example by rooftop PV panels, and use EV batteries as storage during times of peak flow. Traditional, fossil fuel-powered grids are used to stable generation output and unidirectional flow from grid to consumer only. Without upgrades, traditional grids are therefore not able to harness the full power of renewable energy and will suffer significant energy leakage or loss.

Another action that would significantly enhance the resilience of Caribbean countries' energy systems is 'undergrounding' cables, i.e. laying mains cables underground rather than in the air suspended between towers.[245] This makes cables less vulnerable to damage in storms, drastically reducing the instance of power outages following hurricanes and other major events, supporting critical healthcare and other vital services while reducing the use of diesel generators. However, undergrounding is a costly process. Linking this action to the resilient provision of electricity at ports could enable it to access financing under the NZF. Undergrounding mains cables from ports with their own renewable generation capacity would also enhance energy security for the rest of the country, as energy generated at the port could be used to power critical services in emergencies.



Image: Battery energy storage infrastructure. Credit: Prologis, Inc.

This report has highlighted a number of intersections and overlaps where accelerating the decarbonisation of shipping could both attract funding from the NZF's economic element and generate co-benefits to support the country's broader energy transition goals.

- Batteries at ports
- Funding grid upgrades
- EV charging

It is important to note that the demand for electricity by large ships could in many cases equal or exceed the country's domestic energy consumption.[246] Developments for the provision of shore power and electricity bunkering should therefore plan to generate as much electricity as they expect to need, to avoid negative trade-offs for national energy security. This also presents an opportunity to support national energy security, as the generation and storage facilities at the port will have excess capacity most of the time, whenever they are not experiencing peak demand. Integrating this infrastructure into the national grid can boost and stabilise renewable energy across the country.

The renewable energy transition across both the maritime sector and the wider economy presents opportunities for regional collaboration, such as on developing and distributing synthetic fuels, enhancing energy security at the regional level, and conducting regional knowledge transfer initiatives to build the technical skills and trained workforce to implement and operate the renewable energy transition.

Food and water security

Countries in the Caribbean have varying levels of domestic agriculture. However, across the board, much of the food that is consumed by Caribbean nations is imported. This import dependence increases food insecurity, baseline prices and price volatility, especially in the face of supply disruptions due to climatic events, as well as geopolitical fluctuations. For example, in 2022, freight rates from the USA to the Caribbean rose by 22%; then, in 2025, the US imposed steep tariffs on many Caribbean countries, disrupting trade relations.[247, 248] Prior to this, the US was the primary food import partner for many Caribbean countries.[249 250 251] US tariffs have prompted countries to diversify their food imports and look to other Latin American countries as trade partners.[252 253] Compounding this, the number of shipping lines operating in the Caribbean has drastically reduced over the past two decades, reducing access to trade of food and goods.[254]

All three countries studied have major national plans to scale up and diversify their agriculture sectors while making them more productive and resilient to climate impacts; reducing import dependence; and boosting food security, sovereignty and affordability. However, all three countries face the common challenge of a lack of skilled workforce to bring these plans to fruition. This may be an opportunity both for regional collaboration in skills and knowledge exchange, as well as for targeted migration to fill the skills gap. Such knowledge exchange initiatives, as well as other training programmes, may be eligible for funding under the NZF's disbursement category five, as enhancing domestic food production mitigates potential DNIs and boosts food security.

It is important to note that, although the cultivation of feedstocks for biofuels may qualify for funding under disbursement category one, utilising agricultural land, water and other resources for such purposes could have severe negative impacts on food and water security for countries, unless such cultivation is designed to synergise with food-producing agriculture and kept at a small scale. Biofuels which utilise waste materials, such as the sargassum and rum-wastewater biofuel under development in Barbados, do not compete with food security and may even create co-benefits.

