

Country Assessment Report

Country/Region name:

Mauritius is an island nation in the Indian Ocean. It has a population of 1.265 million and GDP worth \$14 billion, with a growth rate of 3%. Mauritius is characterised by a mixed-economic system, but is becoming increasingly liberalised through government intervention, an export-oriented approach and diversification of economic and fiscal policy.

(World Bank 2019: <https://data.worldbank.org/country/MU>)

Generation and demand: (type, MW, TWh)

Electricity generation in Mauritius is mainly characterised by fossil fuels, with non-renewables resources such as kerosene, fuel oil, diesel, and coal producing 78.3% of the nation's electricity (see Table 1). All of Mauritius' electricity production from fossil fuels are categorised as 'secondary energy' sources, meaning they are imported. Whilst coal-powered electricity has seen a decline in contribution, output from fuel oil and diesel increased considerably from 2018 to 2019. In a similar vein, renewable energy registered significant growth, rising from 649 GWh in 2018 to 702 GWh in 2019.

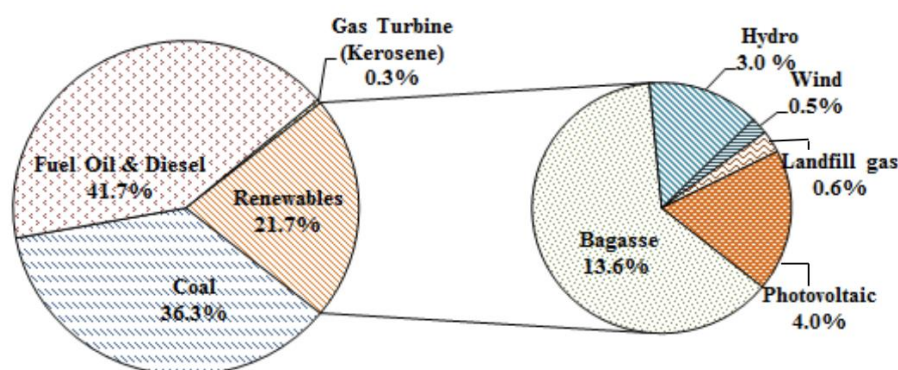


Figure 1. % of Electricity generation share per fuel source (2019).

Source of energy	2018		2019	
	GWh	%	GWh	%
Primary energy	211.6	6.8	262.2	8.1
Hydro (renewable energy)	124.5	4.0	98.6	3.0
Wind (renewable energy)	15.1	0.5	15.2	0.5
Landfill gas (renewable energy)	22.6	0.7	19.9	0.6
Photovoltaic (renewable energy)	49.4	1.6	128.5	4.0
Secondary energy	2,920.0	93.2	2,974.4	91.9
Gas turbine (kerosene)	1.8	0.1	11.7	0.3
Fuel oil & Diesel	1,221.6	39.0	1,349.0	41.7
Coal	1,259.5	40.2	1,174.1	36.3
Bagasse (renewable energy)	437.1	14.0	439.6	13.6
Total	3,131.6	100.0	3,236.6	100.0
<i>of which renewable energy</i>	648.7	20.7	701.9	21.7

Table 1. Electricity generation per technology/fuel (2018 and 2019).

Table 2. depicts the increasing influence of IPPs in renewable energy generation within Mauritius, with a total share of 54.8%. Most of the growth in renewable energy deployment, specifically emergent technologies such as solar PV and wind, is conducted by IPPs in recognition of their potential as a sustainable, cost-effective solution to energy insecurity.

