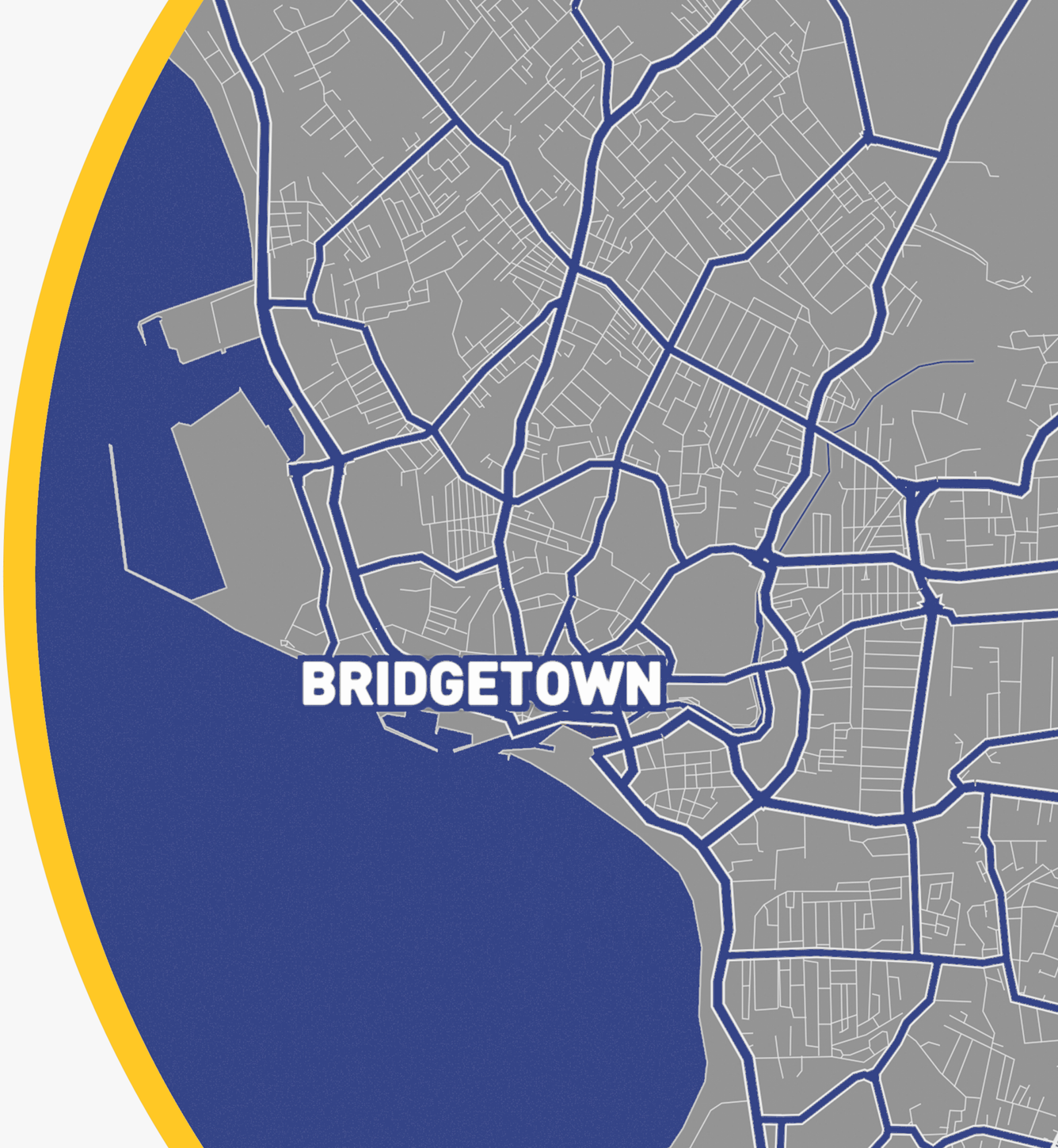
BARBADOS

ENERGY REPORT CARD (ERC) FOR 2022



CARIBBEAN CENTRE FOR RENEWABLE ENERGY & ENERGY EFFICIENCY

AN INSTITUTION OF CARICOM

INTRODUCTION

This is the Energy Report Card (ERC) for 2022 for Barbados.

The ERC provides an overview of the energy sector performance, highlighting the following areas:

- Installed Conventional and Renewable Power Generation Capacity
- Annual Electricity Generation, from Conventional and Renewable Plants
- Other Electricity Sector Metrics, such as Losses, Consumption, and Tariffs
- Renewable Energy Targets
- Renewable Energy Resource Potential

The ERC also includes sectoral data and information on policies and regulations; workforce; training and capacity building; and related areas.

The data and information that are available in the ERC were mostly provided by the government ministries, agencies, and departments, that have responsibility for statistics and planning, in general, and the energy sector and electricity subsector including the electric utilities, in particular. The data and information collected was supplemented by desk based research and, in instances, information was generated from calculations and analyses that were performed by the CCREEE.

Quality Assurance

The collection and treatment of data and information that is produced for the ERC is consistent with the International Recommendations for Energy Statistics (IRES), which provides a comprehensive methodological framework for the collection, compilation, and dissemination of energy statistics in all countries irrespective of the level of development of their statistical system. The ERC is produced in accordance with these performance standards that seek, as far as is possible, to ensure the quality (i.e., objectivity, utility, and integrity) of data and information that it disseminates to the public.

The CCREEE strives for transparency on the information and methods that are used within the production of the ERC, with a view to improve understanding on how the information should be treated and to facilitate reproducibility of the information. Nevertheless, the Centre recognizes that quality may be limited by the nature and source of the data and information disseminated.