Water security is a concern for many Caribbean nations, with islands experiencing varying levels of water security. All three countries studied are currently investing in the resilience of their water sectors. A number of synergies have been highlighted between strengthening and upgrading water provision infrastructure and the maritime energy transition. One possibility is using renewably powered desalination plants to stabilise fluctuating flows to the grid from solar and wind and thereby reduce the need for expensive BESS systems. Another is to frame new water provision facilities as necessary to provide water as the base material for green hydrogen for shipping, which could make such projects eligible for funding under the NZF's economic element. Naturally, there are also synergies between water agriculture and water security, with efficient water management a key component of climate-smart and resilient agricultural practices.

Just and equitable transition

Justice and equity for workers in the renewable energy transition is a concern already being considered by all the countries studied. Each of the countries has undertaken some form of assessment and/or project to ensure that the members of its workforce who will be impacted by the renewable energy transition, within and beyond the maritime sector, are supported through the transition and do not suffer negative consequences. Indeed, the transition is expected to create a large number of jobs in each of the countries. Even within the shipping sector alone, the major port redevelopment and construction projects planned, the conversion of its operations to low- or zero-carbon technologies, and the management of the new, upgraded ports will generate a significant number of jobs. If these countries achieve their goals of becoming green shipping hubs in the region due to their early moving in shipping decarbonisation, this benefit will be multiplied, as the volume of port traffic will be significantly expanded as more ships require green bunkering capability.

Training and upskilling programmes will be needed to enable the workforce to take on these new green jobs. Seafarers, port personnel, electricians, engineers and maintenance workers will need relevant skills in shore-power operation, electrical safety, new vessel and port technologies, emergency response and equipment maintenance. Accredited training and apprenticeships should enable all citizens including young people, women, and workers moving from existing roles to benefit from the proposed investments.[255] Such training could be eligible for funding under distribution categories two and three of the NZF's economic element. As similar skills and knowledge will be required across many countries, this could also be an opportunity for collaboration and training at the regional level to harness economies of scale and knowledge exchange.

Maritime development

Ports are critical to the economy and life throughout the Caribbean, as the island nations' main points of connection to global trade and much of their valuable tourism. Each of the countries studied has plans to upgrade and modernise their ports to enhance its resilience, capacity and efficiency, and to boost its contribution to the economy. These plans vary in how strongly they build capacity for decarbonised shipping, such as installing electricity infrastructure for bunkering and shore power, and assigning space for the future bunkering and delivery of synthetic fuels; as well as how they plan to decarbonise their own operations, such as using electric cranes.

The planned redevelopments and port construction are critical and unique opportunities for these countries to position themselves as early movers in the maritime energy transition. This would facilitate their plans to become leading ports for regional cargo routes, transshipment, homeporting and green cruise tourism as vessels and operators increasingly transition to ZNZs, generating new green jobs. The countries also stand to enjoy a host of co-benefits from advancing maritime decarbonisation, from health improvements for port workers and local communities to supporting the renewable transition of their broader energy sectors including through BESS infrastructure.



Image: Shipping containers in Bridgetown, Barbados (Canva.com)

Modernising and decarbonising ports also has important co-benefits for resilience. As ports are critical to Caribbean islands for essential trade as well as aid and reconstruction following climatic events, the ability of ports to continue or resume functioning immediately after major events is decisive in the country's overall resilience. Modernised ports which combine energy sovereignty, strengthened grids including underground cables, and the continuity of shipping immediately after major events would contribute significantly to countries' overall resilience.

If port upgrades and development work proceed without integrating decarbonisation considerations, this could lead to countries missing out on opportunities to advance their existing development plans. They may also lose the early-mover opportunity to establish themselves as green shipping hubs – and could also imply a forced expensive transition further down the line before the natural lifespan of the new equipment, leaving stranded assets. For example, investing in LNG refuelling infrastructure would likely lead to stranded assets in the near future as marine transport moves away from LNG towards true zero-emissions fuels and technologies before the end of the useful lifetime of the infrastructure. The NZF would provide a global regulatory signal for the shipping energy transition, which is critical in derisking investment in port and maritime decarbonisation.