Power Producer	2018		2019	
	GWh	%	GWh	%
Central Electricity Board (CEB)	1,350.5	43.1	1,461.8	45.2
Island of Mauritius	1,307.8	41.8	1,417.8	43.8
<i>Hydro</i>	124.5	4.0	98.6	3.0
<i>Thermal</i>	1,183.2	37.8	1,319.1	40.8
Island of Rodrigues	42.7	1.4	44.1	1.4
<i>Wind & PV</i>	2.5	0.1	2.5	0.1
<i>Thermal</i>	40.2	1.3	41.6	1.3
Independent Power Producers (IPPs)	1,781.1	56.9	1,774.8	54.8
<i>of which exported to CEB</i>	1,513.6	48.3	1,527.6	47.2
<i>Photovoltaic</i>	43.0	1.4	118.8	3.7
<i>Wind</i>	12.6	0.4	12.9	0.4
<i>Thermal</i>	1,458.0	46.5	1,395.9	43.1
- <i>Landfill gas</i>	22.6	0.7	19.9	0.6
- <i>Other thermal</i>	1,435.4	45.8	1,376.0	42.5
Total	3,131.6	100.0	3,236.6	100.0
Island of Mauritius				
CEB	1,307.8	46.4	1,417.8	48.1
IPP export to CEB	1,513.4	53.6	1,527.6	51.9
Total units generated for sales	2,821.2	100.0	2,945.4	100.0

¹ includes plant capacity for electricity not exported to CEB

Table 2. Electricity generation per CEB and IPPs (2018 and 2019)

Peak power demand in 2019 was 507 MW, registering an **increase** of 8.3% compared with 2018. The commercial sector accounts for the greatest share of electricity sales (36.3%) compared with domestic (34.3) and industrial demand (28%).

Republic of Mauritius (2019) *Energy and Water Statistics* (Available at:

https://statsmauritius.govmu.org/Documents/Statistics/ESI/2020/EI1532/Energy_Water_Yr19.pdf¹).

RE Market Potential:

Mauritius is well-endowed with renewable energy resources which it will need to harness to guarantee energy security over the coming decades, reduce its dependency on fossil fuel imports and ensuring climate resilience in the energy sector. Increasing concerns over freshwater availability also means Mauritius are looking to increase their desalination capacity in the near future, putting pressure on the island's electricity demand. Given the vast renewable resources yet to be exploited, Mauritius will look to meet surges in demand through clean energy production.

Mauritius' annual average solar radiation is 6 kWh/m²/day with an average of 7.3 hours of sunshine per day. Wind is similarly promising, with an annual average speed of 8.1 m/s at sites of 30 m above ground. Preliminary studies by the MRC (Mauritius Research Council) have also explored offshore wind in the Indian Ocean off the coast of Mauritius and Rodrigues (40 interested bidders in 2018). Both solar and wind are in their nascent phase of development in Mauritius but represent the most potential amongst Mauritius' available indigenous renewable resources

Another potential resource is through waste-to-energy. Firstly, the prolific sugarcane industry in Mauritius produces substantial amounts of bagasse which have limited use other than for electricity production. Mauritius may choose to expand its biomass installed capacity but should not specialise in bagasse as a fuel source due to generators only being operational during seasons of harvest.

¹ Figures for the year 2019 are provisional and may be subject to revision.

More generally, Mauritius generates half a million tons of solid waste per year and its only landfill site is nearly full but undergoing refurbishment with vertical stacking, while upstream sorting including WEEE segregation is improving together with bio-digestion project opportunities. A 20+ MW waste-to-energy project has been earmarked at multiple budget speeches but past tendering processes for the project have been unsuccessful. Furthermore, tidal and wave energy are being actively explored by the MRC and the country has received FDI from Australian company Carnegie Wave Energy Ltd and Italy as research funding and capital to establish pilot projects.

Hydro is near full exhaustion, with the potential to harness electricity generation from hydropower regarded as very low.

Finally, a SkySails kite will lift off in 2021, a first deployment in the Southern Hemisphere of such pioneer airborne wind energy system.

Sources: CEB (2020) "Production Overview" (WWW) Port Louis: Central Electricity Board (Available at: <https://ceb.mu/our-activities/production-overview>).

ITA (2020) "Mauritius – Country Commercial Guide: Energy" (WWW) Washington, D.C.: International Trade Administration (Available at: <https://www.trade.gov/country-commercial-guides/mauritius-energy>).

