

7 AFFORDABLE AND
CLEAN ENERGY

GOAL 7

Ensure access to affordable, reliable, sustainable and modern energy for all

Context

Achieving affordable, sustainable and modern energy for all citizens is a goal with implications for production practices, household consumption and livelihoods and overall environmental protection. How countries seek to address the issues surrounding energy production and distribution, therefore, have far-reaching effects that require an approach that considers the multitude of impacting factors.

Jamaica's small open economy is highly dependent on imported fossil fuels for energy in transport, production and consumption. This reduces the domestic energy security impacting the prices of goods and services; and contributes to the emission of pollutants. The policy response to the energy sector continues to reinforce the standard of near-universal access to electricity and increase the diversification of the energy mix, with more alternative and renewable sources. In regulating the energy sector to allow for more producers and cleaner sources, the country aims to reduce costs, improve efficiency and lower the environmental footprint.

Affordable and Clean Energy Highlights 2018-2022



Renewable Energy

13% of electricity generated from renewable sources up 2021 up from 12.1% in 2018

FIGURE 33: HIGHLIGHTS AFFORDABLE AND CLEAN ENERGY (2018-2022)

Discussion

Target 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services

Jamaica continues to have near-universal access to electricity, with an estimated 99.4 per cent of the population. The gap in universal access is due to the status of the rural population, whose access reached 98.6 per cent in 2019. While the access to electricity in the rural population remains below universal, it has been climbing annually as more households are brought onto the national grid. Over the last decade, an additional 10.0 per cent of households have access to electricity, from the 88.0 per cent in 2011. (ECLAC) Efforts at increasing legal and safe access to electricity through the Rural Electrification Programme and the Jamaica Social Investment Fund, have targeted the reduction in costs for wiring of homes, improving relationships between the utility service and communities and prepaid payment plans for lower-income users.

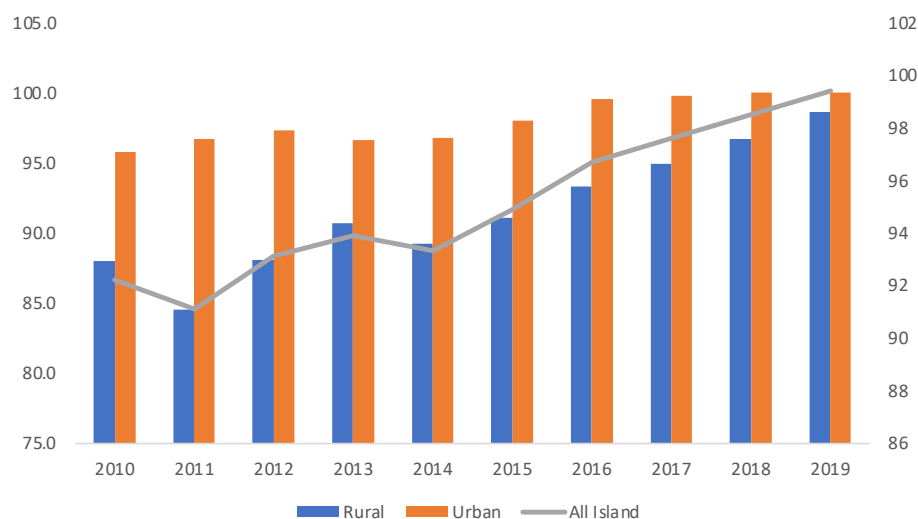


FIGURE 34: ACCESS TO ELECTRICITY BY % OF POPULATION
Source: World Bank SDGs Database

In addition to increasing access to electricity, ensuring access to clean energy sources by the population as a development goal continues to be on the agenda of policy and strategy. Jamaica's energy sources are largely petroleum-based, accounting for 85.8 per cent of total energy consumption in 2020. Due to the high reliance on these products, moving general consumption away from oil has been the aim of long-term development plans and projects. The National Energy Policy and projects like the Jamaica Energy Security and Efficiency Enhancement Project dating back to 2011 targeted (i) the regulatory framework leading to the amendments to the electricity act; (ii) increased investment in alternative sources of energy which saw the emergence of LNG and (iii) improvements in policy like the development of the integrated resource plan.