Image: Container ship on Caribbean Sea, Barbados (Canva.com)

It is also important that a number Caribbean countries advance their port upgrades in parallel to secure a market share sufficient to attract ship operators. One single country having readiness for decarbonised shipping, e.g. green bunkering capacity, would not merit shipping lines operating a route to one port alone.[256] Port upgrades and maritime decarbonisation are therefore a critical area for regional cooperation, and for a handful of countries to emerge as leaders for the whole region. Therefore, especially in markets where collaboration is key like the Caribbean, approaching maritime decarbonisation in a coordinated, collaborative way is vital to its success and benefits.

The early development of synthetic fuels for shipping, including green hydrogen and green ammonia, will not only support countries' plans to become major shipping hubs, but could also enhance national energy security and affordability. Such fuels could even become exports, creating new revenue streams. If a number of countries move early to produce synthetic fuels, the Caribbean has the potential to become a key exporting region of green fuels for shipping and beyond. Care should be taken to ensure that water used in their production is additional and does not negatively impact national water security or plans to increase agricultural production to enhance food security. Caution is urged regarding the development of biofuels from virgin feedstocks, as this could threaten food and water security.

07
Final conclusions and recommendations

This report has demonstrated that a broad interpretation of Regulation 41 governing disbursement of revenues from the NZF's economic element is aligned with the laws and conventions of treaty interpretation. It has likewise shown why the narrow interpretation taken by some Member States in discussions on the NZF that restricts its application to purely technical advancements in ships and fuels is not aligned with the purpose or wording of the Regulation, and is therefore not aligned with international treaty interpretation standards. An interpretation which includes the disbursements of compliance revenues to activities supporting a just and equitable transition of the maritime sector beyond ships, port infrastructure and fuels is not only permissible, but essential to comply with the requirements of the Vienna Convention on the Law of Treaties. As such, the report has suggested a number of areas which could defensibly fall 'within the boundaries of the energy transition in shipping' whilst also supporting the countries more broadly.

In doing so, the report has illustrated a number of promising synergies between the maritime energy transition and existing development priorities in the Caribbean. There are a number of areas in which advancing the maritime energy transition, with or without financial support under the NZF, could advance existing national plans and objectives. In particular, the report has identified:

1. Port infrastructure and upgrades could be leveraged to advance countries' renewable energy transitions and support energy security and stability far beyond ports themselves. Many elements of such upgrades could be eligible for funding under disbursement category one.

2. National and regional-level training programmes in agriculture and renewable energy could support food and energy security as well as a just and equitable maritime energy transition. Such training programmes may be eligible for funding under distribution categories two, three and five.

3. Advancing the development of synthetic fuels could strategically position these countries as green shipping hubs for the region, supporting their plans to become transshipment hubs and homeports for an increasing number of cruise and cargo lines. Synthetic fuels could also support energy security, sovereignty and affordability at national and regional levels, and could be exported, creating a new revenue source. If the production of synthetic fuels were expanded across the region, the Caribbean could become a green fuel-exporting region. The development of synthetic fuels could be eligible for financial support under disbursement category one.

Depending on the governing provisions agreed for the economic element and the terms of each specific funding window under it, the value of individual disbursements is likely to be insufficient to cover many of these projects. The best employment of these compliance revenues may therefore be strategic use to unlock further financing. For example:

- To derisk and crowd-in private sector investments.
- As co-financing to meet eligibility requirements of multilateral funding institutions such as the GEF, GCF, and multilateral and regional development banks.
- To conduct scoping studies to identify pathways towards advancing shipping decarbonisation and prepare project proposals.

