

POLICY BRIEF

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Fostering Renewable Energy Uptake in Caribbean Small Island Developing States

Insights from Barbados

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Highlights

Caribbean small island developing states (SIDS) rely heavily on imported fossil fuels, leaving them vulnerable to unpredictable shifts in global fuel prices and supply disruptions. The region possesses abundant renewable energy resources including solar, wind, hydro, tidal and geothermal. However, the transition to renewable energy has been slow. This policy brief proposes solutions to aid Caribbean SIDS in accelerating their transition to renewable energy.

Recommendations:

- Enhance knowledge and understanding of renewable energy through public education campaigns.
- Issue thematic corporate bonds to bridge the financing gap for transitioning to renewable energy.
- Establish a stable regulatory framework for the disposal or recycling of solar panels to increase confidence among investors and consumers.

Energy in the Caribbean Small Island Developing States

The islands of the Caribbean are isolated and separated by the Atlantic Ocean and the Caribbean Sea, and the cost of establishing a subsea grid is prohibitive. Therefore, the small island developing states (SIDS) in the region currently produce all of their electricity from imported fossil fuels. The high and volatile price of electricity is a critical challenge for these countries. Fuel imports take a decisive toll on national budgets, which are already heavily burdened due to high public debt, climate impacts and other external shocks such as COVID-19 (Byron et al. 2021). This underscores the need for a new energy future. Achieving SDG 7 (affordable and clean energy) would ensure a reliable and sustainable energy supply to support future development and resilience against climate change. The potential for renewable energy in SIDS is vast, including solar, tidal, wind and geothermal energy. Caribbean governments have targeted supplying 47% of total energy from renewable sources by 2030 (IRENA 2022), but progress has been slow.

This policy brief examines the challenges in transitioning to renewable energy in the Caribbean SIDS and provides recommendations for policymakers and stakeholders in the energy industry to overcome them. It draws lessons from the

case of Barbados, which is instructive as the country with the region's highest solar photovoltaic (PV) penetration rate but a small proportion of electricity supplied from renewable energy sources. During 2014–2018, solar PV adoption increased significantly across Caribbean SIDS, with 300 megawatts (MW) of new capacity installed, mainly in Barbados, Cuba and the Dominican Republic (IRENA 2022).

Challenges

A survey conducted in 2021 suggests a lack of understanding among Barbadians regarding the benefits of greater utilization of renewable energy (see Note). Approximately 80% of survey participants perceived the transition to renewable energy as too costly to justify at the national and household levels. In 2013, the Fair Trading Commission (FTC) and the sole electricity provider on the island introduced the Renewable Energy Rider Programme, which allowed households and businesses to sell energy produced by personal PV panels to the national grid. According to the terms of the programme, individual installations are limited to 500 kilowatts (kW), and customers are expected to bear all installation, operation and maintenance costs, which prevented a significant portion of the population from participating (MOEWR 2019). The Renewable Energy Programme was replaced by a system for feed-in-tariffs (FITs) in 2019 for systems of up to 1 MW, and rates were set for 20 years. FITs differed by the system's size and energy source, but generally ranged from 18.125 cents (USD) per kilowatt-hour (kWh) to 26.125 cents per kWh. By advocating for greater private sector involvement, the government had hoped to reduce some of the burdens of the costly transition.

Approximately 70% of survey respondents indicated concerns about the disposal of solar panels at the end of their lifecycles, which made them hesitant to purchase them. The lack of precise regulation or a national policy outlining proper disposal practices further exacerbates the problem. SIDS are highly constrained by land area, making waste management a persistent challenge. Greater utilization of renewable energy can generate additional issues regarding e-waste and hazardous waste disposal.

The survey results suggest that Barbadians do not consider the transition to renewables beneficial. Citizens perceive renewable energy as too costly and a future environmental threat. These challenges are highly relevant to other small states, particularly those with similar geographical, economic and ecological characteristics. Lucas et al. (2017) argue that in the Pacific islands, the challenges hindering the deployment of renewable energy can be summarized in six categories:

(i) the absence of reliable renewable energy data; (ii) the imperative need for comprehensive policy and regulatory frameworks; (iii) limited financial opportunities; (iv) a scarcity of qualified human resources; (v) the high costs associated with necessary infrastructure; and (vi) socio-cultural barriers.

Policy Recommendations

This brief proposes three key policy recommendations to help overcome barriers to the diffusion of renewable energy in Barbados and other Caribbean SIDS.