Disclaimer

The ERC includes data and information that is contained in a variety of public sources and, though every effort is made to validate the accuracy and validity of the contents, reliance on the information herein is strictly at the user's risk.

Correction of Errors

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Requests for Correction

The CCREEE has established administrative mechanisms to allow persons to seek and obtain, where appropriate, legitimate correction(s) to information maintained and disseminated through the ERC. Any request for corrections should be sent to: energyreportcard@ccreee.org, under the subject: REQUEST FOR CORRECTION TO ERC 2022 FOR BARBADOS.

Acknowledgements

The CCREEE acknowledges the contributions of the Ministry of Energy and Business Development, Barbados, and thanks Mark Millar, Senior Economist (Ag) and Mrs Claire Best, Chief Project Analyst in the Energy Unit of the Ministry, for their supervision of the intern, Camile Nurse, who supported the preparation of the ERC.

ENERGY SECTOR SUMMARY

SOCIOECONOMIC POLICIES

The National Strategic Plan of Barbados 2006-2025 [5]

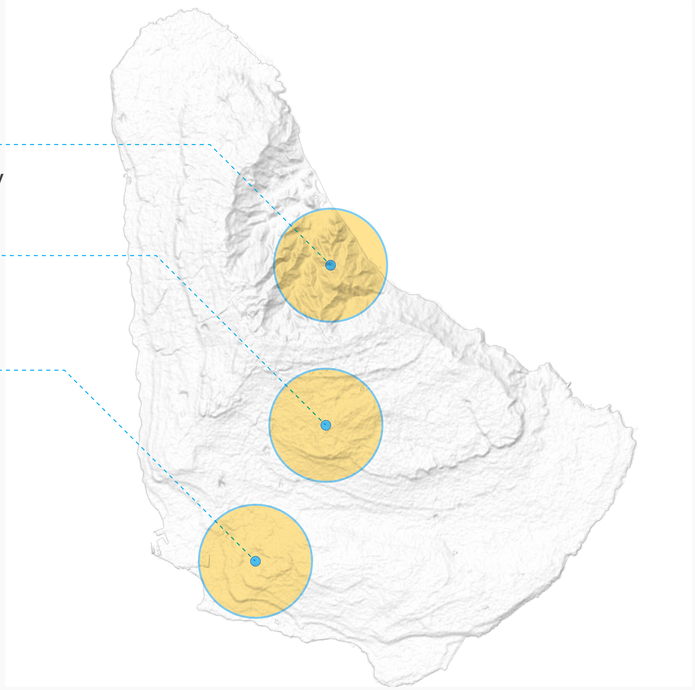
National Development Plan/ Overall Country Development Strategy

Barbados National Energy Policy 2019 - 2030 [6]

National Energy Policy

None

Renewable Energy (RE) Policy



SOCIOECONOMICS

Population (Projection)	267,800 [1]
GDP (USD)	$5,685,800,000 [2]
GDP (USD) Per Capita[1]	$21,231.52
Gross National Income (GNI) Per Capita (USD)	19,490 [3]
Debt as % of GDP	123.6 [1]
Human Development Index	0.790 [4]
RE Target	100% by 2030 [6]

Total Installed Conventional Capacity (MW)	252.2 MW [10]
Total Installed RE (MW)	73.6 MW [10]
Electricity System Losses[4] (%)	6.6% [10]
Energy Use (kWh) Per Capita	3,500 kWh
Total Oil Import (BBL) per day[5]	9,771.19 [11]
Total Oil Export (BBL) per day[6]	387.49 [11]
National Repository for Energy Data	sieBarbados [12]

OTHER ENERGY SECTOR SUB-POLICIES

Climate Change Policy	National Climate Change Policy for Barbados (2012)[2] [7]
National Determined Contributions (NDC)[3]	Conditional absolute emissions reductions contribution below the 2008 base year of 705Gg CO2e (2025) and 1,459Gg CO2e (2030) respectively. Total economy wide BAU emissions projections of 1,881Gg CO2e (2025) and 1,958Gg CO2e (2030) respectively.

Energy Performance Standards/Appliance Labelling [9]

Energy Management

- ISO 12655: 2013 Energy performance of buildings – Presentation of measured energy use of buildings
- ISO 50001:2011 Energy management systems - Requirements with guidance for use
- ISO 50002: 2014 Energy audits – Requirements with guidance for use
- ISO 50004: 2014 Energy management systems – Guidance for the implementation, maintenance and improvement of an ISO 50001 energy management system
- ISO 50015: 2014 Energy management systems – Measurement and verification of energy performance of organisations – General principles of guidance BNS
- IEC 60081: 2002-05 + Amendment 4.0: 2010-02 -Double-capped florescent lamps – Performance Requirements
- BNS IEC 60969: 2001-03 Edition 1.2 + Amendment 1 & 2 - Self-ballasted lamps for general lighting services – Performance Requirements

