THE MINISTRY OF PUBLIC UTILITIES, ENERGY & LOGISTICS

BELIZE ANNUAL ENERGY REPORT

2024

MINISTRY OF PUBLIC UTILITIES, ENERGY & LOGISTICS

ENERGY UNIT

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IMPRINT

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FOREWORD

There has rarely been a point in recent history where the themes and impacts of energy have been more marked on the global stage than the year 2024. From perching on the edges of climate science and now taking the centre spotlight in development plans worldwide, energy matters have permeated international and national discussions to an unprecedented degree. In Belize, the energy sector is more than just a facilitator of daily life, it is a fundamental driver of economic resilience, social well-being, and national progress.

The increasing severity of climate change impacts have made the energy transition more crucial than ever before, while also putting to the test the resiliency of energy supply systems. Renewables and green energy technologies are more widespread and more accessible than ever before, contrasting with a backdrop of still-rising global fossil-fuel consumption. The availability and flow of energy sources and technologies across borders is shaped by political realities that can change quickly. Countries are increasingly giving energy issues an importance atrributed as much to its security considerations as to its environmental, health, and sustainability themes.

Here in Belize, the effects are not abstract, they are lived realities. From tackling compounded effects of extreme weather and surging energy demand, as well as facing steadily rising costs, Belize has a unique chance to foster its energy transition. By harnessing its abundant natural resources, along with its geographic location and an economy uniquely tied to the environment, Belize can become a regional case study in sustainable energy development.

As a signatory to international climate commitments, such as the Paris Agreement, Belize has solidified its commitment to the multilateral approach to climate and development roadmaps.

As an active participant in the Nationally Determined Contributions (NDCs), Belize continues to upgrade and realign its national energy targets, expressing willingness to reduce emissions in an equitable and sustainable way. Our updated National Energy Policy spells out key development areas that align with the NDCs as well as the economic investment landscape of Plan Belize 2.0. We have the groundwork in place and the political will to engage with the opportunities and challenges of charting a sustainable energy pathway for Belize.

In light of this, the Annual Energy Report plays a key role in highlighting the trends and notable advances in the national energy sector, serving as an invaluable tool for investors, policy makers, energy experts, academia, and the wider public. In Belize, the transition is not an abstract idea, it is a reality. With updated energy information, regulatory changes, and infrastructure projects, the energy sector has made inroads into the areas of e-mobility, energy efficiency, distributed generation and energy access. With an outlook for further regional cooperation in renewable energy and climate finance, the sector's critical role in strengthening energy security and building resilient communities will continue to grow.

With many heartfelt thanks to the Ministry's hardworking team, as well as to the actively engaged stakeholders who contributed to the data, composition, and publishing of this report, I welcome you all to join us as we transition to new vistas on Belize's energy journey.

Hon. Michel Chebat

HON. MICHEL CHEBAT, SC.
Minister in the Ministry of Public Utilities, Energy and Logistics (MPUEL)

CONTACT INFORMATION

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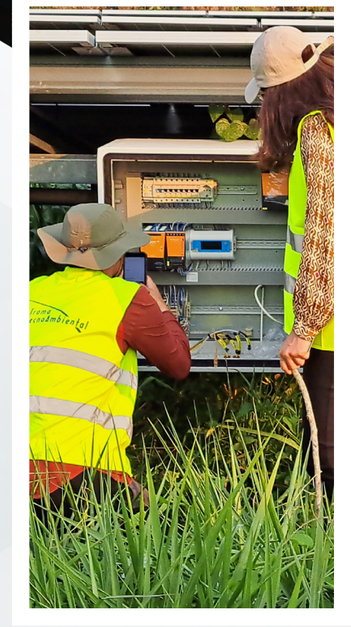
Any questions, comments, or suggestions are welcome.



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ENERGY UNIT

Table of Contents

LIST OF TABLES

LIST OF FIGURES

Driving Belize Towards a Greener Future!

E-Mobility

ABBREVIATIONS

AFOLU	Agriculture, Forestry, and Other Land Use
BAPCOL	Blair Athol Power Company Limited
BBS	Belize Bureau of Standards
BEL	Belize Electricity Limited
BELCOGEN	Belize Co-Generation Energy Limited
BESS	Battery Energy Storage Systems
BNE	Belize Natural Energy Limited
CH	Methane
CO	Carbon Dioxide
CCK	Caye Caulker
CCREEE	Caribbean Centre for Renewable Energy and Energy Efficiency
CDM	Clean Development Mechanism
CEPAL (Spanish)	Economic Commission for Latin America and the Caribbean
CFE	Comisión Federal de Electricidad (state-owned utility of Mexico)
CHP	Combined Heat and Power
DG	Distributed Generation
FTRP	Full Tariff Review Process
FLPC	Farmer's Light Plant Corporation
EBT	Energy Balance Table
GIS	Geographic Information System
GIZ (German)	German Agency for International Cooperation
GDP	Gross Domestic Product
GEF	Grid Emission Factor
GHG	Greenhouse Gas
HDI	Human Development Index
IEA	International Energy Agency
IDB	Inter-American Development Bank
IKI (German)	International Climate Initiative
IRENA	International Renewable Energy Agency
IRES	International Recommendations for Energy Statistics
IPP	Independent Power Producer
IPCC	Intergovernmental Panel on Climate Change
KPI	Key Performance Indicators

ABBREVIATIONS

KtCO2e	Kilo tonnes of Carbon Dioxide Equivalent
LAC	Latin America and Caribbean
LED	Light-Emitting-Diode
LPG	Liquified Petroleum Gas
MER	Mean Electricity Rate
MPUEL	Ministry of Public Utilities, Energy, and Logistics
NDC	Nationally Determined Contributions
NMS	National Meteorological Service
N2O	Nitrous Oxide
OLADE (Spanish)	Latin American Energy Organization
OPEC	Organization of the Petroleum Exporting Countries
PPA	Power Purchasing Agreement
PUC	Public Utilities Commission
PUMA	Puma Energy Bahamas S.A.
PV	Photovoltaic
RE	Renewable Energy
SDG	Sustainable Development Goal
SHS	Solar Home System
sieLAC (Spanish)	Energy Information System of Latin America and the Caribbean
SIEPAC (Spanish)	Central American Electrical Interconnection System
SIB	Statistical Institute of Belize
SICA (Spanish)	Central American Integration System
SIDS	Small Island Developing States
SSEL	Santander Sugar Energy Limited
TPES	Total Primary Energy Supply
TJ	Terajoules
UB	University of Belize
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate
UNSD	United Nations Statistics Division
WTI	West Texas Intermediate
XCD	Eastern Caribbean Dollars

Key Findings 2024

TOTAL ENERGY SUPPLY

Total Energy Supply reached

19,670.5 TJ

in 2024,

up **11%** from 2023.

SECONDARY ENERGY SUPPLY

Increased by

1,505.73 TJ

compared to 2023

driven by higher petroleum products imports,

accounting for **87.6%**
of secondary energy supply

HYDROCARBON PRODUCTION CONTINUES TO DECLINE

Crude Oil Production
5.88%

Natural Gas Output
18.4%

Local production continues to fall, with no crude oil exported or refined within the country.

ELECTRICITY SUPPLY AND DEMAND RECORD

Peak Demand in 2024
129.2 MW
Highest on record and straining available supply

Imports (CFE, Mexico)

12.4%
total secondary energy supply

44.2%
electricity production by source

RENEWABLE ENERGY SHARE

led by hydropower

Renewables supplied
43.4%
of electricity

Notable growth in Solar Installations

ENERGY PRICING POSITION

Prices remain steady in 2024

Energy prices, for both electricity and petroleum products, stayed steady, but remain higher than in most Central American countries.

FINAL ENERGY CONSUMPTION

Transport sector led final energy use

Transport
Residential
Commercial

Followed by residential and commercial use, with gasoline, diesel and electricity as the top consumed fuels.

RURAL ELECTRIFICATION PLANNING

Belize Least Cost Rural Electrification Plan

(with IDB support) provided a roadmap to expand electricity access in underserved communities in the most cost-efficient manner.

GHG EMISSIONS

Energy-related GHG emissions (2022)

722.79 kt CO2eq

with the transport sub-sector remaining the single largest contributor.

Downward Emission Trend

CLIMATE COMMITMENTS AND FUTURE OUTLOOK

Energy sector efforts are central to Belize's Nationally Determined Contributions (NDCs)

Planned diversification into renewables
Solar, Biomass & Hydro

Efficiency measures
Micro-grids, Energy-efficient buildings

Expected to reduce emissions and improve energy security.

1 INTRODUCTION

1.1 ENERGY LANDSCAPE

Energy shapes the way society functions and evolves, serving as the foundation of modern economies. In Belize, the energy sector is more than just a facilitator of daily life - it is a fundamental driver of economic resilience, social well-being, and national progress. Efficient and sustainable energy use is critical for Belize's economic growth, powering key industries, transportation, and households. Nonetheless, 2024 was a year of both opportunity and challenge for Belize's energy sector.

On a global level, the energy sector continued to grapple with the dynamic interplay of geopolitical uncertainties, economic reform and recovery efforts, and the accelerating call to transition toward renewable energy sources. Regardless of geographic region, energy markets remained volatile, subjected to shifts in energy supply chains, inflationary pressures, and changing policy and regulation responses to climate change commitments under the Paris Agreement. Meanwhile, within the Latin America and Caribbean (LAC) region, countries intensified their focus on energy security, grid modernization, and sustainable investments to strengthen resilience against external shocks and to mitigate supply constraints.

For Belize, these global and regional shifts found their way into the country's energy market with tangible impacts. Following the economic rebound from the COVID-19 pandemic, energy costs in Belize remain a concern, with fluctuations in petroleum product prices affecting national energy expenditure. Energy expenditure in Belize amounted to 21% of GDP in 2021, with projections reaching $993 million by 2030 (Ministry of Public Utilities, Energy, Logistics, and E-Governance, 2023). Energy supply constraints and climate-related events underscored the need for strategic energy planning and diversification. Simultaneously, regulatory and policy improvements, new renewable energy initiatives, and critical infrastructure investments marked progress toward the country's energy transition goals.

Against this backdrop, 2024 was marked by both progress and challenges in Belize's energy sector.

Key highlights include:

- **Regulatory and Policy Developments:** Major regulatory discussions took place, leading to new electricity customer classifications, tariff adjustments, and policy revisions designed to enhance sector efficiency and sustainability.
- **Electricity Supply Constraints:** Electricity supply constraints emerged as a major challenge, impacting both businesses and households, and underscored the urgency of diversifying generation sources and strengthening grid resilience.
- **Renewable Energy Expansion:** On a positive note, Belize continued expanding renewable energy and energy access initiatives, reinforcing its commitment to sustainability and climate action.
- **Energy Trade and Prices:** Belize remains heavily dependent on imported fuels, making its economy vulnerable to price fluctuations. This report's examination of energy trade and pricing dynamics offers essential insights into these issues.
- **Energy and Climate Goals:** The country has advanced in its efforts to monitor greenhouse gas (GHG) emissions originating from the energy sector, as updated emission statistics deliver vital information for climate and energy commitments.