By the definition applied by the World Health Organisation, clean fuels and technologies for cooking "are those that attain the fine particulate matter (PM_{2.5}) and carbon monoxide (CO) levels recommended in the WHO Air Quality Guidelines (2021)."⁹² These fuels include solar, electric, biogas, liquefied petroleum gas and alcohol fuels including ethanol. Clean

⁹² These guidelines identify clean fuel and technology as those within the "annual average air quality guideline level (AQG, 5 µg/m³) or the Interim Target-1 level (IT1, 35 µg/m³) for PM_{2.5}; and either the 24-hour average air quality guideline level (AQG, 4 mg/m³) or the Interim Target-1 level (IT-1, 7 mg/m³) for CO."

fuel sources in Jamaica would be classified through the use of LPG and electricity. Jamaican households use LPG as the primary fuel source for cooking, with approximately 85.8 per cent of households reporting its use in 2019, in contrast to 1.5 per cent for electricity. Wood and charcoal, traditional fuel sources are reportedly used by 5.0 per cent and 6.2 per cent of households respectively. Of the households reporting the use of charcoal, the poorest quintiles of the population are the largest users, accounting for its use, at an estimated 14.6 per cent. (JSLC, 2022).

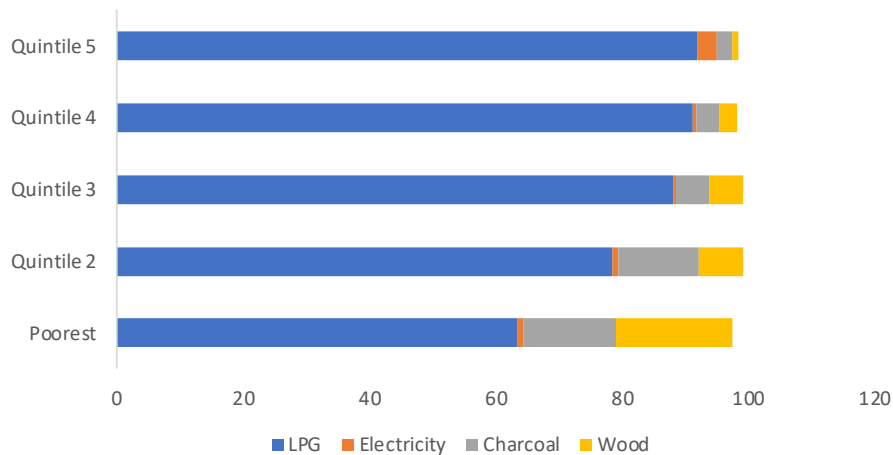


FIGURE 35: DISTRIBUTION OF FUEL USED FOR COOKING BY CONSUMPTION QUINTILE
Source: JSLC

The use of clean fuels is increasing annually, as charcoal and wood are phased out. Notably, the poorest quintile of households, report increased usage of wood, from 14.1 per cent of households in 2017 to 18.4 per cent in 2019. Increased investments in the LPG market by established and new entrants present positive signals for further reduction in the use of charcoal and wood, through a wider distribution footprint of retailers and lower costs.

Target 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.

As stipulated by the NEP, 2009–2030, Jamaica seeks to increase the use of renewable energy as fuel in its energy mix to 20.0 per cent by 2030, and since the MTF 2018–2021 a target of renewables in electricity generation has been added of 30 per cent by 2030. This is part of the drive to decrease the use of imported petroleum as fuel, owing to the price volatility and environmental concerns associated with the use of petroleum products in final consumption. To aggressively reduce the impact of fossil fuel use, the target for electricity generation is under revision, up to 50.0 per cent from renewable sources.

TABLE 18: PERCENTAGE OF RENEWABLE ENERGY IN ENERGY PRODUCTION, 2013–2021

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
% Share of Renewables	5.9	6.3	8.2	10.5	11.2	12.1	10.7	13.0	13.0

Source: Ministry of Science, Energy and Technology

The key component of the push to increase renewable energy use is the Integrated Resource Plan (IRP) approved by Cabinet in 2020. The IRP sets out Jamaica's 20-year plan for the electricity-generation sector. Since the first draft was submitted in 2018, the document has undergone revisions to include a tariff review, system avoided cost, renewable energy integration and long-run marginal cost. Modelling of the forecast electricity demand up to 2030 is being undertaken.