Bundhoo, Z. M. A. (2018) "Renewable energy exploitation in the small island developing state of Mauritius: Current practice and future potential", *Renewable and Sustainable Energy Reviews*, 2029-2038.

Takouleu, J. M. (2019) "Mauritius: New seawater desalination plant on Rodrigues Island (WWW) Paris: Afrik 21 (Available at: <https://www.afrik21.africa/en/mauritius-new-seawater-desalination-plant-on-rodrigues-island/#:~:text=Rodrigues%2C%20an%20island%20in%20the,of%20drinking%20water%20per%20day>).

Electrical interconnection and import/export:

Mauritius is an island nation and does not have electrical interconnection with other nations. Although Mauritius is a member of the Southern Africa Development Corporation, but for geophysical reasons, does not participate in the Collective Power Pool. The GoM (Government of Mauritius) are actively promoting renewable energy as a strategy to mitigate the prospect of energy insecurity, given the absence of indigenous fossil fuel reserves and subsequent reliance on imports.

Historical support or development of renewables in the country/region:

In 2008, the GoM established the landmark Maurice Ile Durable (MID) report to create Mauritius into a model for sustainable development in response to the energy crisis, climate change, and to ensure the long-term sustainability of the country's economy. To achieve this, the government set an ambitious target to produce 65% of its electricity from renewable sources by 2028. However, this has since been reduced to 35% by 2025, with the nation's energy mix stagnating at around 20% renewable for the last two decades.

Despite shrinking renewable goals, the GoM recognises renewables as a route out of its dependency on imported fossil fuels and reducing energy expenses and continue to cultivate an attractive legislative environment for foreign direct investments (FDI) into renewables.

Devi, J. P. (2011) "Investigating the appropriate Renewable Energy Technologies in the Mauritian context" (Master's Thesis) *KTH School of Industrial Engineering Management* (Available at: <http://kth.diva-portal.org/smash/get/diva2:481081/FULLTEXT01.pdf>).

Electricity market structure:

Mauritius's electricity market is operated by the vertically integrated utility CEB (Central Electricity Board) with monopolies over generation, transmission, and distribution. Generation is the only sub-sector to have been partially liberalised with the introduction of IPPs to promote competition (See Figure 3). Decentralised SIPPs (small independent power producers) also operate in Mauritius using small scale production units to harness electricity from solar, wind and mini hydro.

The GoM's decision to refrain from further liberalisation is because competitive electricity markets thrive off a liquid market of both buyers and sellers, and given the small size of Mauritius, there is little to gain from economies of scale through sub-division.

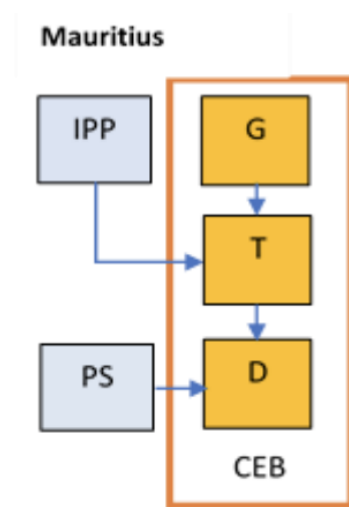


Figure 3. Electricity Market Structure. (Hadush and Bhagwat 2019).

Deepanaray, P. N. K. and A. M. Bassi. (2015) "System Dynamics Modelling of the Power Sector in Mauritius", *Environmental and Climate Technologies*, 16, 1, 20-35.

Hadush, S. Y. and S. R. K. Bhagwat. (2019) "A Comparative Study of Renewable Energy and Electricity Access Policies and Regulatory Frameworks in the Indian Ocean Islands: The Case of Mauritius, Seychelles, Madagascar and Comoros", *European University Institute*.

Description of renewables support mechanism:

Current renewable support mechanisms include:

1. Solar PV projects are VAT exempt.
2. Accelerated Income Tax Depreciation Provision for Green Investment for investment in green technology equipment (50% straight line).
3. E projects are exempt from land conversion tax.
4. Businesses and households eligible for tax deduction from investments in solar units equipment
5. All interest income from debentures issued to finance renewable energy projects and which are approved by the MRA are exempted from tax.