1.2 PURPOSE

In response to these developments, the 2024 Belize Annual Energy Report provides essential insights for decision-makers, industry stakeholders, and the public. The report provides timely and accurate energy data that supports evidence-based policymaking, enhances transparency, and informs sustainable energy planning.

By documenting Belize's Energy Landscape, this report:

- **Delivers Actionable Insights:** Provides policymakers with data-driven guidance to shape Belize's energy future.
- **Tracks Energy Security and Efficiency:** Identifies key challenges and monitors Belize's transition toward a resilient, sustainable energy system.
- **Facilitates Investment and Planning:** Provides investors and technical partners with a better understanding of market trends and sectoral requirements.
- **Supports Climate Action:** Presents the latest available data on emissions and sustainability efforts, aligning Belize with global energy-climate goals.
- **Enhances Public Awareness:** Educates citizens on the country's energy challenges and opportunities, fostering informed dialogue on energy matters in Belize.

1.3 STRUCTURE OF THE REPORT

The 2024 Belize Annual Energy Report is organized into seven chapters, each offering a structured analysis of different aspects of the energy sector:

- **Introduction:** Sets the stage for the report by providing an overview of its purpose, scope, and structure.
- **Overview:** Presents Belize's National Energy Balance and Key Performance Indicators, positioning the country's energy sector within a local and regional context (where applicable).
- **Energy Supply and Final Consumption:** Analyzes primary and secondary energy supply and final consumption patterns by fuel type, sector, and within the electricity sector.
- **Electricity Sector:** Provides comprehensive data on electricity generation, installed capacity, sales, and trade, including a specified look at the electricity supply constraints encountered in 2024.
- **Energy Prices:** Examines local and regional (where applicable) price trends for crude oil and petroleum products, such as gasoline, diesel, kerosene, and LPG, along with electricity.
- **Environment and Climate Goals:** Assesses Belize's energy targets, GHG emissions, and sustainability initiatives concerning climate commitments.
- **Strategic Energy Sector Initiatives:** Highlights key policy and regulatory developments, including electricity tariff reviews, rural electrification strategies, and updates to the Belize Energy Policy Framework.

Energy continues to drive Belize's economic growth and social progress. As the sector evolves amid global uncertainties and domestic challenges, this report provides essential data and analysis to guide decisions that govern Belize's energy future. Through clear, evidence-based analysis, this report supports national planning, attracts investment, and deepens understanding of energy's role in Belize's sustainable development.

2 OVERVIEW

2.1 ENERGY BALANCE

Many of the analyses, flows, and data products exhibited in this report have their genesis in an analytical tool known as an ‘energy balance table’. This internationally utilized tool is an accounting framework designed to track the creation, importation, and diverse uses of energy sources within a bounded space (usually a nation state), as well as within a stated reference period. According to Eurostat (2013), “The energy balance allows users to see the total amount of energy extracted from the environment, traded, transformed, and used by end-users. It also allows seeing the relative contribution of each energy carrier (fuel, product)”.

Energy balances typically incorporate the energy flows summarized in Figure 1. Energy sources are either produced or imported into the country in the ‘Supply’ block. Some of these energy sources or fuels may be subject to conversion into a different form of energy, such as burning diesel to produce electricity. Any such conversions and the losses that accompany them are tracked under ‘Transformation’. Finally, fuels ready for consumption for their end-point use are disaggregated into sectors, usually based on economic activity, under ‘Final Energy Consumption’.

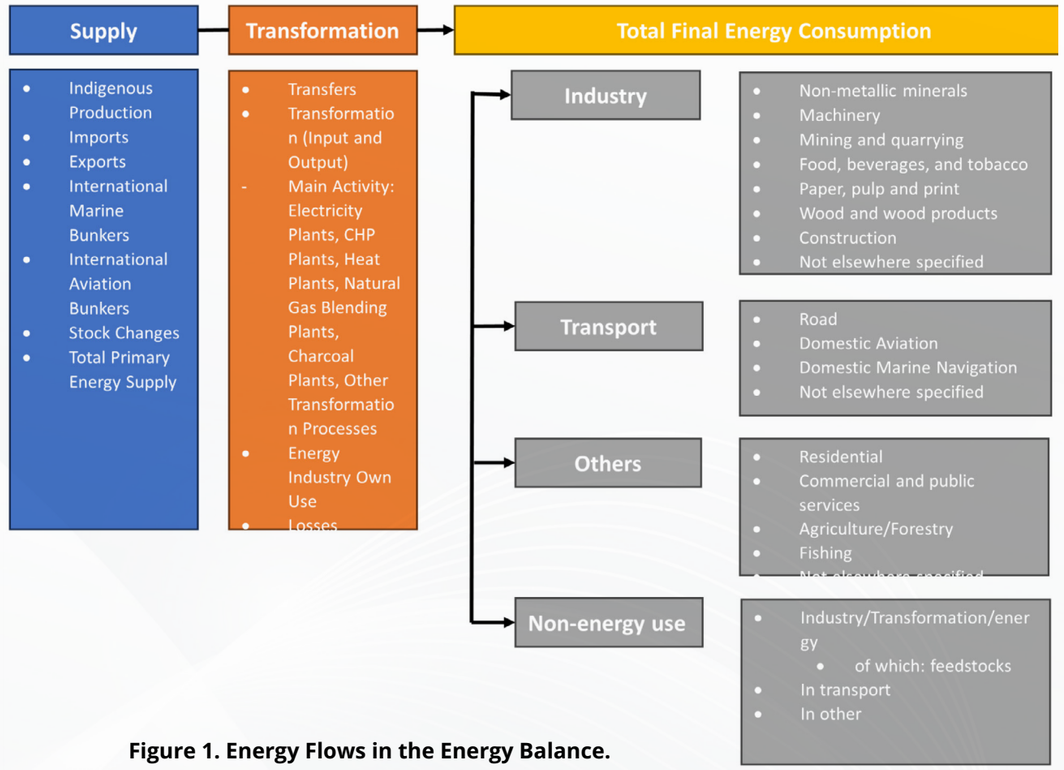


Figure 1. Energy Flows in the Energy Balance.

In 2020, the Energy Unit restructured its energy balance following the structure stipulated in the International Recommendations for Energy Statistics (IRES) (United Nations Statistics Division, 2018). The restructuring exercise identified data gaps, especially as it relates to the disaggregation of final consumption categories. It may be important to note here that there are data gaps within the ‘Final Energy Consumption’ section of the balance tool, such that some fuels have been lumped into presumed categories, while others are consumed within confirmed categories. The Energy Unit seeks to continuously improve the quality and coverage of its data products, thereby increasing the effectiveness of the information for decision-makers and planning efforts.

Table 1 outlines a simplified format of the **2024 Belize Energy Balance**, intended to provide a clear overview of national energy flows for this reporting period.

Table 1. Belize Energy Balance, 2024 (Simplified format).

Energy Flows \ Energy Products	Crude oil	Natural gas	Oil products[1]	Hydro	Solar	Biofuels[2,3]	Electricity[4,5]	Heat	Total
Indigenous Production	851.86	27.89	-	816.95	21.33	5,363.21	-	-	7,081.24
Imports	-	-	12,589.68	-	-	-	1,467.76	-	14,057.44
Exports	0.00	-	-	-	-	-	-	-	0.00
International marine bunkers	-	-	-2.68	-	-	-	-	-	-2.68
International aviation bunkers	-	-	-1140.13	-	-	-	-	-	-1,140.13
Stock changes (+/-)	-40.81	-	-	-	-	-284.59	-	-	-325.40
Total Energy Supply (TES)	**811.05**	**27.89**	**11,446.87**	**816.95**	**21.33**	**5,078.62**	**1,467.76**	**0.00**	**19,670.47**
Statistical Difference	-7.15	0.00	0.00	0.00	0.00	0.00	-0.17	0.00	-7.32
Transfers	-	-	-	-	-	-	-	-	0.00
Transformation Processes	-202.29	-	-1,034.77	-816.95	-21.33	-4,330.69	1,852.29	-	-4,553.73
Energy Industry Own Use	-7.15	0.00	-0.02	0.00	0.00	0.00	-317.89	0.00	-325.06
Losses	-	-27.89	-	-	-	-	-374.34	-	-402.23
Total Final Energy Consumption	608.77	0.00	10,412.08	0.00	0.00	747.93	2,627.99	0.00	14,396.77
Manufacturing Sector	318.49	0.00	0.00	0.00	0.00	0.00	126.71	0.00	**445.20**
Transport	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**7,618.87**
Road	-	-	7,387.36	-	-	-	NR	-	7,387.36
Domestic Aviation	-	-	215.24	-	-	-	-	-	215.24
Domestic Marine Navigation	-	-	16.27	-	-	-	-	-	16.27
OTHER	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**6,332.70**
Agriculture/Forestry	225.39	-	-	-	-	-	-	-	225.39
Commerce and public services	64.88	-	-	-	-	-	1,468.65	-	1,533.53
Households	-	-	2,793.21	-	-	747.93	1,032.63	-	4,573.78
NON-ENERGY USE	0.00	0.00	NR	0.00	0.00	-	0.00	0.00	**0.00**
Electricity and Heat Output[6]									
Total Electricity Generated - GWh	**20.3**	**0.0**	**93.8**	**226.9**	**5.9**	**167.6**	**0.0**	**0.0**	**514.5**
Utility	-	-	54.2	-	-	-	-	-	54.2
Electricity plants (IPPs)	-	-	39.6	226.9	5.9	-	-	-	272.4
CHP plants (IPPs)	20.1	-	-	-	-	167.6	-	-	187.6
Electricity Auto-producers	0.3	-	0.0	-	-	-	-	-	0.3

Notation: - = Not Applicable, NR = Data Not Reported **|** ***Notes:*** 1 Oil products: Motor Gasoline, Diesel Oil, Kerosene, Fuel Oil, Aviation Fuels, and Liquified Petroleum Gas. 2 Biofuels: Bagasse and Firewood. 3 Figures exclude distributed generation from renewable sources.

2.2 ENERGY INDICATORS

This section presents datasets that are referred to as 'Key Performance Indicators' or KPIs. These indicators are intended to assess the country's progress in important aspects of the energy sector, including tracking the achievement of national targets such as the Nationally Determined Contributions (NDCs) or goals such as the Sustainable Development Goals (SDGs). The KPIs also signal macro trends in the climatic, economic, or demographic forces that shape the energy sector's movement. These indicators are intended to give an at-a-glance indication of the status of Belize's energy sector and its project outlook.

These datasets are recalculated every year according to the latest available socio-economic data, aggregate outputs from the Energy Balance, and other data products. Due to this, there may be differences when comparing the presented trends with those in previous publications.

2.2.1 Energy Intensity Measure in Terms of Primary Energy and GDP

Typically used as a metric for a country's progress in the field of energy efficiency, 'energy intensity' is often presented as a ratio of energy units (such as tons of oil equivalents, or British Thermal Units) to economic output, usually in the form of Gross Domestic Product (GDP). Generally speaking, 'Energy Intensity is measured by the quantity of energy required per unit output or activity, so that using less energy to produce a product reduces the intensity' (U.S. Department of Energy, 2020). Therefore, higher intensity values are expected to represent lower efficiencies, and vice versa. It should be noted, however, that energy intensity values can conceivably be driven by factors other than efficient energy use, such as changes in economic productivity or a country's import-export balance (Jelodar & Sadeghi, 2023).