Approximately US\$7.3 billion is scheduled to be invested in the electricity sector by 2037 using the IRP as a guide. The investment in energy infrastructure for new distribution and existing efficiency is expected to have multiplier effects on industrial production, transport and household consumption. Expenditure will be focused on capital and maintenance costs and should result in an overall decrease in energy cost to reflect the retirement of the old and inefficient generators. It should also result in a lower cost to consumers, fewer power outages, and improve the island's carbon footprint.

Progress has been driven by the implementation of several renewable energy projects, the most recent, Eight Rivers Energy 37.0 MW Solar Plant in Westmoreland, the largest solar power plant in the English-speaking Caribbean (commissioned in 2019). This is in addition to With the IRP in place more projects are expected through an internationally competitive tender process managed by the Generation Procurement Entity, a body established to develop and manage tender processes. This method of energy procurement also serves to satisfy good governance principles through transparent exercises with tiers of review.

Crosscutting Issues

Climate Change

The practices outlined to reform and improve the energy sector are largely done as efforts to mitigate the single greatest challenge to mankind, climate change. As an outcome that is attributed directly and indirectly to human activity, how societies produce and consume is largely affected by energy sources. In Jamaica, the Energy sector is one of the main contributors to greenhouse gas emissions which impact climate change, because of the fuel sources used to produce energy.

Jamaica has become the first Caribbean nation to submit a tougher climate action plan under the Paris Agreement by adding targets for forestry and stepping up curbs on greenhouse gas emissions from energy. As shown in Table 19, if industrial operations in Jamaica were to continue as they did before the Paris Agreement, CO₂ emissions were expected to reach a total of 7.2 million tonnes in 2030. Based on Jamaica's initial climate action plan, emissions were expected to reduce between 1.1-and 1.5 million tonnes by 2030. However, based on subsequent tougher climate actions by Jamaica, emissions are expected to reduce by 1.8-2.0 million tonnes by 2030. Without international support, CO₂ emissions from Jamaica are expected to reduce by approximately 25.4 per cent through climate actions, while with international support, these emissions are expected to reduce further by 28.5 per cent.

TABLE 19: CLIMATE ACTION PLAN UNDER THE PARIS AGREEMENT BY 2030

Action	CO2 emissions (million tonnes)
Business as Usual	7.2
Initial Action (Reduce by)	1.1-1.5
Updated Action (Reduce by)	1.8-2.0
% Reduction without International Support	25.4
% Reduction with International Support	28.5

Source: Jamaica Nationally Determined Contribution to United Nations Framework Convention on Climate Change