Solar Energy

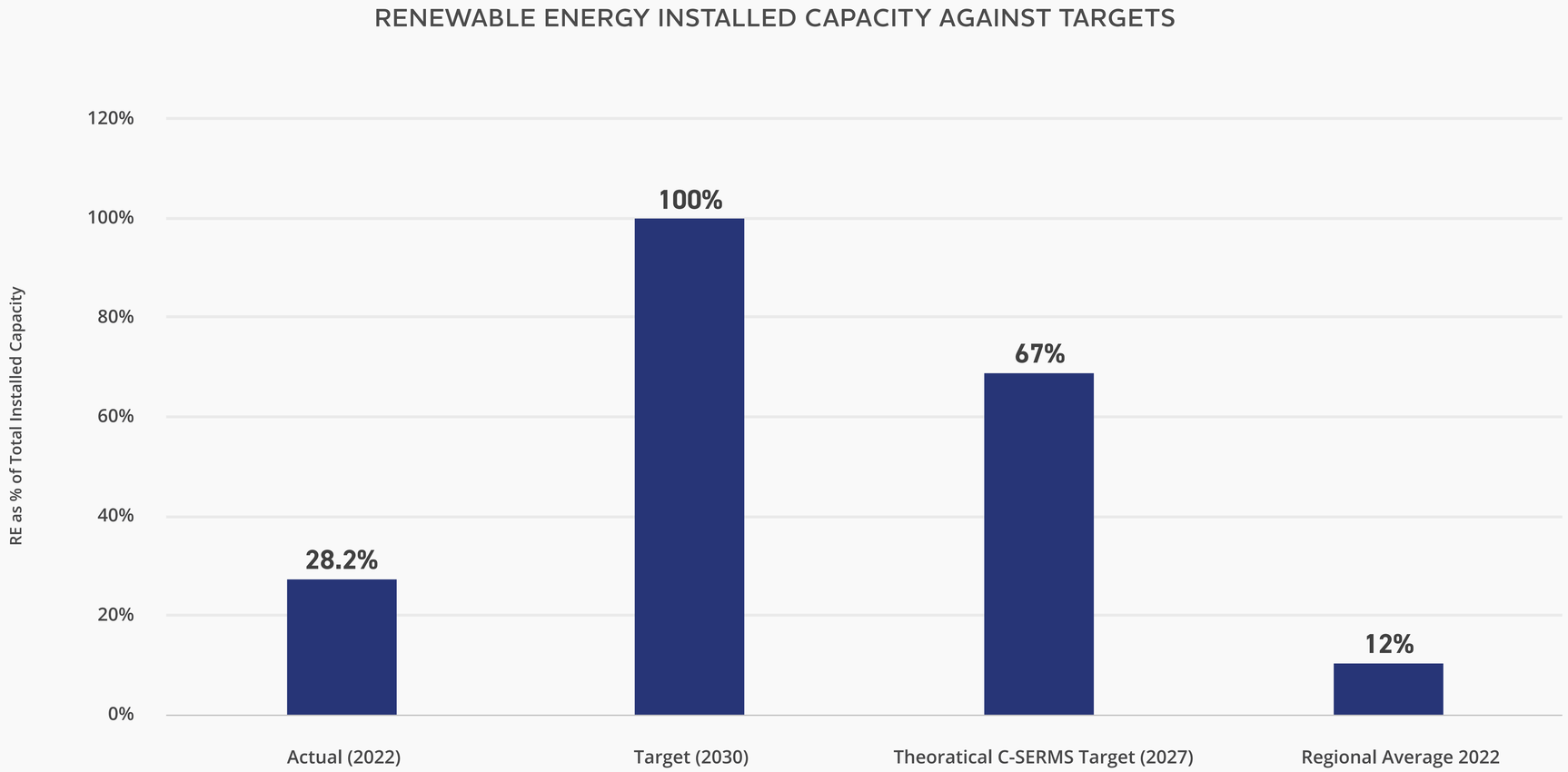
- IEC 61215 Crystalline silicon terrestrial photovoltaic (PV) – Design qualification and type approval
- IEC 61345 UV test for photovoltaic (PV) modules
- IEC 61646 Thin-film terrestrial photovoltaic (PV) modules
- IEC 61701 Salt mist corrosion testing of photovoltaic (PV) modules
- IEC/TS 61836:2007-21 S Edition 2.0 - Solar photovoltaic energy systems - Terms, definitions and symbols
- IEC 61853-1 Photovoltaic modules (PV) performance testing and energy rating Part 1: Irradiance and temperature performance measurements and power rating

Wind Energy

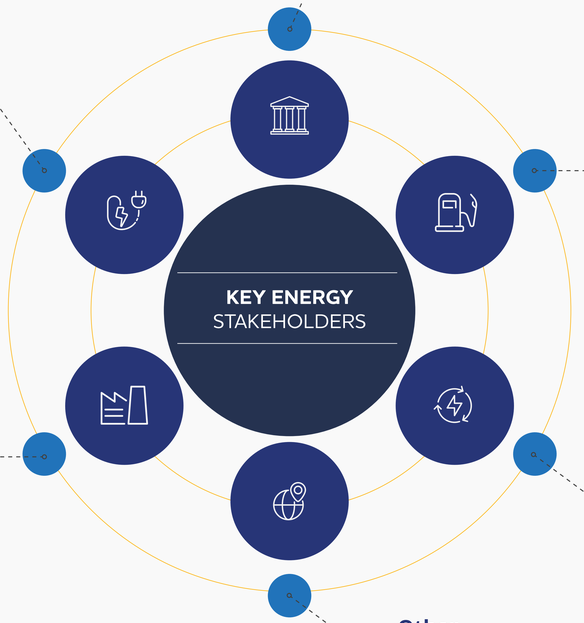
- IEC 61400-1 Wind turbines – Part 1 – Design requirements
- IEC/TS 61400-2 Wind turbines – Part 2 – Design requirements for small wind turbines
- IEC 61400-14 Wind turbines – Part 14 – Declaration of apparent sound power

[1] Estimated value from Nominal GDP and Population
[2] The National Climate Change Policy for Barbados is not available online.
[3] Total absolute emissions in the base year (2008) have been restated at 2,123Gg CO2e. The 2015 NDC inventory stated emissions at 1,816Gg CO2e.
[4] Technical Electricity System Losses
[5] Includes gasoline, diesel, fuel oil and jet fuel.
[6] Only crude oil.