General conclusions

Existing strengths

Across the case studies, the following strengths were observed:

- Favourable conditions for renewable energy generation, e.g. sun, wind, geothermal activity.
- Ongoing advancement and ambitious plans for a renewable energy transition.
- Updates to legislative and regulatory environment to support energy transition.
- Planned and/or ongoing port upgrades.
- Climate ambition and a willingness to pioneer innovative solutions.
- Exploration into the possibility of alternative fuel production.
- Active consideration of the needs for a just and equitable transition.
- Plans to upscale domestic food production and security.

Critical readiness gaps

The following challenges to achieving both maritime decarbonisation and other national development priorities arose across the case studies:

- Upgrades to power grid required to unlock and harness full renewable energy transition.
- Insufficient battery storage.
- Skills and capacity gaps in renewable energy and agriculture.

Near-term priorities

Based on its findings, this report recommends the following as priority actions in the next one-to-three years to remove barriers and open up the maritime energy transition, other national development priorities, and synergies between them, noting that this will be subject to sufficient financing being made available:

- Grid upgrades to increase capacity, flexibility and resilience. Upgrades should be designed with the source of renewable power in mind (i.e. variable vs. baseload) and, where possible, mains cables should be laid underground. Grid upgrades are a critical priority as without them, increasing renewable generation is not possible. Grid upgrades should be sure to interconnect the port to the country's main grid with a high-capacity connection.

- Installation of energy storage systems (BESS). As with grid upgrades, batteries or other systems to store electricity generated by variable renewable sources are critically needed to enable the installation of additional renewable generation capacity and a full transition of the energy system, including of the port.

- Plans for port upgrades and energy system transformation should be integrated to harness as many synergies as possible. Scoping studies should be conducted where information is missing.

- Coordination between Caribbean ports leading maritime decarbonisation to build a market share attractive to major shipping lines.

- Training programmes to equip a workforce for decarbonised shipping at regional and/or national levels.

Given their co-benefits for existing national priorities, this report recommends that these actions be pursued regardless of NZF support.

Medium-term opportunities

The following actions are not immediate priorities or not immediately practicable, but offer positive synergies for both maritime decarbonisation and national development priorities in the longer term (four-to-10 years):

- The development of alternative fuels, including green hydrogen and ammonia, taking care to ensure that these are fed by additional and sustainable water resources. Ideally, this would enhance water security for the countries and at a minimum would have a neutral impact. If the development of biofuels is pursued, efforts should be taken to avoid production from virgin feedstocks. Ideally, any biofuel production could have co-benefits including using waste or harmful products and producing natural fertilisers. At a minimum, they should not compete with agricultural resources for food security.

- Building regional systems to enhance energy and food security and resilience.
  - Interconnecting grids, as Dominica plans to do with Martinique and Guadeloupe, would allow countries with abundant renewable resources and advanced infrastructure to export electricity and allow countries with less readiness to benefit from the advantages of local renewable energy.
  - Where grid interconnection is not possible, decarbonised ships could transport electricity via batteries and green fuels such as hydrogen. This would promote resilience, affordability, reduced carbon emissions and air pollution, and help build economies of scale across the region.
  - Co-ordination in planning agricultural scale-up to ensure a diversity of food produced across the region could create intra-regional food security and reduce the need to import food from outside of the Caribbean, enhancing both security and affordability of food.

Potential NZF intervention

This report has identified elements of the recommended actions that could be eligible to receive compliance revenues from the NZF's economic element, depending on the eventual governing provisions adopted and the terms of each specific funding window. Actions that could justifiably qualify for support under each disbursement category of Regulation 41 of the Net-Zero Framework, as currently drafted, are: [ix]

Category 1: 'Researching, developing and making globally available and deploying zero and near-zero GHG emission technologies, fuels and/or energy sources, supporting the energy transition of shipping, and developing the necessary maritime, coastal and port-related infrastructure and equipment.'

- Installation of renewable electricity generation and storage at, or servicing, ports.
- Upgrades to grids which allow the port to provide renewable electricity to ships.
- Research and development of production and bunkering of ZNZs.

