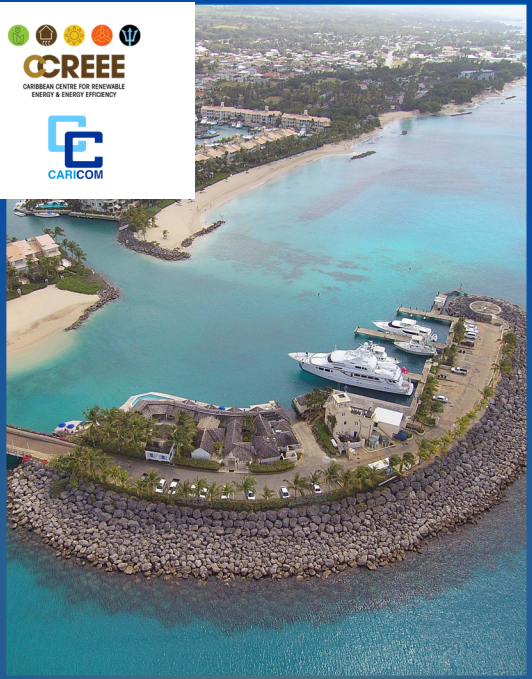
CCREEE
CARIBBEAN CENTRE FOR RENEWABLE ENERGY & ENERGY EFFICIENCY

CARICOM



2018 ENERGY REPORT CARD
BARBADOS

This document presents Barbados' Energy Report Card (ERC) for 2018. The ERC provides an overview of energy sector performance in Barbados. The ERC also includes energy efficiency, projects, technical assistance, workforce, training and capacity building information, subject to the availability of data.

This ERC includes data and information that was provided by government ministries, agencies or departments with responsibility for energy and was supplemented by internet research, author calculations and inferences.

WWW.CCREEE.ORG

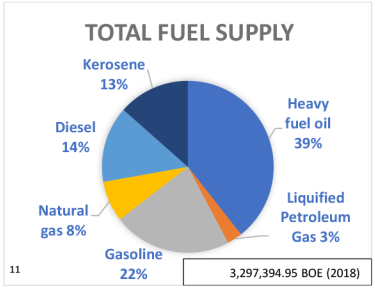
Disclaimer

The information included in this document is for general information purposes only. While reasonable attempts were made to provide accurate data, this document was prepared using data resources from other sources, including public sources. As such, no representations or warranties of any kind, express or implied, are made about the completeness, accuracy, reliability, suitability or availability with respect to the information provided in this document. Any reliance placed on such information is therefore strictly at the user's risk. In no event will the author, their affiliates or third-party sources be liable for any loss or damage including without limitation, indirect or consequential loss or damage, or any loss or damage whatsoever arising from loss of data or profits arising out of, or in connection with, the use of the information provided herein.

"AT-A-GLANCE"

Summary of the Energy Sector

KEY DATA & INFORMATION – ENERGY SECTOR IN BARBADOS	
Population	274,465 (2017)[1]
GDP (USD) Per Capita	$15,453.34 (2017) [2]
Human Development Index	0.8 (2017)[3]
National Energy Policy	Yes (2019)[4]
Renewable Energy (RE) Policy	Yes (2019)[4]
RE Target	To achieve a 100 % renewable energy and carbon neutral state by the year 2030.[4]
Energy Performance Standards/Appliance Labelling	No
Total Oil Imports (BOE) per day	8,870 (2011)[5]
Total Oil Export (BOE) per day	790 (2011)[6]
Total Installed Capacity (MW)	286.6 [6]
Total Installed RE (MW)	37 (Solar PV)[19]
Fuel & Oil Imports as % of GDP	6.9% (NREL 2015)[8]
Electric vehicle stock	400[9]
National Repository for Energy Data	National Energy Information System (NEIS)[10]