ENERGY SECTOR PERFORMANCE [6][10]



KEY ENERGY STAKEHOLDERS



Government Ministries, Departments and Agencies

Minister of Energy and Business Development
- Energy Division [13]

Ministry of Environment and National Beautification [14]

Government Electrical and Engineering Department [15]

Ministry of Transport, Works, and Water Resources [16]
- Transport Board [17]
- Barbados Licensing Authority [18]

Fuel Importers & Suppliers

SOL [19]

Rubis [20]

Barbados National Oil Company Limited [21]
- Barbados National Oilfield Services Limited (BNOSL)
- Barbados National Terminal Company Limited (BNTCL)
- Barbados National Oil Holding Company Limited (BNOHCL)

National Petroleum Corporation [22]

Harville Enterprise [23]

Electric Utility

Barbados Light and Power Company Limited [24]

Other

Barbados Renewable Energy Association [26]

Barbados National Standards Institute [27]

Electricity Regulator

Fair Trading Commission [25]

Independent Power Producer

None

POLICY, LEGAL AND REGULATORY (PLR) FRAMEWORK

POLICIES RELEVANT TO THE ENERGY SECTOR

2004

Barbados Sustainable Development Policy [43] ●

The National Sustainable Development Policy aims to guide Barbados towards sustainable development. The policy was designed to guide the development of the economic and social aspects of the country while ensuring environmental stewardship.

2007

National Strategic Plan of Barbados 2006–2025 [5] ●

The Barbados National Strategic Plan 2006-2025 covers six broad strategic goals, with one the goals being "Building a Green Economy-Strengthening the Physical Infrastructure and Preserving the Environment". Several renewable energy-related targets are outlined in the Strategy. Achieving the targets outlined would also make the energy sector more efficient and reliable.

2010

Sustainable Energy Framework for Barbados [33] ●

The Sustainable Energy Framework for Barbados aims to unlock viable investments in renewables and energy efficiency, reducing energy costs, improving energy security, and enhancing environmental sustainability. The Framework also calls for the incorporation of renewable energy into electricity generation and the promotion of renewable energy and energy efficiency.

2012

Integrated Resource Plan [9] ●

2013

Barbados Growth and Development Strategy (MGDS) 2013-2020 [44] ●

Establishes the need and urgency to jumpstart and sustain private sector and investment-led, productivity and export-driven growth based on an environmentally green and socially sustainable and equitable economy while radically adjusting and reforming the Barbadian economy thereby:

1) Returning the economy to a sustainable growth rate of 3 per cent while maintaining macroeconomic stability;
2) Facilitating broad based adjustments and reforms in the economy;
3) Enhancing social and human development and;
4) Enhancing energy and environmental sustainability in the context of the Green Economy.

National Sustainable Energy Policy [45] ●

Addresses the growing concerns about the predominance of imported fossil fuels in the country's energy sector, and need for increased efficiency and sustainability of energy supply and demand.

2019

Barbados National Energy Policy [6] ●

The Policy provides a framework for moving from a fossil fuel-based economy to one completely based on renewable energy sources by 2030.

Implementation Plan for the Barbados National Energy Policy [37] ●

This Plan identifies output-level measures that will accelerate full integration of renewable energy into Barbados' energy mix.

2022

Integrated Resource and Resilience Plan [41] ●

The Integrated Resource and Resilience Plan outlines the generation and transmission planning studies over 10 years. The IRRP attempts to provide a modern, efficient, diversified and environmentally sustainable energy sector plan for the island to coincide with the BNEP 2019-2030 timeline. The Plan assesses demand and supply-side options while assisting the Ministry responsible for energy with the tools to optimise energy services and minimise consumer electricity costs. There were three scenarios investigated in the IRRP. The scenarios were, the Least-cost Plan (LCP), the Carbon Cost internalised (CO2), and the Forced Firm Renewable Scenario with Carbon Cost internalised (FRES).

Integrated Resource and Resilience Plan [41] ●

The Action Plan promotes sustainable energy practices on the supply and demand side. It is encouraged that renewable energy sources be used on the supply side and energy efficiency and energy conservation be used on the demand side. This is intended to reduce the country's dependency on fossil fuels, enhance security, stabilise the energy supply, and improve the economy and environmental stability. The Plan and roadmap provided in this document coincide with the fulfilment of the BNEP 2019-2030.

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[9] Document not available for detailed review

POLICY, LEGAL AND REGULATORY (PLR) FRAMEWORK

LEGISLATION RELEVANT TO THE ENERGY SECTOR

1978

Electricity Act [31] ●

Outlines the duties of the Electrical Engineer regarding the inspection of public buildings and inspection before electric installations of public and private buildings based on the required regulations made under the Electric Light and Power Act.

Transport Board Act (Last Amended 2008) [50] ●

The Transport Board Act provides the outline for establishing a Transport Board concerned with transport and specifies their powers, duties, and related matters. The Act provides the Transport Board with an operational outline, including the powers and financial provisions.

1979

National Petroleum Corporation Act (Amended 1984 and 2003 [46]**, 2012** [47]**, 2017** [48]**)** ●

The Act establishes the National Petroleum Corporation and its operations. The subsequent amendments allow for the National Petroleum Corporation to make better provisions for the rate charged for the supply of natural gas.

1882

Storage of Petroleum Act (Last Amended 1987) [49] ●

This Act relates to the storage and importation of petroleum in Barbados. This includes the parameters for storage and warehouse rental, quality testing of the petroleum and rules and regulations for petroleum storage.

2002

Utilities Regulation Act [28] (Amended 2020) [38] ●

The Utilities Regulation Act works in tandem with the Fair Trading Commission Act, which enables the Fair Trading Commission as the regulator in Barbados to investigate complaints and appeals. The Act governs the Utilities by outlining the duties of service providers and the standards of service and mandates the FTC to ensure reasonable rates.

Fair Trading Commission Act [32] (Amended 2020) [39] ●

The Fair Trading Act empowers the Fair Trading Commissions to regulate the utilities. The FTC has the power to oversee the standard of operation and tariffs of the utilities.