Figure 2 presents the timeline[1] of Belize's energy intensity, expressed in US dollars for international comparability, and depicts the last reference year as having one of the lowest intensity values of the decade. A lower energy intensity value is expected to indicate that either Belize is using less energy to achieve the same level of economic output or can get more economic output from using similar levels of energy input into the system. Over the past several years, multiple energy efficiency programs have been implemented, such as energy management in public buildings, appliance efficiency labels, piloting of electric public transport systems, and the replacement of inefficient streetlights with LED type streetlights.

1 This indicator has had changes made to both the constant GDP figures, which the Statistical Institute of Belize revised on the 17th of December 2024, as well as to the Total Energy Supply, for which the data definition has now been updated. This resulted in changed figures for a number of years in the timeline.

Nonetheless, there is currently no systematic or accurate method to correlate these relatively small measures to the decrease in intensity as displayed in Figure 2. More in-depth studies are needed to fully analyse the drivers of Belize's energy consumption and energy efficiency patterns.

Another factor to consider in the analysis of this indicator is recognizing that the preferred version of the indicator would incorporate 'final energy consumption', since energy intensity is primarily defined as 'a measure of energy consumption that compares energy usage to another metric, usually the national GDP' (Clark, 2023). However, the Ministry cannot accurately denote Belize's final energy consumption from a data perspective. As a proxy, the 'total energy supply' is used in our calculation instead. Given that there is no guarantee that all available energy in the country was put to an (economically) productive use, these figures must be treated only as a general guide or proxy indication of energy use patterns in Belize.

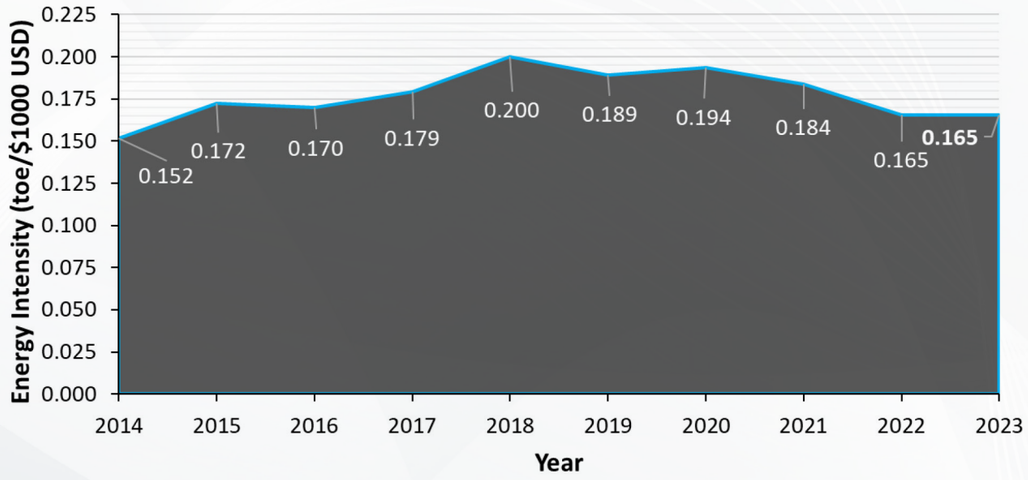


Figure 2. Belize's National Energy Intensity in Terms of Constant GDP, 2013-2023.

2.2.2 Energy Import as a Share of Total Primary Energy Supply (TPES)

Belize has a significant reliance on energy sources imported from outside of country. Figure 3 shows how Belize's energy import reliance has varied over the past ten years[2]. While the trend exhibits fluctuations throughout the decade, it has remained above 50%, even at its trough during the COVID pandemic lockdowns. In 2024, more than 70% of Belize's energy was imported, one of the highest importation rates of the decade.

2 Any changes in the timeline from our previous publications are the result of revisions to the Total Energy Supply figures, especially as it regards the definition of bagasse supply.

Most of the imports are from a combination of refined fuels and electricity, with the role played by these energy sources being a key discussion point for Belize's sustainable development and energy autonomy. While it is frequently acknowledged that some degree of importation will always be necessary, it is also recognized that reduced energy dependence is a desired goal. According to a statement made by BEL in 2022, "There was a shock with the increase in fossil fuels which impact the generation at Caye Caulker, the generation at the Mile 8 sub-station facility and the BAPCOL facility down south that are dependent on fossil fuels…we have plans to be less reliant on these facilities and more reliant on renewable energy resources – solar, wind and the cheap power that we can purchase when it's available from Mexico." (Amandala, 2022).

Energy independence has become a much-discussed issue in global deliberations, not only as a sustainability issue, but also as a security issue, as geopolitical tensions and conflicts flare in various regions of the globe. This recently published technical analysis encapsulates the many sides of this matter:

> "Conflicts in key resource regions, growing cyberattacks on critical infrastructure, and fierce competition over renewable supply chains have highlighted vulnerabilities in both fossil fuel and renewable energy systems.
> This instability has forced governments and energy providers to rethink their strategies, including diversifying supply sources, building resilient infrastructure, and investing in energy independence through decentralized systems." (World Energy Report, 2025)"

As a small developing country, Belize must take these themes into consideration as new energy sources are planned, and new systems and infrastructure are proposed. Our novelty in these areas of development can be both an avenue of opportunity and a challenge, depending on how and when strategic planning efforts are levied within the energy space.

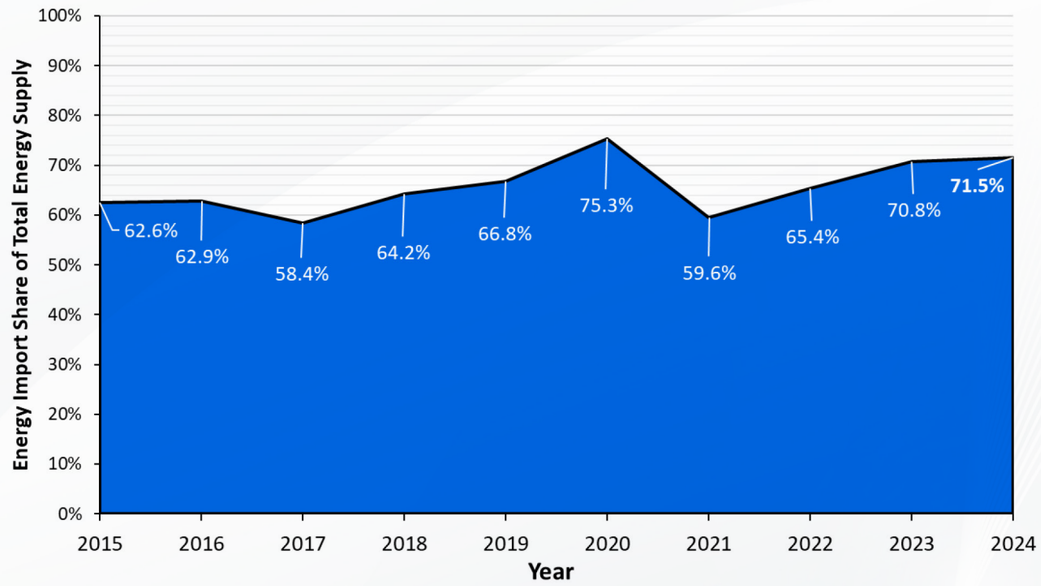


Figure 3. Timeline of Energy Import Shares of the Total Energy Supply, 2015-2024.

2.2.3 Renewable Energy Share of Total Primary Energy Supply

The renewables share in the total energy supply represents the percentage of Belize's available energy sources, both locally produced and imported, that are attributable to renewable sources. Nationally, these sources translate into solar, hydropower, firewood, and bagasse (sugar cane). Variations in supply are mainly tied to changes in hydropower output and sugar cane crop yields, both of which are highly sensitive to climatic factors. Figure 4 illustrates Belize's renewable energy share in the total energy supply over the last decade[3]. In 2024, the renewable share equated to 31.5% of the total energy supply. The trend makes it clear that while yearly variations occur, the renewable energy share of the country's energy supply does not diverge strongly from the mean value – about 34%, albeit the peak of 2021 (a wet year) or the nadir of 2019 (a marked drought year). Significantly increasing Belize's renewable energy supplies in the long term is not an incidental process that can be left up to environmental factors alone; rather, it must be a targeted and strategic movement involving careful analysis of national resources and the optimal way of sustainably using them. Consideration must be given to what the potential maximum renewable capacity of the nation is, and how to mitigate the demands of additional energy needs.

3 Revisions are visible throughout this dataset, as compared to previous publications, due to updates in the definition of bagasse supply, and subsequent changes to the Total Energy Supply.

If imports are required to meet demand, emphasis can be placed on ensuring it's from renewable-based sources. To improve energy security and resilience, diversification of energy import sources must be made a priority. These are important examinations for any policies that will guide Belize's energy future.

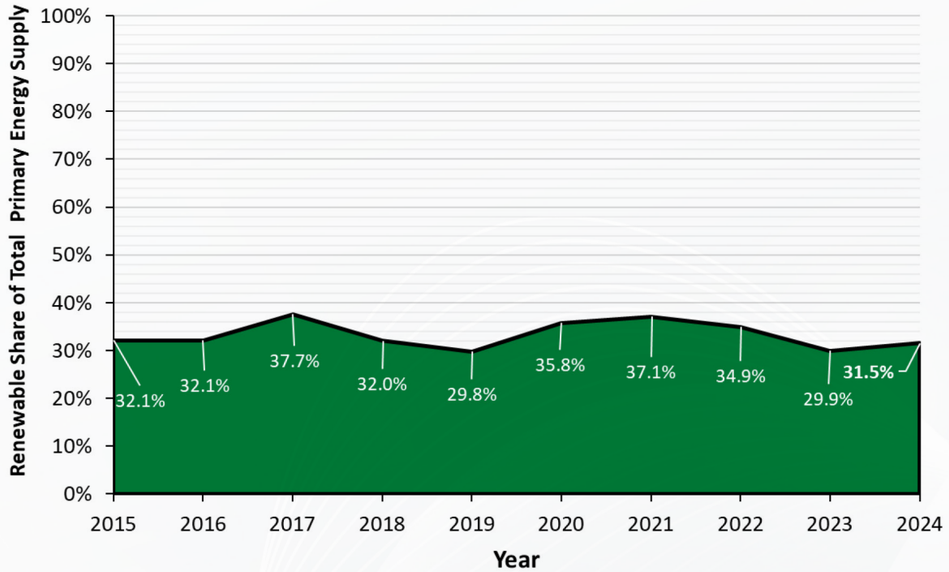


Figure 4. Timeline of Renewable Energy Shares in Total Energy Supply, 2015-2024.