ENERGY SECTOR PERFORMANCE AGAINST TARGETS

Indicator	Base /Current Performance (Year)	National Target	National Target (Proposed by CARICOM – CSERMS Report)[13]	***Indicative RE Oil Displacement[14,15] Potential Annually**** • *1 MW wind displaces 1,760 barrels of oil equivalent (BOE)* • *1 MW hydro displaces 3,300 BOE* • *1 MW solar displaces 1,210 BOE* ***Energy Intensity (EI)[16]:*** • *EI measures how energy benefits the economy and is calculated by taking the ratio of total primary energy use (all of the fuels and flows that a country uses to get energy) to GDP (the total money made in a country). EI indicates how effectively an economy uses their fuels and flows.*
RE as % of Installed Capacity	4% (2017)[17]	100% RE by 2030[18]	67% by 2027	
***Energy Intensity (BTU/US$1 Unit of output)**				

*The energy efficiency target for CARICOM is 33% reduction in energy intensity by 2027, compared to a reference of Average Annual Energy Intensity of ~13,000 BTU per USD of GDP in 2015.
**Based on capacity factors of 0.32 for wind. 0.6 for hydro and 0.22 for solar.-[16]

KEY ENERGY SECTOR STAKEHOLDERS

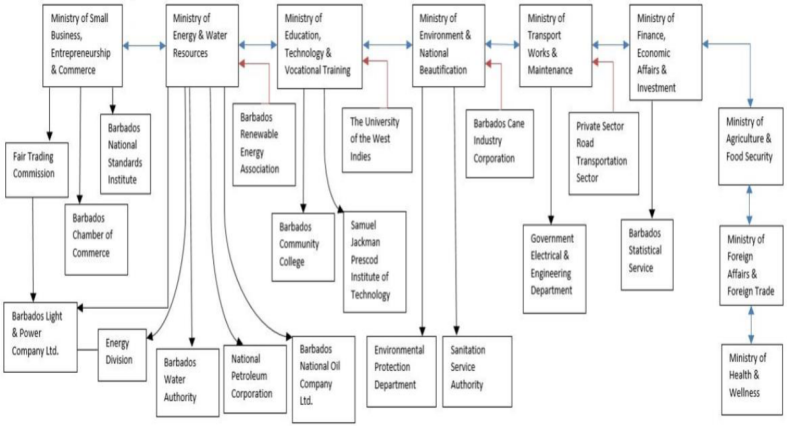
KEY ELECTRICITY STAKEHOLDERS:

A red arrow indicates an organisation which is playing a supportive role.

A blue arrow is used between ministries of government.

A black arrow indicates an organisation which is responsible for another.

A black line indicates two organisations which have an operational relationship.



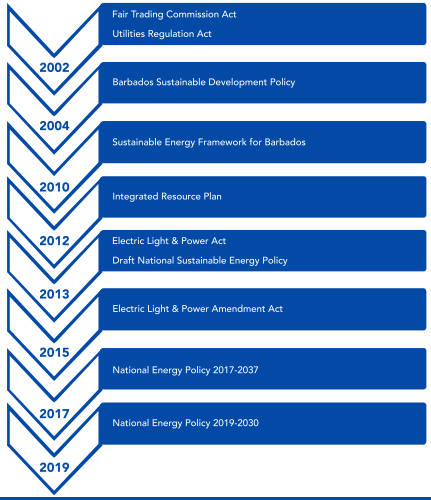
POLICY, LEGAL AND REGULATORY FRAMEWORK

Electricity Sector : Policy, Legal and Regulatory (PLR) Framework

✓ Energy Policy and Energy Action Plan	●
✓ RE Target	●
✓ EE Target	●
✓ Electricity Regulator	●
✓ Net billing/Net metering	●
✓ Interconnection Policy/Standards	●
✓ Feed-in-tariff	●
× RE/EE Act	●

● Completed/ In place ● In progress/ Draft ● Not yet started/ Not established

Key Achievements: PLR Framework Timeline for the Electricity Sector



POLICY, LEGAL AND REGULATORY FRAMEWORK

Policies and Legislation Relevant to the Transportation Sector [20]	
Policies	• National Energy Policy: 2017-2037; 2019 - 2030
Legislation & Regulation	• Transport Board Act