2007

Offshore Petroleum Act [51] ●

An Act to vest in the Crown the property in petroleum in the territorial waters, exclusive economic zone and continental shelf of Barbados, and to make provision for the search for and recovery of the petroleum, and for related matters.

Offshore Petroleum Act (Taxation) Act [52] **(Amended 2012)** [53] ●

Addresses the growing concerns about the predominance of imported fossil fuels in the country's energy sector, and need for increased efficiency and sustainability of energy supply and demand.

Transport Authority Act [54] **(Amended 2008)** ●

The Transport Authority Act provides for the establishment of a Transport Authority, and the functions and administration, duties, and financial resources of the Authority.

1981

Road Traffic Act (Amended 2017, 2018, 2022) [55] ●

The Road Traffic Act governs the law relating to road traffic, including insurance, driving licence, vehicle registration and road use.

2013

Electric Light and Power Act [34] **(Amended 2015** [35] **and 2019** [36] ●

The 2015 amendment promotes electricity generation from renewable energy by Independent Power Producers to enhance the security and reliability of the electricity supply and to provide for related matters.

Offshore Petroleum Regulations [56]

Working in tandem with the Offshore Petroleum Act, the Regulations similarly give Authority to the Energy Minister to oversee the Offshore Petroleum Activities. The Regulations detail the duties and requirements for a reconnaissance licence, an exploration licence, work programmes, the process to follow for discovery, appraisal and production, operational matters, the operational procedures for environmental and health and safety obligations and decommissioning of a site.

2021

The Control of Inefficient Lighting Act [57] ●

The Act seeks to phase out inefficient lighting in Barbados and establishes the standard for importing electrical lights and prohibits the importation of inefficient lamps.

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POLICY, LEGAL AND REGULATORY (PLR) FRAMEWORK

INCENTIVES RELEVANT TO THE ENERGY SECTOR

2015

Excise Tax Act [58] ●

Allows for a reduced rate of excise duty on natural gas, hybrid, solar powered and electric vehicles

Income Tax Act (Amended 2013 [59] **and 2015** [60]**)** ●

The 2013 amendment included tax holidays or deductions for individuals or corporations who develop, manufacture, install, receive training, or undertake research in renewable energy systems and energy-efficient products.
The 2015 amendment also included tax deductions for individuals who expend resources to conduct energy audits or electrical retrofitting to produce electricity from sources other than fossil fuels.

2007

Customs Act [61] (Amended 2019) [62] ●

The Act establishes the National Petroleum Corporation and its operations. The subsequent amendments allow for the National Petroleum Corporation to make better provisions for the rate charged for the supply of natural gas

2019

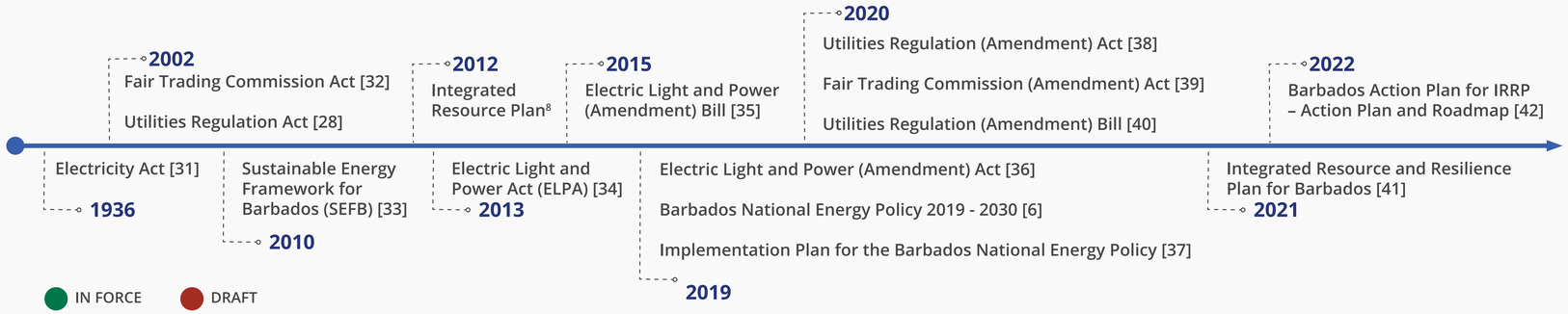
Customs Tariff Act (Amendment) [63] ●

The Customs Tariff Act states that items and machinery used for the generation of renewable energy and energy conservation were eligible for conditional duty exemptions.

The 2019 amendment include:

- Exemptions of renewable energy systems from the 20 % import duty,
- Conditional duty exemptions on items designed to produce power, heat, light, or electricity through the utilization of renewable sources of electricity, and
- 5 % import duty on LED light bulbs