Gender Equality

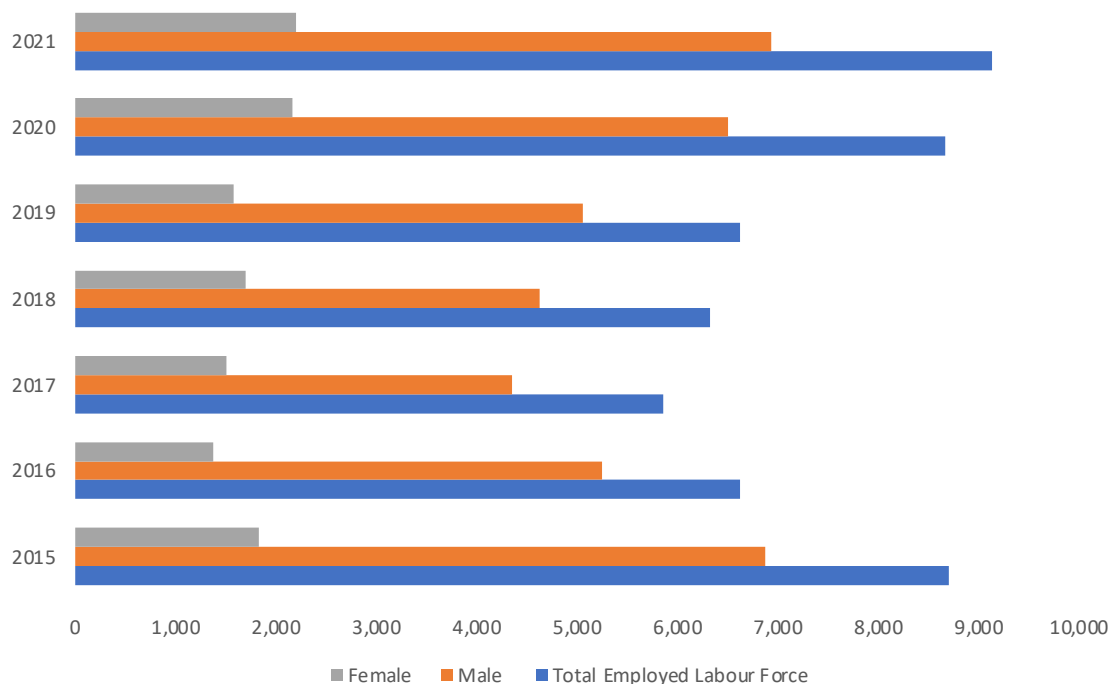


FIGURE 36: EMPLOYED LABOUR FORCE IN ELECTRICITY, GAS AND WATER SUPPLY INDUSTRIES
SOURCE: STATISTICAL INSTITUTE OF JAMAICA

Using the Electricity, Gas and Water Supply Industry as a proxy for analysis, the labour force data highlights that employment in the industry declined in 2016 and 2017 but entered an upward trajectory since and surpassed the 2015 level in 2021 with 9 125 employed persons (6 925 males and 2 200 females). Disaggregated by sex, the data showed that employment has remained consistently skewed towards males who continuously accounted for over 70.0 per cent of those employed and reached a high of 79.0 per cent in 2015. Female employment has fluctuated from a low of 20.8 per cent to a high of 26.9 per cent in 2018. The most significant jump in employment was between 2019 and 2020 with an increase of 592 females. The employed labour force in the industry has remained below 1.0 per cent of the Jamaica's total employed labour force.

While the Jamaican industry demographics are not dissimilar to global practices, attracting diverse talent pools to the industry supports the wellbeing of a broader group of the population. In response to the gap in employment, The Ministry of Science, Energy and Technology, has partnered with the Faculty of Science and Technology at the University of the West Indies, Mona for the 'Walking in Her Footsteps' Stem Mentorship Programme. This programme is intended to increase the levels of attractiveness of careers in the Science, Technology, Engineering and Mathematics field; with potential for spill over effect and lead to more women in the energy sector. The programmes aim to connect young girls at the secondary and tertiary levels across the region with female STEM professionals.

Lessons Learnt and Best Practice

To address these concerns, the Government of Jamaica (GOJ) has been pushing, through policy initiatives, for increased usage of renewables and other forms of alternative energy in the energy mix. One main initiative is the formulation of the National Energy Policy (NEP), 2009–2030, with objectives focused on seven key areas:

- Security of Energy Supply through diversification of fuels as well as the development of renewables
- Modernizing the country's energy infrastructure
- Development of renewable energy sources such as solar and hydro
- Energy conservation and efficiency
- Development of a comprehensive governance/regulatory framework
- Enabling government ministries, departments and agencies to be models/leader for the rest of society in terms of energy management
- Eco-efficiency in industries.

Energy Efficiency and Conservation Programme (EECP)

A programme implemented to design cost-saving energy efficiency and energy conservation measures in the public sector. As stipulated by the NEP, 2009–2030, government should be leading in energy conservation practices. Under the programme, which **started in 2012**, retrofits and energy efficiency improvements have been carried out at several facilities across the public sector. The areas targeted were building envelope insulations and air conditioning.

At the end of 2019, there was the certification of approximately 120 public sector Facility Managers and Administrators in Energy Management and Auditing Techniques. Approximately 81 500 square feet (sq. ft.) of heat reducing film was installed at more than 37 public sector facilities; approximately 208 000 sq. ft. of cool roof solution was installed at 14 public facilities, and 29 facilities were outfitted with energy-efficient air-conditioning solutions. These interventions saved the GOJ US\$3.2 million, lowered CO₂ emissions by approximately 8 150 tonnes and reduced oil consumption by 6 330 barrels since the start of the project.

The programme was completed in 2020. Final activities included retrofitting 272.2 tonnes of air conditioning capacity and the installation of 2 057.3 square metres of cool roof solutions at the May Pen Police Station, Mobile Reserve (now Special Operations) and National Police College of Jamaica. There was also the development of a Hazardous Waste Management Manual for Energy Efficiency and Conservation Interventions in the Public Sector.