2.2.4 Percentage of Renewable Energy in Electricity Mix

Focusing on the national electricity supply, this indicator describes the renewable share of all electricity generated or imported into Belize (on-grid and off-grid). Over the past ten years, the share of renewable energy within Belize's electricity mix presents a much more dynamic picture than the 'renewables share of total energy supply' indicator[4] (Figure 5). The first part of the decade has a predictable share of about 56%, but from 2019 onwards, stronger variabilities are visible. The year 2019 was known to be a drought year, which significantly reduced the electricity generated from hydropower and bagasse-based co-generation plants. Since then, numerous factors have come into play to make Belize's electricity mix a more delicate system. Changes in price and availability of Mexican electricity, rapidly increasing demand since 2021, and intense climatic heat over the past two years have added to the volatility of the electricity mix. BEL (2024) noted that "demand was buoyed by greater use of fans, air conditioners, and refrigeration units in response to extreme heat" in 2024. This highlights the growing need for resiliency planning and for diversifying the sources feeding the national electricity grid.

4 Any differences in figures from the previous publications are due to updated definitions of bagasse supply.

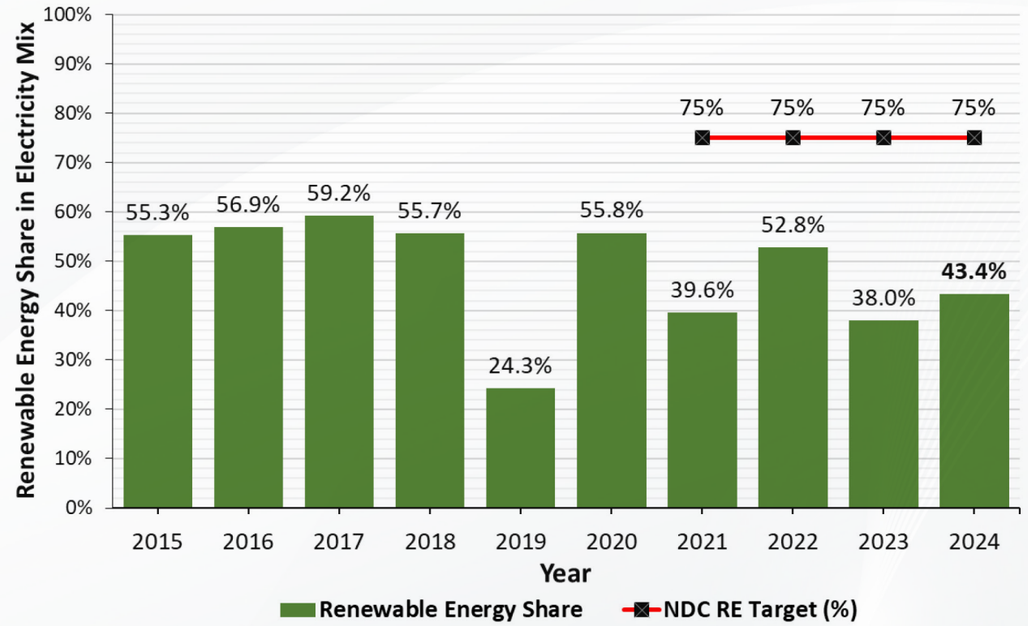


Figure 5. Timeline of Renewable Energy Share in the National Electricity Mix.

2.2.5 Renewable Energy Generating Capacity

The indicator 'Installed Renewable Energy Capacity per Capita' represents the ratio of built renewable energy generating infrastructure against a set population and is designed to monitor and compare global progress towards the components of the seventh Sustainable Development Goal that state 'ensure universal access to affordable, reliable and modern energy services' and 'increase substantially the share of renewable energy in the global energy mix'. These statements ask for every citizen to have access to electricity, as well as for there to be increasing sustainability and climate consideration.

This indicator equalizes the effect of disparate population sizes and infrastructure scale as countries push for greater energy development and renewable technologies. It implies that having a large renewable capacity is only meaningful if compared to the country's overall population. According to the United Nations Statistics Division (UNSD), 'Developed countries average 1,162 (renewable) watts per person – nearly three times the average of developing countries, 341 watts.' This suggests that economic weight is playing a large role in the progress towards upscaling renewable energy deployment, as well as highlighting the strong potential for disparity between countries in their pursuit of the SDG goals. For Belize, the five-year trend (Figure 6) shows little to no variation, indicating that the renewables capacity has kept more or less abreast of population changes over the given timeframe.

There was a small decrease in 2024, which is more likely the result of additional fossil fuel capacity coming online, rather than a proportionately large share of the nation's population increasing. It is interesting to note that at around 200 watts/capita, Belize is far behind the average cited by the UNSD for developing countries. There is a clear need for the country to carefully consider how to increase renewable energy capability, even as it strives to expand electricity access to every Belizean household.

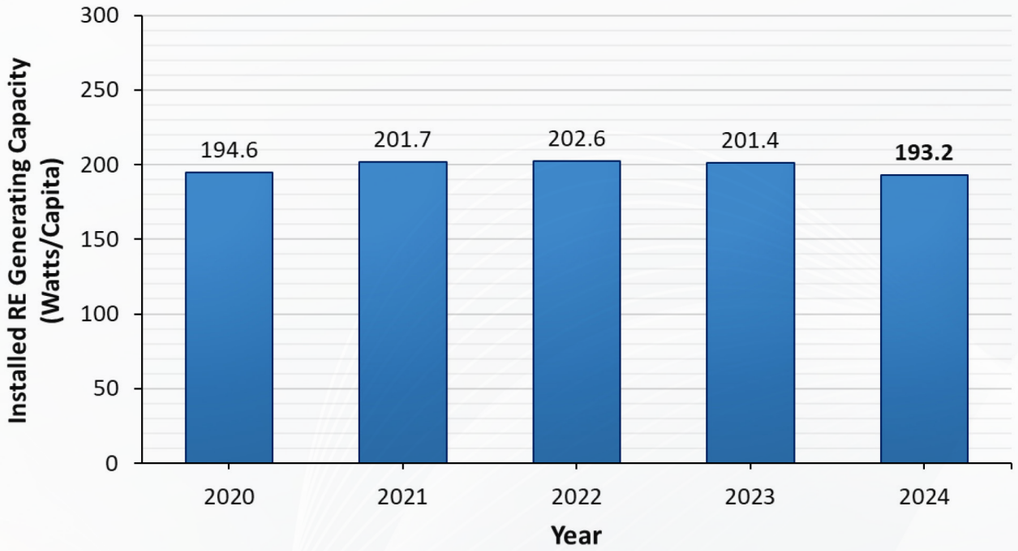


Figure 6. Five Year Timeline of Installed Renewable Capacity per Capita in Belize.

2.2.6 Regional Comparisons for Key Performance Indicators

Figure 7 compares Belize's national energy intensity[5] with regional averages as presented by OLADE's regional energy database, sieLAC[6]. It depicts Belize with consistently higher intensities for each of the reference years provided. The Caribbean region is presented to be more energy-intensive than Central America, but despite its physical location, Belize is more energy-intensive than both. Granted, there may be differences in each country or region's economic relationship with the US dollar, and the changes over time should be considered in light of a near-decade's worth of inflation. Nonetheless, this analysis should prompt a stark and in-depth consideration of Belize's economic relationship with energy. Belize consumes abundant amounts of energy for the goods and services provided, compared to our regional neighbours.

5 To ensure comparability with regional data, this iteration of Belize's energy intensity dataset incorporates GDP at current prices, instead of GDP at 2014 (constant) prices as presented in Section 2.2.1 of this report.

6 Regional data for the Caribbean and Central America were taken from sieLAC (Sistema de Información Energética de Latinoamérica y el Caribe) at https://sielac.olade.org/default.aspx (accessed on 18 July 2025).

As of right now, analysis of Belize's productive sectors is lacking to clearly identify what factors might be the root cause of the trend presented. Only the broadest conjectures are possible. The cost of energy in Belize is high (see Chapter 5: Energy Prices). The largest drivers of Belize's economic sectors are tourism and agriculture, but as these sectors grow, their energy consumption is not bound by any regulated framework or legislation with regard to energy efficiency. Furthermore, the transportation sector also consumes large swaths of the supplied energy in Belize at high costs, relative to the size of Belize's population and economy. While governance and the lack of quality data present a challenge, the information presented underscores the urgency needed to develop more concrete energy efficiency regulations, guided by a specific action plan for reducing the consumption of energy-intensive sectors.

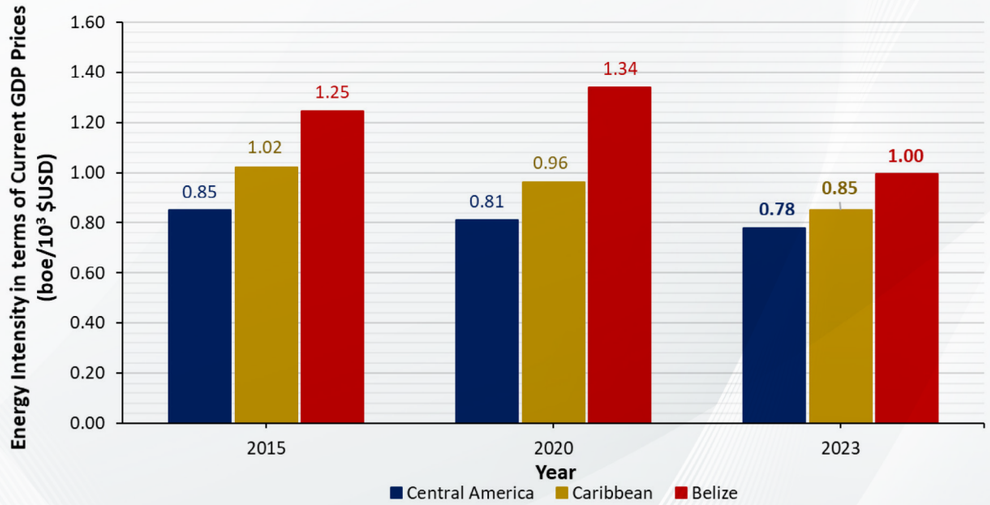


Figure 7. Regional Energy Intensity Comparison for Selected Available Years.

The comparison shown in Figure 8 illustrates Belize's renewable energy supply as a percentage of total energy supply, compared to regional averages. Belize ranks in the middle, behind Central America but ahead of the Caribbean. This result aligns with expectations, given differences in resources, population (which affects energy demand), and land area. It is notable that, despite being on the Central American mainland, Belize still has a high reliance on fossil fuels, similar to many Caribbean islands. To increase renewable energy shares and reduce fossil fuel dependence, some form of cross-border energy trade within the region is necessary to balance the differing resource potentials. A study on regional energy integration states, "The energy system in Central America can be defossilised by 2050, … through the promotion of RE, particularly solar PV and geothermal energy, and a dedicated sector coupling approach". Therefore, Belize's regional energy trade plans are becoming an increasingly important part

of its sector development strategy. This is acknowledged by Belize's National Energy Policy, which expresses interest in participating in SIEPAC (Central American Electrical Interconnection System) and notes that "Belize can benefit from an in-depth evaluation of RE penetration by its neighbours" (Government of Belize, 2023).