KEY ACHIEVEMENTS: PLR FRAMEWORK TIMELINE FOR ELECTRICITY SUB-SECTOR

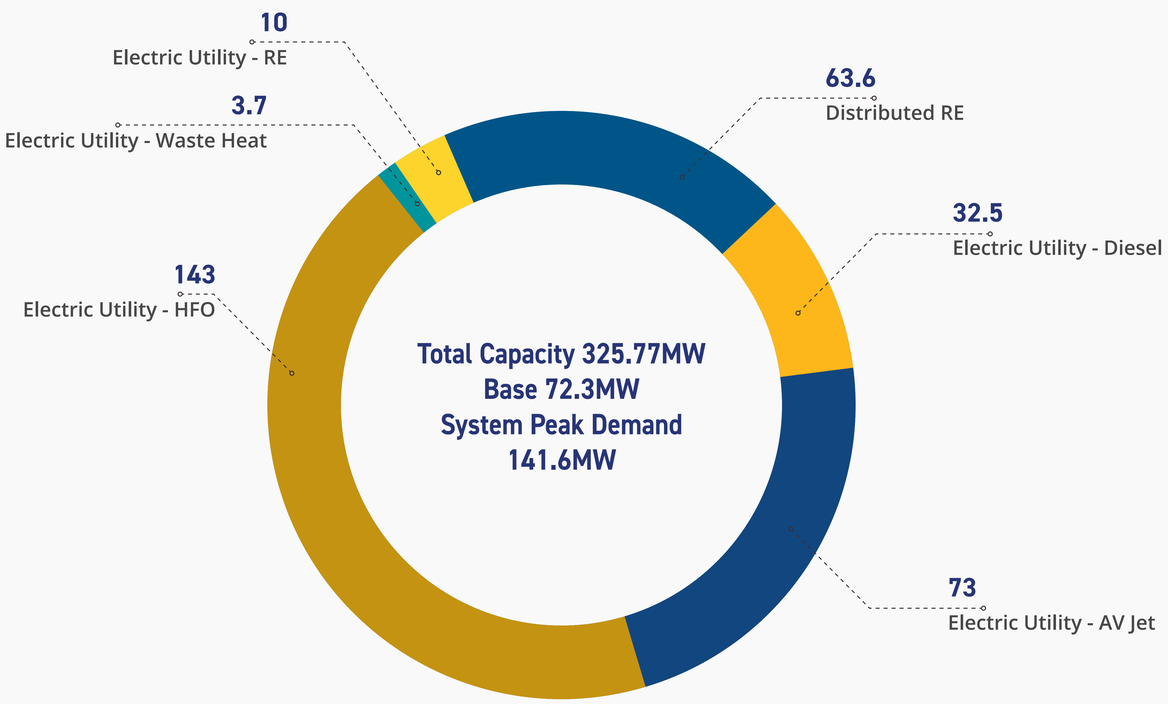


	YEAR
Energy Policy and Energy Action Plan [6]: ●	2019
RE Target [6]: ●	2019
EE Target [8]: ●	2021
Electricity Regulator [28]: ●	2002
Net Billing/Net Metering[7]: ●	2012
Interconnection Policy/Standards [29]: ●	2017
Feed-in-tariff [30]: ●	2019
RE/EE Act:	

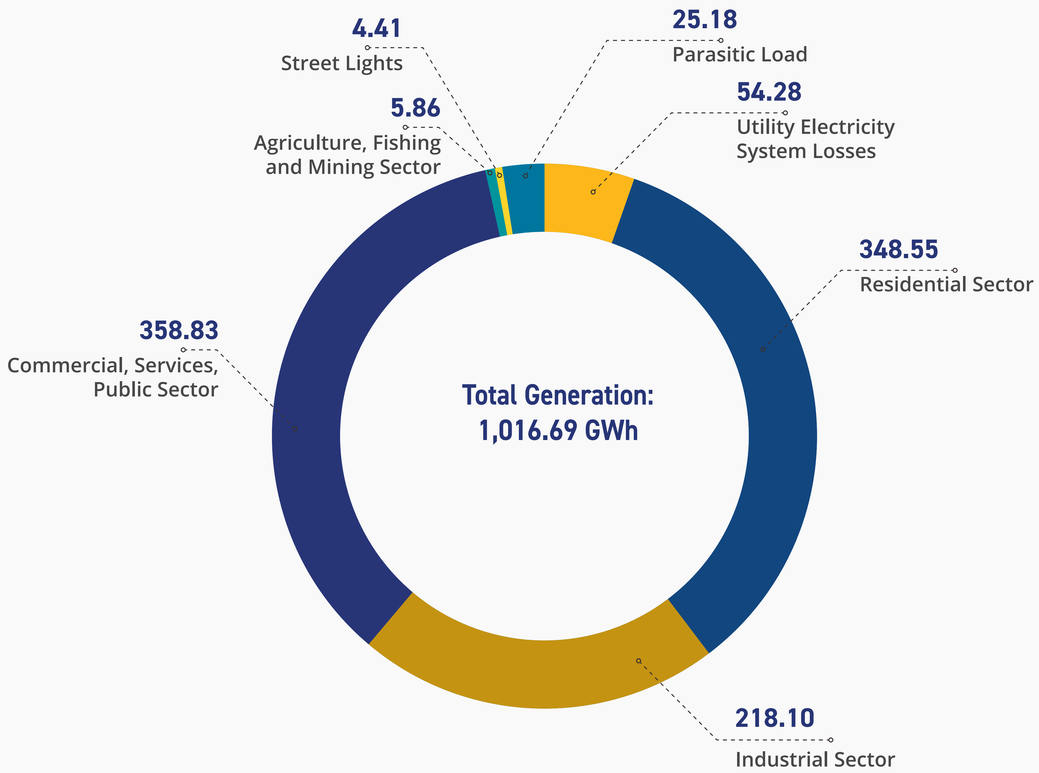
[7] The programme was piloted in 2010 [74] and was fully established in 2012
[8] Document not available for detailed review.