A Feed-in-Tariff scheme was introduced in 2010 for Small Scale Distributed Generation (SSDG) to support domestic IPP installations worth up to 2 MW (extended to 3 MW by 2012), as well as a Medium Scale Distributed Generation (MSDG) for self-consumption initiatives up to 10MW (up to 30MW by 2020). FiTs are granted to SSDGs in solar, hydro and wind for a period of 15 years. Owners are eligible to export surplus' back to the national grid in exchange for FiT payments. If annual generation to self-consumption is larger than three, the FiT in the following annum is reduced to the Greenfield tariff (15% less than regular FiT).

Sources: IEA (2020) "Policies database" (WWW) Paris: International Energy Agency (Available at: <https://www.iea.org/policies?country=Mauritius>).

EDB (2020) "Renewable Energy" (WWW) Port Louis: Economic Development Board Mauritius (Available at: <https://www.edbmauritius.org/renewable-energy>).

Responsible government department: (include key contacts)

Ministry of Energy and Public Utilities is mandated to oversee the entire energy sector. The Central Electricity Board (CEB) is the generator and supplier of electricity and acts as the only electricity regulator.

Mauritius Renewable Energy Agency (MARENA) was established in 2016 and is responsible for promoting the development and use of renewable energy technologies to increase its share in the nation's electricity generation mix. Its main objectives include:

- (a) promote the adoption and use of renewable energy with a view to achieving sustainable development goals;
- (b) advise on possible uses of liquified natural gas;
- (c) create an enabling environment for the development of renewable energy;
- (d) increase the share of renewable energy in the national energy mix;
- (e) share information and experience on renewable energy research and technology; and
- (f) foster collaboration and networking, at regional and international levels, with institutions promoting renewable energy.

Utility Regulatory Authority (URA) became the functioning regulator for electricity, water, and wastewater in 2019. Regulatory responsibilities were transferred from the CEB to promote efficiency, competition, and the interests of customers. It released a strategic business plan in collaboration with the ADB (Africa Development Bank) and African Legal Support Facility.

Source: ITA (2020) "Mauritius – Country Commercial Guide: Energy" (WWW) Washington, D.C.: International Trade Administration (Available at: <https://www.trade.gov/country-commercial-guides/mauritius-energy>).

Existing/Planned energy legislation: (is there a CPO)

Energy Efficiency Act provides product labelling and importation of energy efficient equipment, and the Building Control Act of 2011 aims to improve energy efficiency in building design. In December 2018, the Smart Grid Roadmap for Mauritius was launched to help the CEB integrate new technologies in the power system that will enhance reliability, safety, and security.

Source: ITA (2020) "Mauritius – Country Commercial Guide: Energy" (WWW) Washington, D.C.: International Trade Administration (Available at: <https://www.trade.gov/country-commercial-guides/mauritius-energy>).

Environmental legislation for RE:

Environment Protection Act introduced in 2002 to mandate ecological stewardship and remains the most comprehensive legislation concerning environmental protection and management in Mauritius (Accessible at: <https://www.mra.mu/download/TheEnvironmentProtectionAct2002.pdf>).

Existing/Planned energy certificate systems: (purpose, extent)

There are no existing or planned energy certificate schemes in Mauritius so I-RECs will not conflict with any current systems.

Extent of engagement with government:

Initial contact has been made with the [REDACTED]
[REDACTED] Minister for Energy and Public Utilities. [REDACTED]

Response from Government in relation to attribute tracking systems:

TBC

Demand-side market potential or strategic nature of market development:

Multiple subsidiaries of multinational organisations associated with RE100 are based in Mauritius. These include Barclays, Accenture, PwC, EY and more. There are also hospitality companies such as Hilton who aspire to claim renewable energy consumption in their supply chain to limit their carbon footprint. A shift to eco-tourism in Mauritius will also put further pressure on the industry to claim for RECs. Some local/regional hospitality groups and Tour Operators are already engaged in ambitious GHG emissions monitoring, reporting, and offsetting either voluntarily and/or as SEM Sustainability Index-listed companies (Stock Exchange of Mauritius). The introduction of I-RECs to Mauritius will likely stimulate further subscription to RE100 from multinationals as it will provide the evidencing requirements necessary for this type of reporting infrastructure.