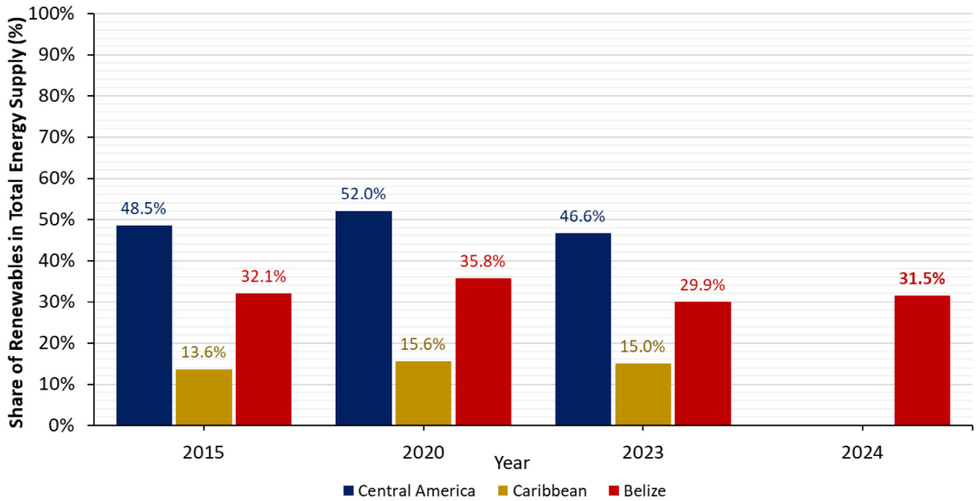


Figure 8. Regional Renewable Energy Share in Total Energy Supply.

Whereas the previous chart gave the renewable portion of the total energy supply, the data presented in Figure 9 compares the renewable proportions[7] within the electricity generation sector. Compared to the regional averages, Belize scores higher than Central America and the Caribbean (with greater differences between the Caribbean), in terms of local renewable generation. This is attributable to Belize's natural resource reservoirs (freshwater and biomass in particular), especially framed against the country's small population size. Compared to regional neighbours, Belize is well-placed for a foundation that supports a national energy transition. In one sense, the 'distance Belize has to cover' is less to achieve the goals of decarbonisation. Weaning off a dependence on fossil fuels is typically seen as a two-phase strategy: (i) make electricity the primary end-use fuel and (ii) generate electricity using renewable sources. With significant investments and long-term plans already underway towards utility-scale renewable projects (Belize Electricity Limited, 2025), the second of these two phases can be framed as 'most doable' for Belize's energy sector landscape. The first phase needs significant inroads into transforming the consumption sectors currently based on LPG, motor gasoline, and diesel, a theme with the potential for further development within the national policy.

7 For the sake of regional comparability, Belize's renewable share of electricity mix is presented here excluding electricity imports, which results in a much higher proportion compared to that shown in Section 2.2.4.

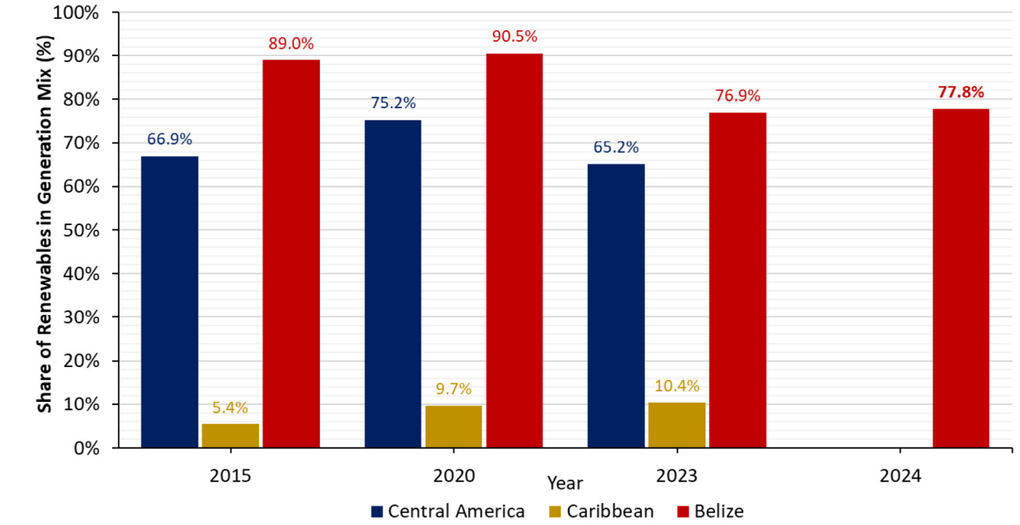


Figure 9. Regional Renewable Energy Share in Electricity Generation Mix.

3 Energy Supply and Final Consumption

3.1 Total Energy Supply

According to Ritchie, Rosado, & Roser (2020), as populations increase and more people move up the economic bracket, the demand for energy across many countries will continue to grow. While growth rates differ for various elements of the world's energy system, global energy demand grew by 2.2% in 2024, outpacing the annual average of 1.3% witnessed over the preceding decade (International Energy Agency, 2025).

At the local level, this trend is apparent, as Figure 10 illustrates steady growth of Belize's total energy supply over the last five years, reflecting a cumulative increase of over 4,000 TJ. In 2024, Belize's total energy supply rose to 19,670.5 TJ, marking a total year-on-year increase of 10.97%. The increase is significant and signals a growing national demand for energy services, possibly linked to economic recovery, population growth, extreme temperatures, and increasing electrification and fuel use.

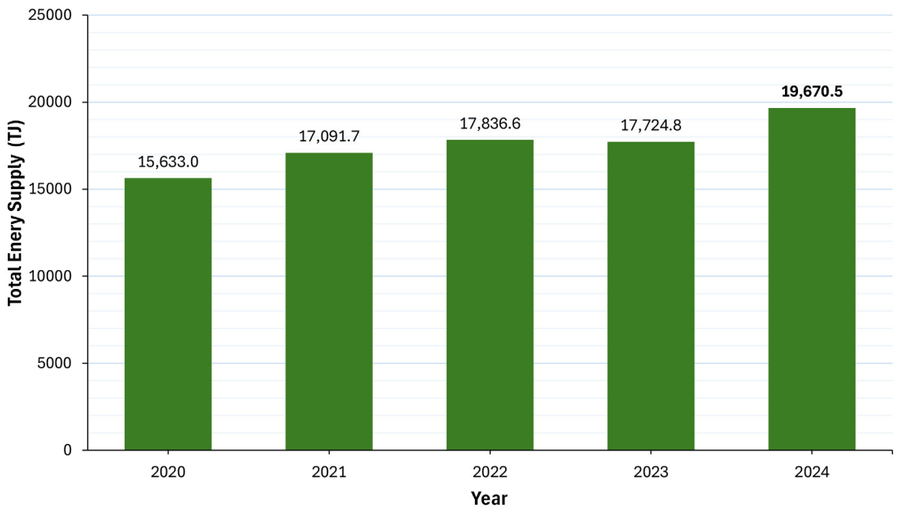


Figure 10. Belize's total energy supply over the period, 2020 – 2024.

Figure 11 provides a snapshot of Belize's total energy supply for 2024, displaying the different sources of energy and how they flow into the national system. From an indigenous perspective, renewable energy accounted for a significant portion of the total energy supply, contributing 6,201.5 TJ, while fossil fuels, which include crude oil production, accounted for a small share at 879.7 TJ.

The majority of Belize's total energy supply is from energy imports, consisting of petroleum products and imported electricity, totalling 14,057.4 TJ. This highlights Belize's energy security risks by being heavily dependent on foreign sources of energy. Notably, 2024 was marked by no energy exports; however, a significant amount of energy was allocated to international aviation bunkers, at 1,140.1 TJ.

Given the current energy supply landscape in Belize, strategic energy planning is necessary to balance the country's efforts towards energy security and climate goals while meeting the growing energy demand.

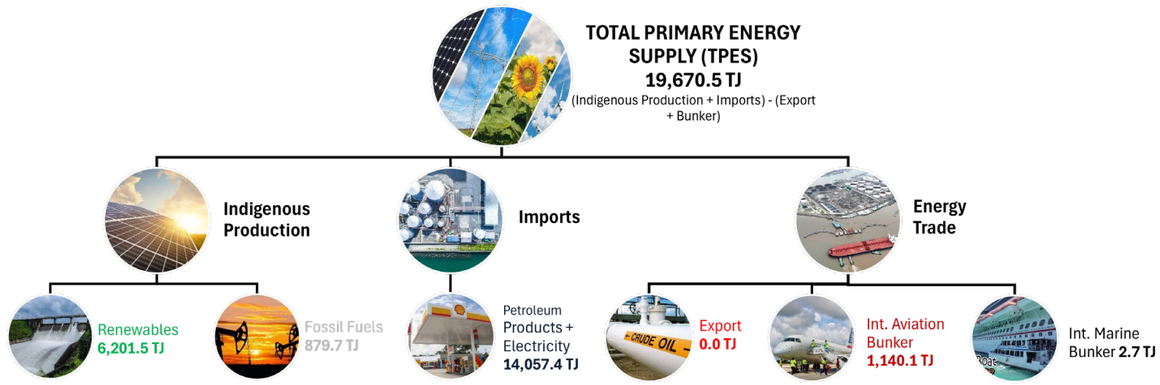


Figure 11. Snapshot of Belize's total primary energy supply for 2024.

3.2 Energy Trade Data

Belize's imports of energy-related products rose by 10.7% in 2024, totalling 14,057.4 TJ, an increase of 1,505.7 TJ over the previous year. Consistent with last year's trend, Belize's energy trade landscape is characterized by complete import dependency, marked by 100% energy imports and zero exports in 2024 (Figure 12).

This complete dependency scenario presents both critical challenges and emerging opportunities for Belize's energy and trade sectors. With energy imports constituting more than 70% of the country's total energy supply, a one-way trade flow exposes Belize to external shocks, trade deficit pressures, and limits the country's energy sovereignty, all of which can drive up domestic energy costs, affecting households, businesses, and public services (International Energy Agency, 2022).

However, this dependency also highlights a strategic opportunity. In the context of governmental commitments to transition to clean energy, Belize's current trade imbalance underscores the urgency and potential for proactive policy changes and targeted investments in local energy production systems. Advancing technological innovation centered on regional collaboration, resiliency, and renewables can help reduce import reliance while contributing to Belize's long-term energy sovereignty.

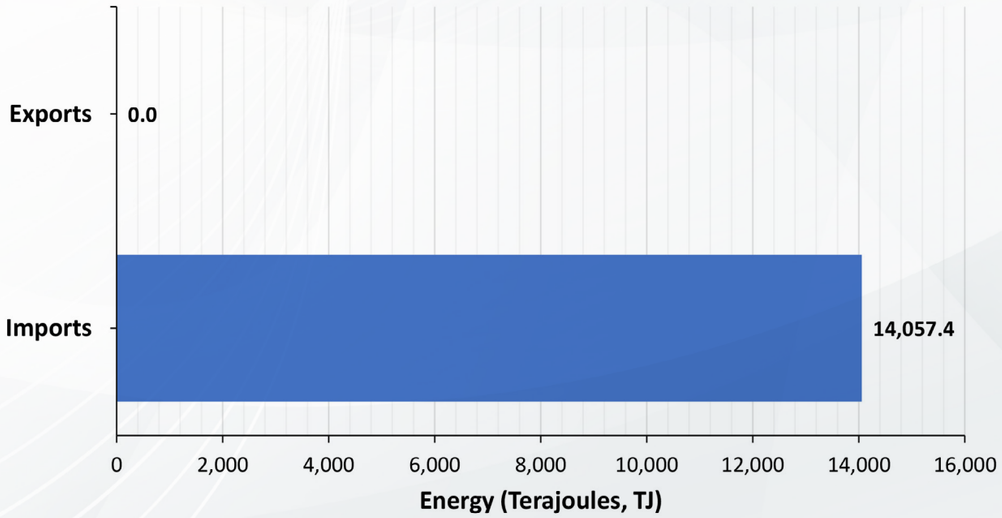


Figure 12. Belize Energy Trade Data in 2024.