Category 2: 'Enabling a just transition for seafarers and other maritime workforce.'

- Training programmes which equip workers with the skills necessary to operate decarbonised ports and shipping across the entire chain, from the production and management of fuels, to the operation and maintenance of port infrastructure, to the loading, bunkering, maintenance and navigation of decarbonised ships.

ix These are notional suggestions based on the interpretation laid out in the introduction of Regulation 41 as it is currently drafted and are not guaranteed or exhaustive.

Category 3: 'Facilitating information-sharing, technology transfer, capacity-building, training and technical cooperation supporting the implementation of the regulations in this chapter.'

- Training programmes to fill skills and knowledge gaps, recruitment of additional capacity, and other capacity-building activities including training programmes and workshops in energy transition, maritime operations and institutional capacity. Especially if conducted at the regional scale, these could facilitate information sharing and technical cooperation.
- Regional cooperation to create economies of scale in the procurement of necessary and costly technology, such as a vessel with ship-to-ship electricity bunkering by battery.
- Grid interconnections and/or energy transfer between countries.

Category 4: 'Supporting the development and implementation of National Action Plans (NAPs), including fleet renewal and upgrade.'

- Transitioning national fleets to run on ZNZs through retrofitting or replacement.
- Actions included in NAPs.

Category 5: 'Addressing, as appropriate, disproportionately negative impacts on States, including on food security, resulting from the implementation of the regulations in this chapter.'

- Training, infrastructure and technology required to scale up domestic agriculture to enhance food security and reduce import dependence.

Regardless of the eligibility or success of any project in securing financing from the NZF's economic element, this report recommends the priority actions listed above as strategic avenues to advance existing national development priorities and to position countries advantageously to benefit from the inevitable decarbonisation of global shipping. Therefore, if resources are not made available for such activities from compliance revenues under the NZF,, the actions identified remain relevant targets for countries to seek alternative sources of financing.

Recommendations for specific actors

In line with the findings of this report, the following suggestions indicate how a number of key actors can contribute to harnessing the potential of the maritime energy transition in pursuit of the region's development priorities.

CARICOM, OECS and regional bodies:

- Convene knowledge exchange and training programmes, particularly those aimed at retraining and upskilling adults already in the workforce, to help to fill labour shortages which might hinder the achievement of national plans. Coordinating regional skills-based migration programmes could also help to fill these gaps in the immediate term. These programmes would be especially beneficial in:
  - Renewable energy installation and maintenance.
  - Agriculture.
  - Decarbonised shipping, including port planning, operation and maintenance.
  - The development of synthetic fuels, including green hydrogen and ammonia.
- Conduct scoping, capacity, gaps, or feasibility assessments in a number of areas (including and beyond those identified in this report) to inform further development. Such assessments could examine capacity, infrastructure, financial and regulatory/legislative needs to enhance synergies and advance maritime decarbonisation. They could produce national and/or regional roadmaps and project proposals which can seek funding.
- Convene programmes at regional level, including knowledge exchange between countries to build capacity building for strengthened national institutions.
- Foster agricultural cooperation to ensure a diversity of foods is produced in the region and facilitate intra-Caribbean food trade to boost regional food security, sovereignty and affordability.
- Support the establishment of green shipping corridors within the region, and potentially to and from the region in the longer term.
- Coordinate alignment in infrastructure developments across countries and managing relationships with shipping lines to secure decarbonised routes to ports with ZNZ capacity within the region.

National governments:

- Support the adoption of the NZF with an economic element at MEPC 85 to provide regulatory certainty and revenues for a just and equitable maritime energy transition.
- Make maritime decarbonisation a priority as a strategy to advance existing national development plans.