ELECTRICITY & ENERGY EFFICIENCY [6] [10]

INSTALLED CAPACITY (MW) [10]



ENERGY CONSUMPTION (GWH) [11] [12]

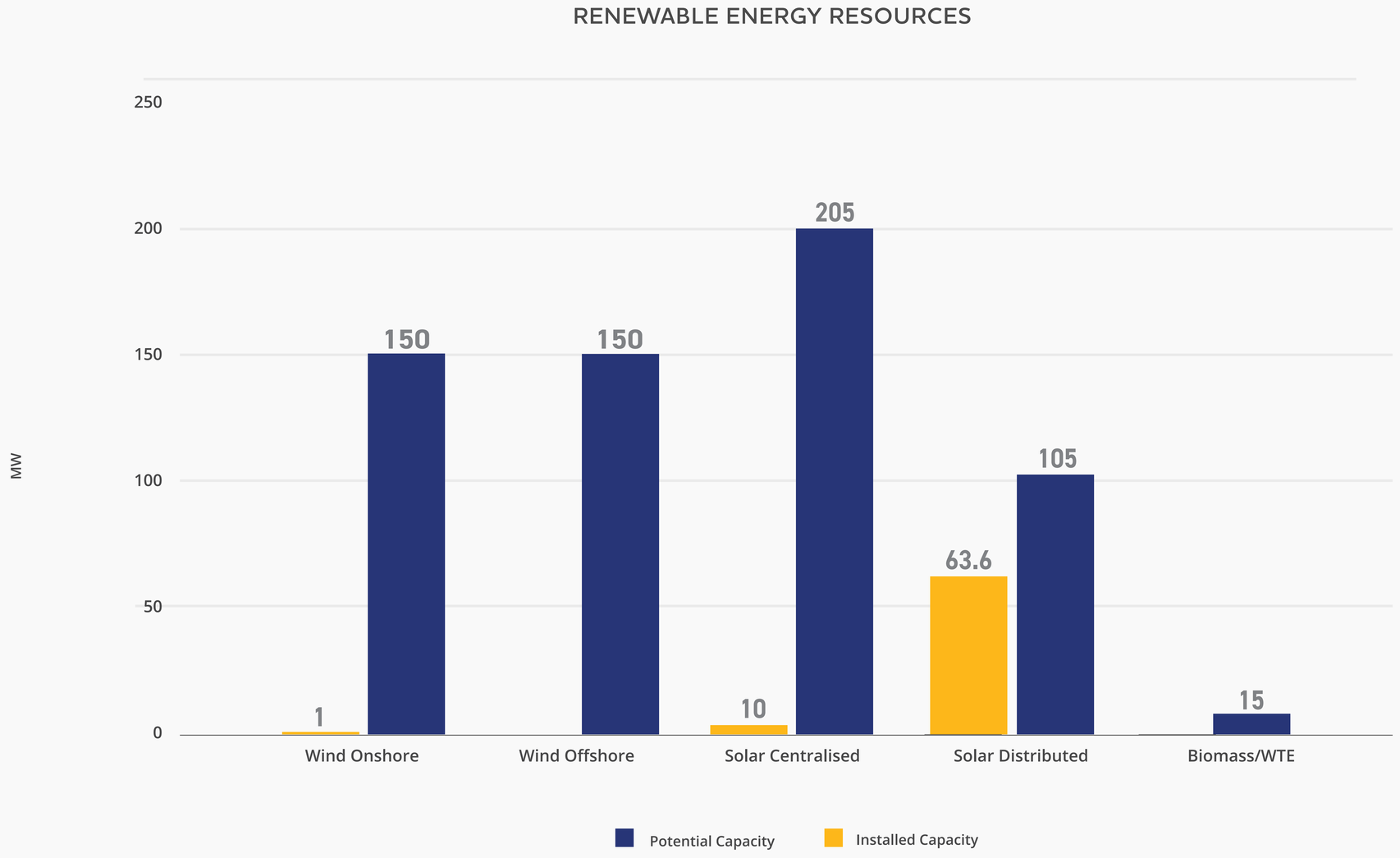


Consumption for the Constriction and Other Sector for 2022 was 1,483 MWh.

[10] The base and peak loads are based on utility generation and do not account for distributed renewables.
[11] Adjustments were made to total and net generation calculations to account for the fact that sales includes purchased power.
[12] The utility purchased 93,364 MWh of power.

Customers with Distributed RE systems larger than 1 MW are in a separate class similar to IPPs in other jurisdictions.

ELECTRICITY & ENERGY EFFICIENCY [14] [65] [66]



ELECTRICITY TARIFFS [13] [10]

Rate Class			US$
Domestic	Customer Charge	1-150	$3.00
		151-500	$5.00
		Over 500	$7.00
	Base Energy Charge	1-150	$0.07
		Next 350 kWh	$0.09
		Next 1,000	$0.10
		Over 1,500	$0.11
	Fuel Charge	All kWh, per kWh	FCA
General	Customer Charge	1-150	$4.00
		151-500	$5.50
		Over 500	$7.00
	Base Energy Charge	0-100	$0.09
		Next 400	$0.11
		Next 1,000	$0.13
		Over 1,500	$0.14
	Fuel Charge	All kWh, per kWh	FCA
Secondary Voltage Power	Customer Charge	Each service	$10.00
	Demand Charge	Per kVA	$12.00

Rate Class			US$
Secondary Voltage Power	Base Charge	All kWh, per kWh	$0.07
	Fuel Charge	All kWh, per kWh	FCA
Large Power	Customer Service	Each Service	$150
	Demand Charge	Per kVA	$11
	Base Energy Charge	All kWh	$0.06
	Fuel Charge	All kWh, per kWh	FCA
Streetlights	Customer Charge	Each 50W HPS light	$3.52
		Each 70W HPS light	$3.86
		Each 100W HPS light	$4.29
	Fuel Charge	50 W HPS (25 kWh/month)	25 x FCA
		70 W HPS (33 kWh/month)	33 x FCA
		100 W HPS (43 kWh / month)	43 x FCA
Time of Use Pilot[14]	Customer Charge	Each Service	$150
	Demand ($/kVA)	Per kVA	$9
	Base Charge	On-Peak, per kWh.	$0.11
		Off-Peak, per kWh.	$0.03
	Fuel Charge	On-Peak, per kWh.	1.12 x FCA
		Off-Peak, per kWh.	0.92 x FCA

[13] FCA = Fuel Clause Adjustment, calculated monthly in accordance with the Fuel Clause. The approved FCA is based on the total fuel cost.
[14] This tariff is available as a pilot programme to customers who satisfy the criteria for the Large Power. Customers are charged a different price depending on when they consume power.