3.3 Primary Energy

3.3.1 Primary Energy Supply by Fuel Type

In 2024, Belize's primary energy profile remained strongly rooted in renewable sources, accounting for a significant 87.6% of total primary energy, an increase of 2.8% from the previous year (Figure 13). Bagasse, a by-product of the sugar cane industry in Belize, continued to dominate the mix, accounting for 64.2% of the total primary energy share, followed by hydro as the second largest renewable energy primary source at 11.5%.

Firewood, an essential household energy source for cooking and heating in rural communities, accounted for 10.6% of the total. Together, these biomass sources brought the total biomass share to 74.3% of Belize's total primary energy mix in 2024, underscoring the importance of traditional fuels and agriculture in the country's energy ecosystem. Solar energy, though present, remained marginal at just 0.3%. On the non-renewable energy side, both crude oil and natural gas recorded slight declines, contributing 12.0% and 0.4%, respectively.

Overall, Belize's primary energy composition in 2024 remained relatively stable, with modest gains in hydro and firewood offsetting reductions in fossil fuel sources. Unless new fossil fuel reserves are discovered and developed, Belize's energy future is poised to remain renewable-dominated. This trend would be encouraged and reflects both the country's natural resource strengths and the growing relevance of clean energy in shaping its development path.

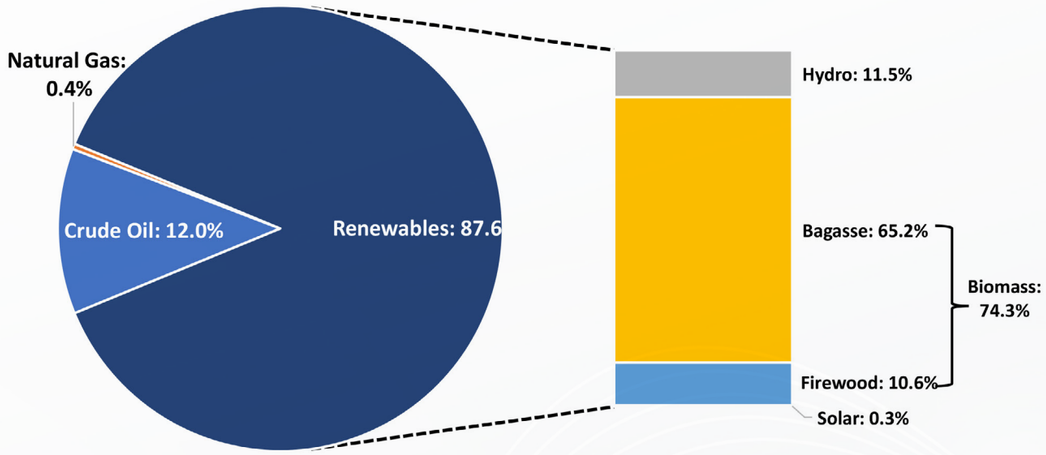


Figure 13. Primary energy supply by fuel type, 2024.

3.3.2 Crude Oil and Natural Gas Production

According to Figure 14, Belize continues to experience a decline in its crude oil and natural gas production. Across the Spanish Lookout and Never Delay oilfields, crude oil output has steadily decreased from 194,434 barrels in 2020 to 146,399 barrels in 2024. Both oilfields combined produced an average of 406.6 barrels of oil per day in 2024, down 5.88% from the previous year. Similarly, natural gas production, while showing signs of fluctuation, has dropped from 32,593.9 Mcf in 2020 to 28,426.0 Mcf in 2024. This reflects the natural depletion of Belize's developed oil fields and the absence of any major fossil fuel development activities (Geology and Petroleum Department, 2025).

Without the successful exploration and development of new fossil fuel resources, there is a connection between the downturn in oil and gas production and everyday economic impacts. The decline in production can lead to a series of tangible issues on public revenue and employment, and a resource crisis for industry partners that depend on crude oil (Andriyanova, Demyanova, & Haiyan, 2023)

Although the decline in domestic oil and gas production presents immediate challenges, it also opens the door for Belize to assess its long-term energy strategy and where to place its energy investments.

By gradually steering investments away from declining fossil fuel operations and into renewable energy, storage, and grid upgrades, Belize can enhance its resilience, reduce import reliance, and position itself on firmer ground in the face of rising demand and the global shift toward sustainability.

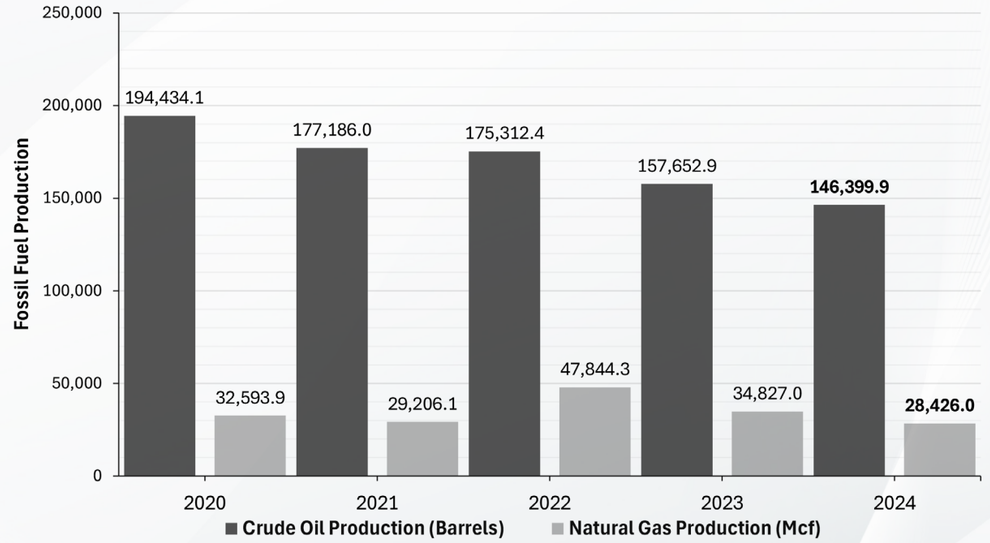


Figure 14. Timeline of Crude Oil and Natural Gas Production, 2020 – 2024.

3.4 Secondary Energy

3.4.1 Secondary Energy Supply by Fuel Type

Figure 15 provides a clear snapshot of Belize's secondary energy supply mix in 2024, highlighting a continued heavy dependence on petroleum products, which account for nearly 90% of all usable energy forms.

Gasoline and diesel are the most prominent fuels, each representing 28.9% of the supply, reflecting the country's high reliance on road transport and fossil fuel-based mobility. Diesel recorded the largest year-over-year increase in share, rising by 9.05%, which indicates growing demand across sectors. LPG at 10.8% and jet fuel kerosene[8] at 9.4%, also playing notable roles in the energy mix, driven by sustained household demand for cooking and an uptick in aviation-related activities.

Imported electricity accounted for just 10.3% of the total supply in 2024, down from 12.4% in 2023. While this slight reduction marks some progress, it underscores Belize's continued import reliance and the ongoing need to rely more on homegrown energy sources to improve Belize's long-term energy security.

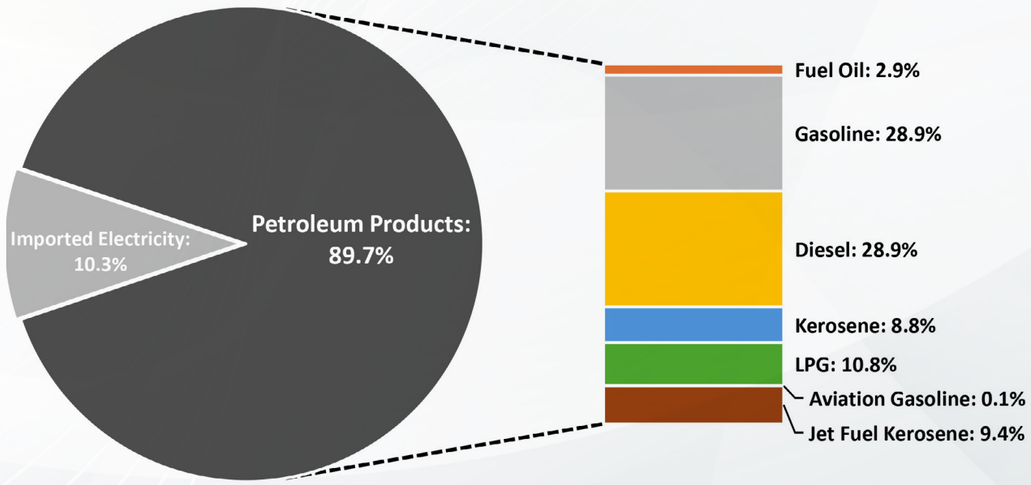


Figure 15. Secondary Energy Supply by Fuel Type in 2024.

8 Majority of the Jet Fuel Kerosene is consumed in International Flights, which is captured as "international aviation bunkers" and not included in the national total energy supply for the country. See Energy Balance section (2.1).

3.4.2 Imports of Petroleum and Gas Products

The importation of petroleum and gas products remains essential to meeting Belize's domestic energy needs. As illustrated in Figure 16, the total volume of petroleum products imports has steadily increased over the past five years, with regular gasoline, diesel, and liquified petroleum gas (LPG) standing out as the dominant refined fuels.

Regular gasoline has shown a sharp and sustained rise, surpassing diesel imports in 2022 and maintaining its lead each year since. This upward trend points to a national shift toward gasoline-powered vehicles, possibly driven by an expanding light-duty vehicle fleet and consumer preferences as transportation demands evolve. Diesel imports remain high due to their critical role in powering commercial transportation, agricultural machinery, and electricity generation. However, diesel has shown slower growth rates compared to gasoline, suggesting subtle shifts in national consumption patterns.

At the same time, LPG (measured in kilograms on the secondary axis) and jet fuel kerosene have both experienced steady growths. This reflects wider use of LPG in households and businesses, as well as increased activity in aviation-related activities.

The overall rise in nearly all fuel types (except premium gasoline) highlights Belize's growing energy demand, and with it, the country's deepening reliance on imported petroleum products. From a policy and planning perspective, the data emphasizes Belize's growing exposure to global price volatility and supply disruptions that can impact national energy security. To support long-term resilience, it is increasingly important to accelerate the transition toward cleaner, more sustainable energy solutions.