- Conduct a national assessment of what development plans present synergies with the maritime energy transition and could be supported by NZF financing, and/or maritime energy transition activities that could support national development priorities, independently of NZF regulations or financing.
- Collaborate with other governments undertaking similar plans and those wishing to but not yet advancing, to support cohesive regional progress. This would benefit countries, the region, and also help attract shipping lines to run decarbonised Caribbean routes.
- Leverage any revenues received from the NZF's economic element to de-risk or crowd-in larger scale investment for projects harnessing synergies between maritime and national development from other sources including the private sector and multilateral development banks.

Port authorities:

- Secure early-mover advantages in decarbonised shipping by ensuring that ambitious decarbonisation features in port upgrade or construction plans. In doing so, consider how to position the port to benefit the most from the maritime energy transition, and to create co-benefits throughout the domestic economy.
- Pursue decarbonisation as a strategy to support plans of becoming transshipment hubs and homeports, and to add additional revenue streams including from the provision of shore power.
- Consider how to decarbonise port operations as well as providing ZNZs and shore power to ships.
- In designing port upgrades, consider what elements could be eligible for funding especially under disbursement category one, and in particular, how could port redevelopment or upgrade projects and infrastructure support broader national development priorities, e.g. by stabilising renewable energy with battery storage or providing water for ships that can also boost national water security.

Shipping and cruise lines:

- Consider, in the procurement and/or renovation of vessels, that electricity bunkering at a number of Caribbean ports is a near-term probability. This both carries advantages for Caribbean countries and is likely to be more economic than fossil fuels, especially in the mid- to long-term as fossil fuel prices rise and renewable energy prices fall.
- Prepare vessels to be able to run on shore power in ports. Many Caribbean ports are actively working towards providing this in the near future, and ships operators stand to benefit from this facility.
- Capitalise on the regulatory certainty provided by the Net-Zero Framework the maritime energy transition. This will both accelerate the transition and de-risk investments in converting fleets and infrastructure to ZNZs.
- Move early to keep pace with infrastructure developments in many Caribbean nations, which are advancing decarbonised shipping regardless of the Net-Zero Framework.

- Transition cruise vessels to ZNZs to benefit from the increased emphasis a number of countries are putting on sustainable tourism, as well as future green shipping corridors.
- Coordinate with regional institutions such as CARICOM and OECS to establish new decarbonised routes that serve both the operators and the region.

IMO and the economic element of the NZF:

- Recognise the unique challenges and constraints facing the Caribbean and other SIDS when designing funding windows. These include limited access to concessional finance, small size of countries limiting economies of scale, and market share requirements for shipping lines to operate decarbonised routes.
- When deciding criteria for priority geographical allocation of compliance revenue, consider compound metrics like the Multidimensional Vulnerability Index, rather than simply GDP.
- Consider prioritising projects that will generate co-benefits which support national development priorities when developing project eligibility and assessment criteria.

Caribbean Development Bank and other MDBs:

- Consider funding more maritime decarbonisation projects with co-benefits for national development priorities, including opening specific funding windows for this type of project.
- Conduct scoping, capacity, gaps, or feasibility assessments in a number of areas (including and beyond those identified in this report) to inform further development. Such assessments could examine capacity, infrastructure, financial and regulatory/legislative needs to enhance synergies and advance maritime decarbonisation. They could produce national and/or regional roadmaps and project proposals which can seek funding.
- Consider funding training programmes in the areas where skills and labour gaps have been identified, to support the maritime energy transition and to support countries to achieve their national goals and priorities.
- Consider funding regional programmes to develop regional integration on key areas identified, such as food security, energy security, just and equitable transition. These programmes would be best implemented in collaboration with CARICOM, OECS and/or other regional institutions.

Training and educational institutions

- Conduct assessments of skills requirements and gaps for the maritime energy transition and supporting sectors, and develop courses to fill these gaps.
- Convene courses for young people in decarbonised economies to equip the next generation to manage and thrive in a decarbonised economy in and beyond the maritime sector. Such courses might include renewable energy, shipping and agriculture.

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