ELECTRICITY AND ENERGY EFFICIENCY

KEY DATA & INFORMATION	
1. Fuel Consumption – Electricity Subsector (BOE)	
2. Installed Conventional Capacity – Electric Utility (MW)	266.6 [8]
3. Installed Conventional Capacity – IPPs (MW)	20 [8]
4. Base Load (MW)	190 [8]
5. System Peak Demand (MW)	152.3 [8]
6. Total Generation (MWh)	996,154.6 [8]
7. Total Sales (MWh)	942,562.92 [8]
8. Total Number of Customers	129,985 [13]
TARIFFS	
9. Residential Tariff (US$/kWh)	0.25 [8]
10. Commercial (US$/kWh)	0.27 – 0.28 [8]
11. Industrial/Large Power (US$/kWh)	0.25 [8]
12. Street Lights (US$/kWh)	N/A

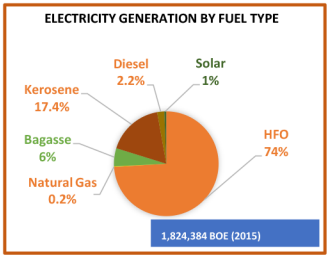
EFFICIENCY	
13. EE Target	A reduction in energy consumption of 20% below the Business as Usual (BAU) consumption between 2019 and 2030 [4]
14. Electricity System Losses (%)	5.2% [6]
15. Energy Use (kWh) Per Capita	7,528 [6]
16. EE Initiative and Impact	**Retrofit of Streelights with LED bulbs**[20] 20 % **EE Retrofit of 13 Public Buildings**[19] % reduction not estimated

ELECTRICITY AND ENERGY EFFICIENCY

RE Resource Potentials	Potential Capacity (MW)
Wind	10[19]
Solar PV	10 – 15[19]
Hydro	N/A
Geothermal	N/A
Biomass/ WTE	N/A
Total	N/A

RE Resource	Installed Capacity (MW)
Wind	N/A
Solar PV	37[19]
Hydro	N/A
Geothermal	N/A
Biomass/ WTE	N/A
Total	30

RE as % of installed Power Capacity = 4%



PROJECTS IN THE PIPELINE

RENEWABLE ENERGY SOURCE	Resource & Project Capacity	Development Partner	Funding Source
Solar Photo-Voltaic	Public Sector Smart Energy Programme (PSSEP) Component 1 of the project involved the retroffiting of government buildings and public lights with EE technologies and the installation of solar phot-voltaic (PV) systems. PV systems were installed on thirteen (13) government buildings with a target of 1.14 megawatts (MW) of renewable energy electricity produced.	Inter-American Development Bank	European Commission (Grant), Inter-American Development Bank (Loan)
Wind Energy	Demonstration of Smart Energy Buildings for Barbados Project The project includes the installation and demonstration of smart energy building systems for public buildings in Barbados, and capacity building for Barbadian engineers	Inter-American Development Bank	Ministry of Trade, Industry & Energy (MOTIE), Korea
	Public Sector Smart Energy Programme (PSSEP) Component 2 of the project focuses on the generation of electricity from off-shore wind.	Inter-American Development Bank	European Commission (Grant), Inter-American Development Bank (Loan)
Other	Sustainable Energy Framework for Barbados (SEFB) The project indirectly supports the transition to RE & EE through the financing of policy & strategy development, capacity building of stakeholders, institutional strengthening & public awareness.	Inter-American Development Bank	Inter-American Development, Bank Government of Barbados
	Public Sector Smart Energy Programme (PSSEP) Component 2 of the project focuses on the generation of electricity from ocean-thermal energy conversion (OTEC).	Inter-American Development Bank	European Commission (Grant), Inter-American Development Bank (Loan)

Source:

Division of Energy in the Ministry of Energy & Water Resources (Project Manager) (2019)

NUMBER AND TYPE OF TERTIARY LEVEL SUSTAINABLE ENERGY PROGRAMMES OFFERED

Name of Education Programme Provider	Name of Programme	Type of Programme			
		Certificate	B.Sc	M.Sc	Ph.D
The University of the West Indies, Cave Hill, Barbados	Renewable Energy Management			X	