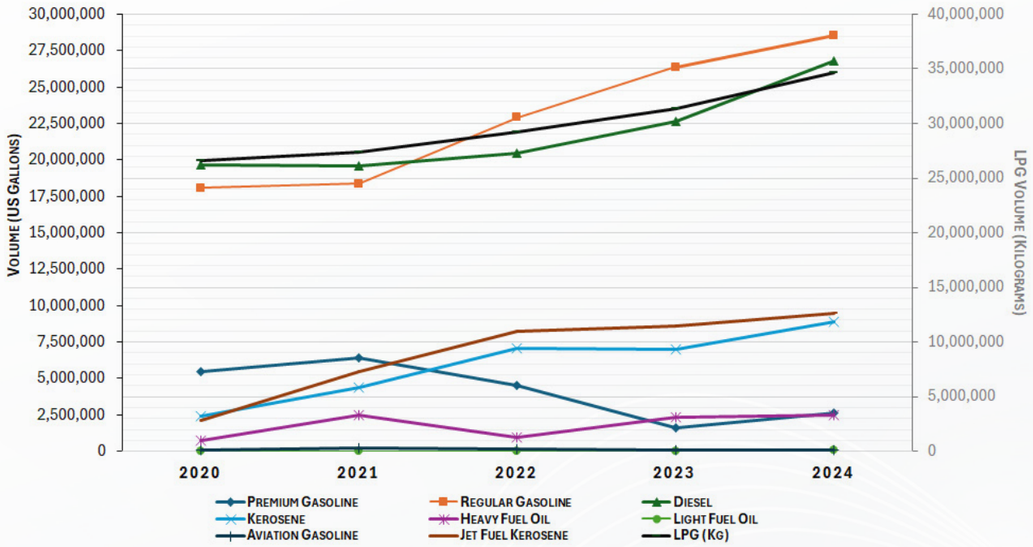


Figure 16. Importation of Petroleum Products, 2020 – 2024.

3.5 Final Consumption

According to the United Nations Statistical Division (2023), total final consumption refers to "all fuel and energy that is delivered to users for both their energy and non-energy uses which do not involve a transformation process". Under the reporting definition of this report, non-energy use, consisting of the use of energy products as raw materials for the manufacture of products outside the scope of energy statistics, as well as for direct use that does not involve using the products as a source of energy, is not included in final consumption.

The amount and mix of energy consumption by country depends on the state of economic and technical progress in different industries and from various energy sources (Ritchie, 2022).

3.5.1 Total Final Consumption, by Fuel Type

Figure 17 presents an overview of the types of fuels consumed in Belize in 2024, offering insight into the country's energy mix at the final consumption level.

Petroleum-based fuels continue to dominate the national energy consumption profile, with motor gasoline (4,107.63 TJ) and diesel (3,296.01 TJ) leading national energy use.

This reflects Belize's strong dependence on fossil fuels, particularly for transportation. LPG (1,533.52 TJ) and kerosene (1,259.69 TJ) also show significant levels of use, confirming the ongoing role of imported fuels in meeting commercial and household energy needs. In addition to fossil fuels, electricity use is substantial and ranks third overall in final consumption (2,627.99 TJ). This means that electrified end-use applications are central to Belize's energy demand.

In contrast, renewable energy sources make only a minimal direct contribution to final energy consumption. While they are used for electricity generation, they are not widely applied at the point of use[9]. One exception is firewood, a traditional biomass fuel, which accounted for 747.93 TJ. Used directly for cooking and space/water heating in rural households, firewood represents the primary renewable energy source in Belize's final energy use mix.

Overall, Belize is a nation still heavily reliant on petroleum-based fuels, with electricity and LPG as notable secondary sources.

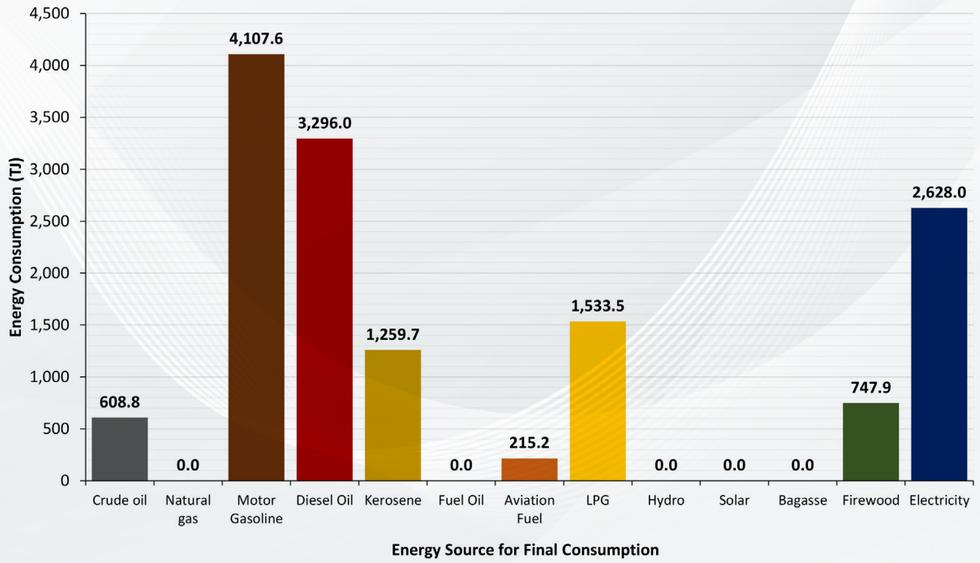


Figure 17. Belize's final energy consumption by fuel type for 2024.

9 For a renewable energy source to be counted under final energy consumption, it must be used directly by end users without being transformed into electricity or other energy carriers.

3.5.2 Total Final Consumption, by Sector

Figure 18 presents Belize's final energy consumption across the industrial, transportation, residential, commercial and public services, and agriculture/forestry sectors. The transportation sector is Belize's largest energy consumer, accounting for 52.9% of total final energy use. It also relies most heavily on fossil fuels, with liquid fuels making up the majority of energy used in transport.

The residential sector follows as the second-largest user, consuming 31.8% of all energy supplies consumed. LPG for cooking and electricity for household use make up the bulk of residential energy consumption.

Next, the commercial and public services sector follows with 10.7% of final energy consumption. The industrial and agricultural/forestry sectors together account for only a small share, 3.1% and 1.6% of total consumption, respectively. This is largely because Belize lacks heat and energy-intensive manufacturing processes that typically make the industrial sector the top global energy consumer (Diversegy, 2024).

Combined, transportation and residential use made up 84.7% of Belize's total energy consumption in 2024. This supports prioritizing these sectors for energy transition efforts focused on fuel switching and improved efficiency (Brown, 2018). As noted in Section 3.5.1, the use of renewable energy at the consumption level remains limited. This highlights major opportunities to expand clean energy use, especially in the transport and residential sectors. These measures can support Belize's broader shift toward a more sustainable and resilient energy system.

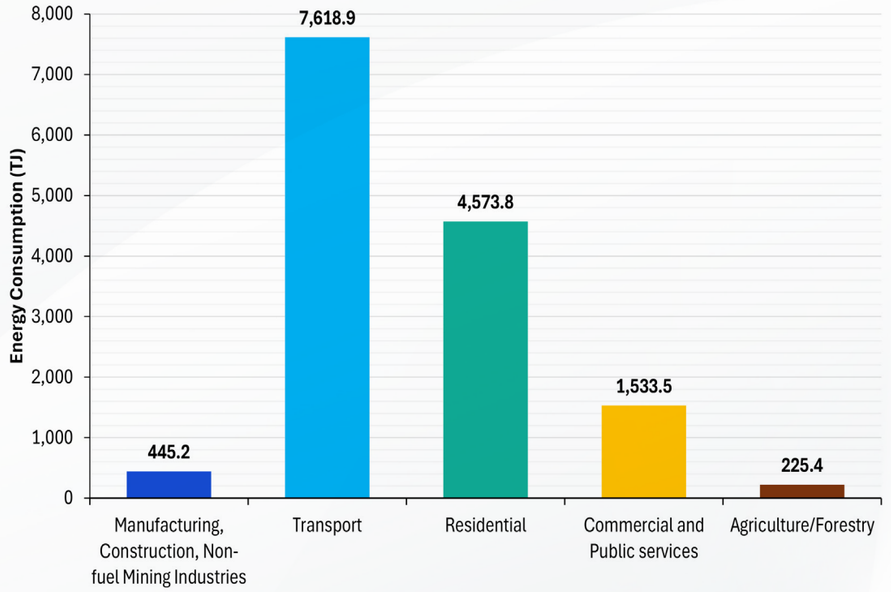


Figure 18. Total final energy consumption by sector, 2024.

3.5.3 Gross Electricity Consumption, by Sector

According to the International Energy Agency (2025), "Global electricity demand increased by 4.3% in 2024, with electrification picking up across sectors, raising electricity demand in most major economies". In Belize, the share of electricity in final energy consumption increased slightly, rising by 7.04% in 2024 compared to the previous year.

Figure 19 outlines trends in Belize's electricity consumption across four key end-use categories[10]: Commercial, Residential, Industrial, and Street Lighting. The commercial sector continues to lead electricity consumption by a wide margin, using 367.6 GWh in 2024, representing a 5.75% year-over-year increase. Residential use also showed a steady upward trend, with the largest year-on-year increase among sectors at 11.85%, reaching 280.3 GWh. The surge in electricity consumption reflects several contributing factors: population growth, wider household access to electricity, increased air conditioning use (amplified by a 2024 heatwave), and rising demand from commercial operations, particularly the expanding business process outsourcing (BPO) sector (Gonzalez, 2024).

10 Data reflects electricity final energy consumption within BEL's national grid and the Spanish Lookout Grid (FLPC), based on the customer tariff classifications established by BEL.

In contrast, industrial electricity use remains comparatively low and fluctuates more, rising slightly to 35.2 GWh in 2024. This suggests the limited scale and variable performance of energy-intensive industries in Belize. Street lighting consumption has held relatively steady, declining marginally to 22.1 GWh in 2024. As communities grow across Belize, the demand for public lighting is expected to rise, further increasing electricity needs for this service.

Overall, Figure 19 demonstrates rising national electricity demand, driven primarily by the commercial and residential sectors. These trends highlight the importance of continued investments in efficient, reliable energy infrastructure to meet growing needs.

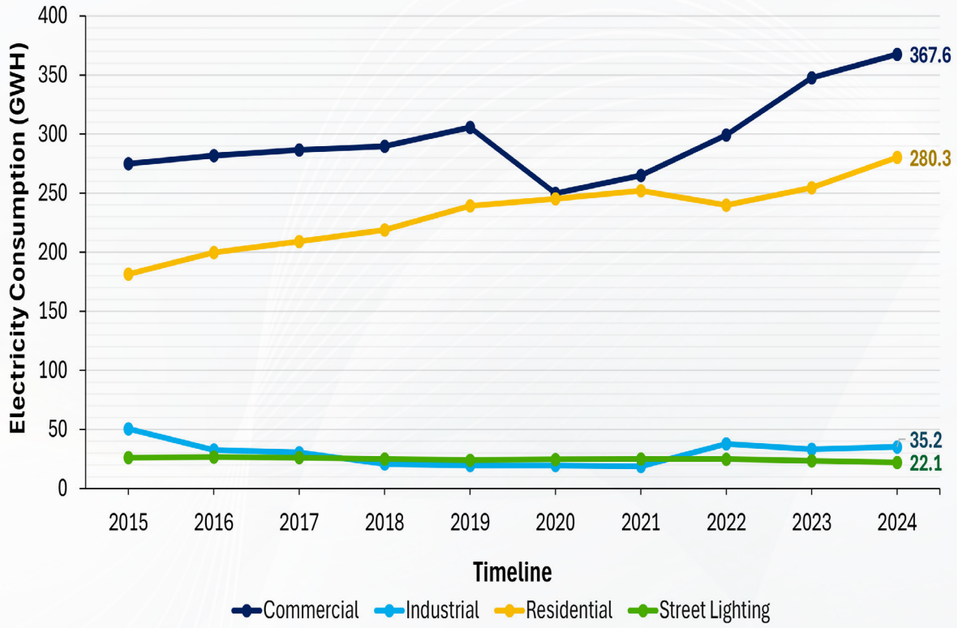


Figure 19. Belize's electricity consumption trend across key end-use categories.