1. Implement effective communication and public education strategies to increase demand for renewable energy in their countries.

Increasing the utilization of renewable energy in Barbados will require a large proportion of the population to adopt relatively new technologies over a short period. Public opinion about any new technology can be slow to change. However, reports of positive experiences and how technology has integrated with other consumers' lives can be powerful instruments to swing the tide of public opinion (Van Der Schoor & Scholtens 2015). When solar water heaters were first introduced in Barbados, the 1974 Fiscal Incentives Act offered manufacturers a tax break on the raw materials needed, and the government established a policy mandating that new public housing developments install the systems. Additionally, the private sector engaged in an intensive media campaign, which boosted support for the fledgling industry. Similar engagement by the private sector is required to boost adoption of renewables. Public education and awareness should be enhanced by coordinating the efforts of the public and private sectors, supported by unions and civil society organizations. Goddard (2004) provides an example of how a social partnership model that involved these groups helped to communicate the need for a structural adjustment programme in the country.

2. Support the growth of thematic bonds to bridge the financing gap at the national level and establish funding channels for private citizens at the individual level.

The initial cost of transitioning to renewables is high and poses a familiar problem for Caribbean SIDS. These islands frequently encounter challenges in accessing financing for crucial development projects. The issue is further compounded by the inability to generate and source domestic public financing. Thematic bonds, such as green and blue bonds, represent a feasible option for small states to help buffer the costs of energy transition. In 2018 and 2021, Williams Caribbean Capital issued green bonds with a minimum investment of USD 250,000. Drawing upon existing

knowledge and technical capacities, such as thematic bonds, provides considerable flexibility and security to investors and issuers. The greater public participation in the energy transition embeds social support directly into the movement and increases the likelihood of success.

At the household level, supporting purchase decisions requires reasonable financing options at affordable rates that reduce the potentially high upfront costs of adopting new technologies (Pode 2013). Lease agreements and loans with low monthly repayment terms are useful options to help households and businesses transition to the latest technology.

3. Establish a stable and transparent regulatory framework for the disposal and recycling of e-waste, increasing confidence among investors and consumers.

A clear policy boosts confidence in the technology among citizens and investors. In 2019, global e-waste was estimated at 53.6 metric tons, or 7.3 kilograms per person (Forti 2017). The future energy mix in Barbados is expected to include many solar PV sources. As a result, the volume of decommissioned PV panels and related electrical systems will inevitably increase. Establishing a clear framework for their disposal is crucial.

Barbados does have a framework on which to build for managing e-waste. Electrical and electronic equipment waste is collected at recycling centers and some retailers. The items are then taken to a reprocessing plant and shredded into small pieces. Once sliced, strong magnets remove ferrous metals such as steel. With the help of PV system manufacturers, this system could be augmented to include the recycling of PV panels.

A clear example of a policy in action is the Waste Electrical and Electronic Equipment (WEEE) Directive in the European Union (EU). The EU regulations require that suppliers of PV panels pay for the end-of-life costs, i.e., collection and recycling. Since August 2012, the recast WEEE Directive 2012/19/EU has provided a legislative framework for extended producer responsibility of PV modules at the European scale (Directive, E.C. 2012). Policymakers in SIDS will need to set the fundamental legal rules and obligations for collecting and recycling photovoltaic panels, including minimum collection and recovery targets.

In its FIT decision related to independent power producer systems above 1 MW, the FTC acknowledged the imminent e-waste issue and made provision in its tariff structure to recover decommissioning costs. The funds are accumulated over the first 10 years of the project from operating cash flows

(Fair Trading Commission 2020). Ideally, there should be a comprehensive plan that speaks to the acceptable lifetime as determined by operational efficiency or environmental determinants, as well as handling during decommissioning, transportation, storage and ultimate disposal.

NOTE

The analysis is based on an online survey conducted in May–August 2021 on the perceptions of the transition to renewable energy in Barbados. It primarily consisted of closed-ended questions, utilizing a five-point Likert scale to measure agreement with various aspects of the transition. The survey covered four main themes: awareness of the transition, areas of concern, willingness to change behavior and general demographic information. Given the adult population size of 217,000 at the time, the sample size of 384 was determined to achieve a 95% confidence level with an acceptable margin of error. Even though the total number of responses was 115, representing 30% of the target sample size, a test for randomness could not be rejected, and analysis of the survey distribution suggests that it was similar to that of the population.

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