NUMBER OF PERSONS EMPLOYED IN THE ENERGY SECTOR

NAME OF ENTITY	PRIVATE OR PUBLIC?	NUMBER OF PERSONS EMPLOYED	BREAKDOWN BY GENDER	
Barbados Light and Power Company	Electric Utility (Private)	365	**Females: 99**	**Males: 266**
Fair Trading Commission	Regulator (Public)	5	**Females: 3**	**Males: 2**
Ministry of Energy and Water Resources	Public	30	**Females: 17**	**Males: 13**
Barbados Renewable Energy Association	Non-governmental organisation	1	**Females: 1**	**Males: 0**

***This may not be an exhaustive list**

REFERENCES

[1]Barbados Statistical Services (2017) The 2017 population figure was taken since figure for 2018 has not yet been published. Note that the population number recorded at the end of 2018 was 273,467.

[2]Barbados Statistical Services: Calculated as the ratio between the GDP (2017) & the population (2017).

[3]United Nations Development Programme (2018) Human Development Indices and Indicators 2018 Statistical Update. Retrieved from http://hdr.undp.org/sites/default/files/2018_human_development_statistical_update.pdf

[4]Government of Barbados (2019). Ministry of Energy & Water Resources. "Barbados National Energy Policy 2019 - 2030"

[5]Inter-American Development Bank. (2016). Achieving Sustainable Energy: Barbados Dossier. Retrieved from https://publications.iadb.org/bitstream/handle/11319/7909/Achieving-Sustainable-Energy-in-Barbados-Energy-Dossier.pdf?sequence=1

[6]Barbados Light & Power (Director of Operations) (2019)

[7]Emera Incorporated (2018). 2017 Annual Report. Retrieved from http://investors.emera.com/Cache/1001235103.PDF?Y=&O=PDF&D=&fid=1001235103&T=&iid=4072693

[8]National Renewable Energy Laboratory. (2015). Energy Transition Initiative: Islands Energy Snapshot - Barbados. Retrieved from https://www.nrel.gov/docs/fy15osti/64118.pdf

[9]Barbados Today (2019) https://barbadostoday.bb/2019/10/10/car-charge/

REFERENCES

[10]Division of Energy in the Ministry of Energy & Water Resources (Research & Planning Unit - Economist) (2019)

[11]Division of Energy in the Ministry of Energy & Water Resources "Barbados Energy Chapter 2018"

[12]Inter-American Development Bank. (2016). Achieving Sustainable Energy: Barbados Dossier. Retrieved from https://publications.iadb.org/bitstream/handle/11319/7909/Achieving-Sustainable-Energy-in-Barbados-Energy-Dossier.pdf?sequence=1

[13]Worldwatch Institute. (2015). Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS) Baseline Report and Assessment. Retrieved from http://www.worldwatch.org/system/files/C-SERMS_Full_PDF.pdf

[14]Ministry of Science, Energy, Technology and Mining. (2013). Grid Impact Analysis and Assessment for Increased Penetration of Renewable Energy into the Jamaican Electricity Grid. Retrieved from https://www.mset.gov.jm/sites/default/files/pdf/Grid%20Impact%20Analysis%20for%20Renewable%20Energy%20Penetration_2.pdf

[15]Sustainable Energy Ireland – Renewable Energy Information Office. (2011). Energy Unit Conversion Tool. Retrieved from https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/make-it-be_energy_unit_conversion_tool.xlsx

[16]J.M.K.C. Donev et al. (2018). Energy Education - Energy intensity. Retrieved from https://energyeducation.ca/encyclopedia/Energy_intensity.

[17]Calculated

[18]Government of Barbados (2019). Ministry of Energy & Water Resources. "Barbados National Energy Policy 2019 - 2030"

REFERENCES

[19]Government of Barbados (2019). Ministry of Energy & Water Resources

[20]Division of Energy in the Ministry of Energy & Water Resources (Project Manager) (2019)

[21]Government of Barbados (2017). Barbados National Energy Policy 2017-2037. Retrieved from http://www.energy.gov.bb/web/component/docman/doc_download/86-barbados-national-energy-policy-2017-2037

[22]Rapid Scan Assessment of the Capacity Requirements for Sustainable Energy Development for CARICOM Countries (Professor Dr. Olav Hohmeyer, International Energy Consulting) (2019)