PROJECTS IN THE PIPELINE

Donor Funding and Technical Assistance Landscape	Donor Organization & Banks	Funding Awards (USD)	Year
Support for the Public Sector Smart Energy Program [64]	Inter-American Development Bank	$5,810,000.00	2012
Deployment of Cleaner Fuels and Renewable Energies in Barbados [65]	Inter-American Development Bank	$34,000,000.00	2016
Sustainable Energy Investment Program (SMART FUND II) [66]	Inter-American Development Bank	$30,000,000.00	2019
Barbados - “Better Batteries” an Energy-as-a-Service Model to Accelerate the Hotel Industry's Access to Renewable Energy, Utilizing a Battery Storage Solution with an Iot framework Enabling External Control and Data Analytics [67]	Inter-American Development Bank	Total Cost - $703,500.00 Country Counterpart Financing - $313,500.00 Amount - $390,000.00	2021
Support for the Design of Carbon Neutral Strategies in the Context of Energy Transition in Barbados [68]	Inter-American Development Bank	$400,000.00	2021
Public Sector Smart Energy (PSSE) Program [15] [16] [69]	Inter-American Development Bank European Commission	Total - $24,664,000 Grant - $7,664,000 Loan - $17,000,000	2012

The Public Sector Smart Energy (PSSE) Program incorporated the following components during its execution.

1. Retrofit of government buildings with RE and EE technologies and public lights with EE technologies
2. A pilot project and studies for encouraging the use of RE
3. Capacity Building, Institutional Strengthening and Public Awareness

[15] The Public Sector Smart Energy (PSSE) Program incorporated the use renewable energy and energy efficiency technologies in public and government buildings

[16] This programme closed in 2023.

PROJECTS IN PIPELINE

ENERGY EFFICIENCY PROJECTS

There were no Energy Efficiency Projects reported for 2022.

RENEWABLE ENERGY PROJECTS

There were no Renewable Energy Projects reported for 2022.

TERTIARY PROGRAMMES OFFERED

PROGRAMMES

Name of Education Programme Provider	Vocational Certificate	Bachelors Degree	MPhil/PhD	Programme Link
Barbados Community College	Photovoltaic Design and Practice			https://www.bcc.edu.bb/Divisions/Technology/Academics/Programmes/TECPWK15PT/
Samuel Jackman Prescod Institute of Technology	Wind Energy 1			https://www.sjpi.edu.bb/wp-content/uploads/2023/01/Feb-2023-Advertisement.pdf
	Photovoltaic Installation 1			
	Photovoltaic Electrical Installation			
	Electric Vehicle Maintenance Fundamentals			
	Energy Advisory 1			
	Basic Car Maintenance for ICE and Electric Vehicles			
University of the West Indies, Cave Hill Campus		Environmental Science[17]		https://www.cavehill.uwi.edu/chol/deleted/2020-2021-fst-handbook-september-9-2020kb.aspx
		Physics[18]		
			Natural Resource Management	https://www.cavehill.uwi.edu/cermes/docs/orientation/narem_student_handbook_2023_2024.aspx
			Environment Studies[19]	https://www.cavehill.uwi.edu/fst/resources/fst-faculty-office-mphil-phd-programmes-informatio.aspx
			Physics	

[17] Includes a course in Sustainable Energy Systems
[18] Includes courses in Sustainable Energy, Physics of Sustainable Energy Systems
[19] Offers an area of study in Energy and the Environment

TRANSPORTATION SECTOR[12]

TRANSPORTATION SECTOR

No data was available for the transportation sector for 2022.

CLIMATE CHANGE FRAMEWORK

Climate Change Policy	National Climate Change Policy (2012)[20] [7]
National Determined Contributions [8]:	Total absolute emissions in the base year (2008) have been restated at 2,123Gg CO2e. The 2015 NDC inventory stated emissions at 1,816Gg CO2e. • The absolute emissions reductions resulting from this 2021 NDC update conditional contribution below the 2008 base year are 705Gg CO2e (2025) and 1,459Gg CO2e (2030) respectively. • Total economy wide BAU emissions projections are 1,881Gg CO2e (2025) and 1,958Gg CO2e (2030) respectively.
Emissions Reduction Target [8]:	2025 • 20% reduction relative to business-as-usual emissions scenario in 2025 without international support (unconditional). • 35% reduction relative to the business-as-usual emissions scenario in 2025 conditional upon international support.
	2030 • 35% reduction relative to business-as-usual emissions scenario in 2030 without international support (unconditional). • 70% reduction relative to business-as-usual emissions scenario in 2030 conditional upon international support.
Priority Sectors for NDC [8]	• Energy, including transport • Agriculture • Industrial Processes and Product Use, • Land-use Land Use Change and Forestry • Waste
National Communications (NC) to the UNFCCC:	Barbados' First National Communication to the United Nations Convention on Climate Change (2001) [70]
	Barbados' Second National Communication Under the United Nations Framework Convention on Climate Change (2018) [71]

SUMMARY OF BARBADOS' GREENHOUSE GAS SOURCES AND SINKS BY SECTOR AND GAS, 2010 [71]

Emissions (Gg CO_2e)				
Categories	CO_2	CH_4	N_2O	HFC/SF_6
Energy (excluding Domestic Transport)	1441	15	4	
Industrial Processes	101			67
Agriculture	0	35	24	
Waste		288	7	
LULUCF	-51			

[20] The National Climate Change Policy for Barbados is not available online.

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