Expand Infrastructure and Upgrade Technology for Supplying Modern and Sustainable Energy

There were upgrades at the Bogue Power Plant (201 MW) and Old Harbour Power (190 MW) to facilitate the replacement of traditional heavy fuel oils (which contribute more pollution to the environment) with LNG (more environmentally friendly), simultaneously diversifying Jamaica's fuel options, which increases energy security, and reducing the country's carbon footprint.

- Old Harbour Power Plant - The Jamaica Public Service/South Jamaica Power Company 190MW Old Harbour combined cycle power plant was commissioned into service in 2019 and since then has been providing power to the national grid, becoming the second natural gas power plant, following the conversion of the JPS Bogue Power Plant in Montego Bay from ADO to Natural Gas.

- Bogue Power Plant - The plant was commissioned and started commercial operations in 2016. It was converted from using only Automotive Diesel Oil (ADO) as fuel into a dual-fuel efficient plant utilizing Liquefied Natural Gas (LNG) as well as ADO.

Smart Streetlight Programme

This programme involves the replacement of High-Pressure Sodium (HPS) lamps, with Light Emitting Diode (LED) bulbs in street lights across the country. The programme is expected to result in significant improvements in public lighting across the island as these lights are more energy-efficient, have a longer service life and added intelligent capabilities plus are also outfitted with smart controllers which allow for improved maintenance and monitoring. As of January 2021, approximately 84 700 smart LED bulbs have been installed in street lights across the island, representing more than 80.0 per cent of the island's street lights.

Way Forward

The importance of the energy sector to all facets of life requires all stakeholders in the regulation, production and distribution of energy sources to be resilient and able to withstand shocks. As a result, the COVID-19 pandemic did little to disrupt key operations, and impacted instead mainly macro indicators of generation and consumption, through declining in transport and production. Notwithstanding, reforms of the industry over time and prospects for the future have shown challenges in the process of achieving energy efficiency including:

- The slow pace of finalizing the relevant sub-policies of the NEP which remain in the draft since 2010
- Weak coordination of cross-sectoral government linkages in implementing strategies for energy diversification
- Use of different measurement frameworks to assess energy consumption from renewable energy sources
- Improving the generation of industry data for commercial and residential production and consumption across end uses.
- The relatively aged plants and equipment that are operational within the Electricity & Water Supply industry have contributed to the relatively lower than expected economic growth, as the industry continues to be plagued by plant downtime and inefficiency - The GOJ has addressed this by increasing the tax depreciation rate and initial capital allowances, as well as implementing sound fiscal and monetary policies, which have led to a downward trend in interest rates. This should make it more economical to invest in the upgrade of production plants and equipment.
- The cost of energy has been a major factor that has constrained development within the economy, especially within energy-intensive industries like Mining & Quarrying and Manufacturing. This partly reflects an inefficient system (generation plant, transmission and distribution) and the fuel source. The GOJ has created the policy environment and regulations to facilitate greater diversification in the source of energy utilized (new wind farms, solar farms and use of LNG) and the construction of more efficient plants in the Electricity & Water Supply, Manufacturing, and Bauxite & Mining Industries.

Resource Requirements

Through alignment of the Vision 2030 Jamaica—National Development Plan and the SDGs, national outcome 10, energy security and efficiency outline a variety of plans and actions needed for the achievement of the targets related to renewable energy and access to electricity. Broadly, the strategies are under the themes of diversifying the energy supply and promoting efficiency and conservation.

Achieving these two aims requires the continued development of policy that attracts investment in the energy sector, but also ensures that investments align with the stated goals of improving livelihoods and prosperity through lowering the costs of energy for consumption and production and lowering the carbon footprint. In supporting policy, modern data collection methods to monitor the output of energy production are needed to measure impacts on air quality and waste management.

At the global level, Jamaica has stated and revised commitments to lowering its carbon footprint and regulating the production of harmful substances. However, as an open economy with reliance on shipping, logistics and cruise and leisure travel, how these industries consume petroleum-based products will further impact the island's ability to be carbon neutral. The international community is therefore encouraged to ensure that global industries, specifically in travel and logistics, as heavy consumers of fossil fuels, identify cheaper and cleaner fuels that lower the costs associated with a globalized economy and the impact on the environment.