The strategic nature of market development encompasses the constellation of islands in the Indian Ocean, starting with Mauritius due to concrete demand, then exploring the opportunities in other SID's (Small Island Developing State) such as Madagascar, Maldives, Seychelles and more. Collectively, these are set to be/already are the biggest victims of climate change and require mitigation of carbon emissions and adaptation to rising sea levels. I-RECs can incentivise renewable energy deployment as a mitigation strategy to reduce carbon emissions from the energy sector.

Analysis of political disruptions or market risks:

Bundhoo cites a wide range of obstacles facing renewable energy development in Mauritius, including public awareness, technical know-how, cost, intermittency, and optimisation. These represent archetypal barriers for any developing renewable energy market and are possible to overcome through education programmes, transfer of knowledge, enabling regulatory and incentivisation frameworks and the diversification of energy resources.

As Hadush and Bhagwat claim, one of the biggest challenges for Mauritius is attracting private investment for on-grid and off-grid generation, distribution, and supply. In 2018, fossil fuels were still cheaper than most renewables and despite the presence of several financial incentives, Mauritius could benefit from I-RECs to further stimulate renewable energy generation by adding an additional marketable value.

The additional revenue stream of I-RECs would make investments into renewables more lucrative and have a positive impact on the sector's growth.

Mauritius has enjoyed political stability for some time and there are no significant risks or disruptions expected to impact the renewable energy market and its continuing development.

Sources: Bundhoo, Z. M. A. (2018) "Renewable energy exploitation in the small island developing state of Mauritius: Current practice and future potential", *Renewable and Sustainable Energy Reviews*, 2029-2038.

Hadush, S. Y. and S. R. K. Bhagwat. (2019) "A Comparative Study of Renewable Energy and Electricity Access Policies and Regulatory Frameworks in the Indian Ocean Islands: The Case of Mauritius, Seychelles, Madagascar and Comoros", *European University Institute*.

Analysis of regulatory risks including linkages with carbon markets and support systems:

Some solar and wind IPP projects have already been registered to GHG accounting schemes like CDM and VCS. These projects now want to adopt I-REC as the globally accepted evidence for renewable energy origination claims.

CDM-DNA operational within the Ministry of Environment, Solid Waste Management and Climate Change, Department of Environment; and regulated by the Environment Protection (Designated National Authority) Regulations 2010.

Current environmental reporting in energy:

The Ministry of Environment and Sustainable Development is responsible for environmental reporting in the energy sector.

Mechanisms in place to support the reliable verification and issuance of I-RECs:

Public records of electricity output are available on the [CEB](#) website to support the reliable verification and issuance of I-RECs for GCC and future issuers.

Local organizations of importance and their opinion on local I-REC market development:

I-REC Services were approached [REDACTED] to initiate market development in Mauritius. Winterbourne Holdings offers comprehensive carbon and energy solutions by implementing long-term, renewable energy strategies. Winterbourne Holdings have clients with several renewable energy projects wanting to make an additional revenue stream, with I-RECs identified as an effective origination mechanism to reliably achieve these goals.

Any other relevant information:

The 5 Largest Corporations in Mauritius have already made public commitments to be Net Zero by 2030 or sooner. These companies, and many more, are already actively reporting on their ESG Strategies and have all incorporated Renewable Energy in their roadmaps to achieving Net Zero status.

The largest banking group in Mauritius, MCB, has already gone so far as to make their customers aware that they will no longer finance transactions that has a negative impact on the country, or their carbon footprint. To this end they have also launched a Carbon Trading Platform in partnership with BNP Paribas and are actively engaging with their clients to make the switch to Renewables.

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