4 Electricity Sector

4.1 Electricity Purchase and Sales

The process of electricity purchases and sales is a critical component of Belize's electricity market, ensuring demand across the grid is balanced and a stable supply of power is achieved.

Belize Electricity Limited (BEL) is the primary national electricity utility company in Belize, responsible for generating, transmitting, distributing, and supplying electricity throughout the country. BEL is a privately operated entity where the majority of the shares are owned by the Government of Belize. As the primary national utility in Belize, BEL plays a critical role in ensuring a reliable electricity supply while driving the development and maintenance of Belize's electrical infrastructure. Components of BEL's operational and business model include the importation of electricity from the Comisión Federal de Electricidad (CFE) in Mexico and power purchases from independent power producers (IPPs) within Belize, including both renewable and non-renewable thermal sources.

Within Belize's electricity market, the Farmers Light Plant Corporation (FLPC) is another key player. FLPC is a small electricity producer supplying power to the Spanish Lookout Community in western Belize, known for its agricultural and industrial activities. To note, FLPC operates independently from BEL, contributing to the localized electricity market and ensuring a reliable power supply within the community. Together, these two organizations are responsible for the management of Belize's electricity supply, ensuring energy needs are met across diverse sectors and regions of the country.

In 2024, the national electric utility purchased 755.89 GWh of electricity, representing a 6.2% increase compared to 2023. BEL electricity sales in 2024 reached 705.23 GWh, marking a 6.9% increase compared to the previous year[11]. In 2024, FLPC produced 24.8 GWh of electricity, of which 22.5 GWh were sold to consumers. This reflects a 13% increase compared to 2023. This is in line with increased energy demand to meet customers' needs.

11 See section 3.5.3 above for breakdown of electricity sales by customer classes.

Electricity production increased by 8.3% in 2024 due to improved generation capacity and higher local demand. Sales followed a similar trend, rising by an average of 9.9% compared to the previous year. Electricity purchases and sales in 2024 reflect the ongoing transformation of Belize's energy sector, with growing domestic generation capacity to meet higher local demand and to reduce reliance on imported electricity, paving the way for a more secure and sustainable electricity market.

4.2 Installed Electricity Generation Capacity

In 2024, Belize's total installed electricity generation capacity stood at 224.8 MW, reflecting a mix of domestic generation and imported electricity (Figure 20) (see Appendix B: Detailed Tables, 1 for more information). Of this total, 169.8 MW was local capacity, while 55 MW came from imports, primarily from the Comisión Federal de Electricidad (CFE) in Mexico. This means that imports accounted for 24.5% of Belize's total capacity, a level of dependency that exposes the country to risks such as price fluctuations, supply instability, and geopolitical pressures. The impacts of this vulnerability became evident during the energy supply crisis in 2024 (see section 4.10 for more details).

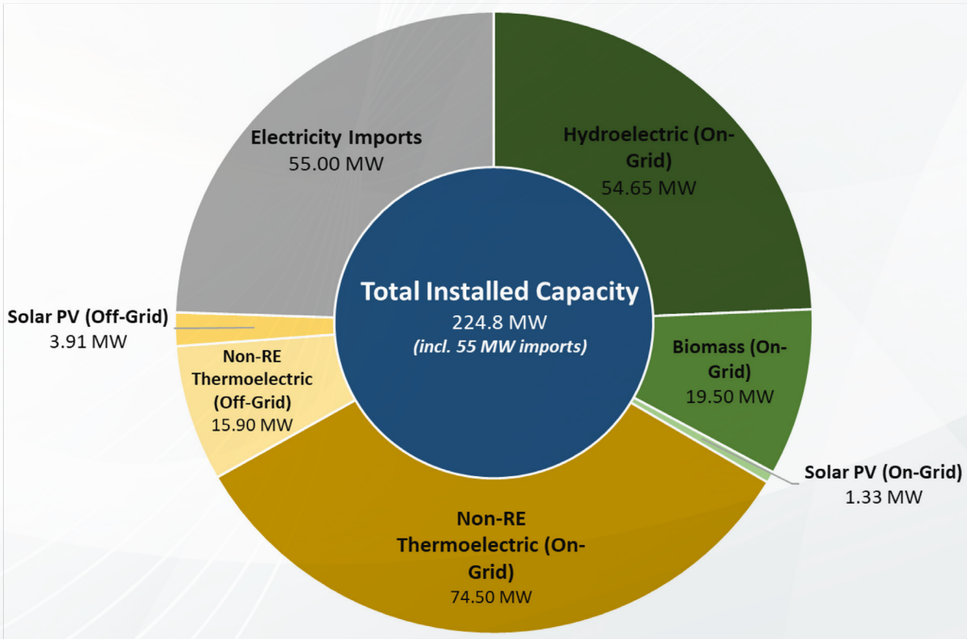


Figure 20. Breakdown of Installed Electricity Generation Capacity (MW) in 2024.

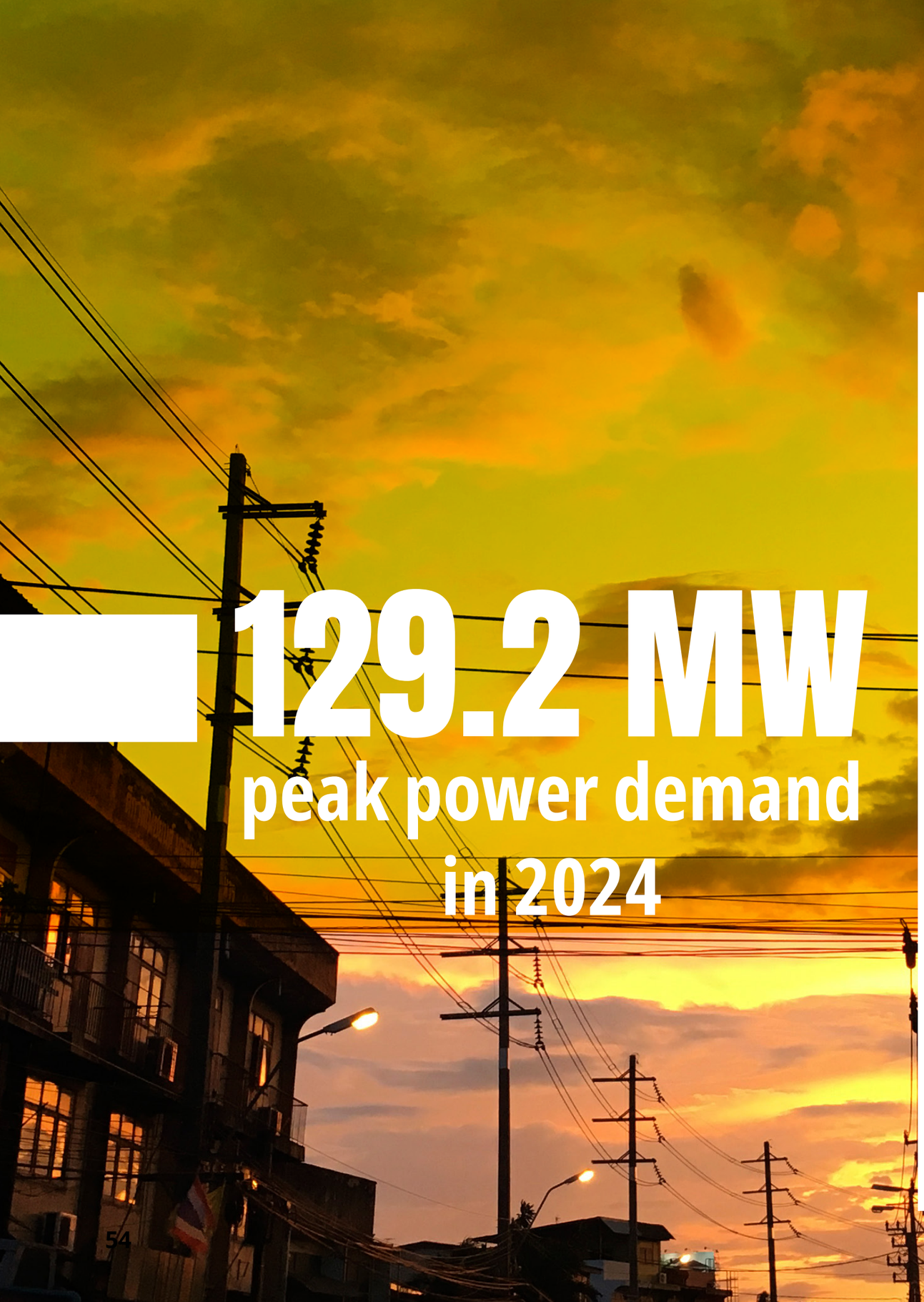
Belize's domestic electricity generation capacity is a balanced mix of renewable and non-renewable sources. Renewable energy, including hydroelectric, biomass, and solar PV, provided a combined capacity of 79.4 MW, representing 46.7% of in-country generation and 35.3% of total installed capacity.

On the non-renewable side, generation from on-grid and off-grid thermoelectric plants totalled 90.4 MW, making up 53.3% of domestic capacity and 40.2% of the overall total. Two major developments in 2024 significantly influenced non-renewable capacity:

1. *BEL's Westlake Gas Turbine facility was upgraded in the second quarter of 2024, increasing the plant's generation capacity to 30MW from its previous maximum of 19MW.*
2. *A new gas turbine facility on Ambergris Caye came online in the fourth quarter of 2024, further expanding non-renewable capacity.*

Belize's electricity sector, while reasonably diversified, remains heavily reliant on imported and non-renewable energy. This reliance heightens exposure to fuel price volatility and environmental concerns. Although renewable energy already accounts for 35% of total installed capacity, there is clear growth potential, particularly in expanding solar and wind generation. Recognizing the need for a more balanced approach, the Government of Belize has already initiated strategic projects aimed at expanding utility-scale solar photovoltaic (PV) generation and deploying battery energy storage systems (BESS). These investments are designed to align future capacity expansion with the country's renewable energy targets and climate commitments.

Expanding renewable capacity, coupled with strategic upgrades to generation infrastructure, presents an opportunity to enhance energy security, reduce vulnerability to external shocks, and support a more sustainable and resilient electricity sector.



4.3 Peak Electricity Demand

Following the sharp surge in peak electricity demand in 2023, peak power demand reached a record high of 129.2 MW in 2024, representing a 33.5 MW (or 35%) increase over the 2015 baseline (Figure 21). This sustained growth trajectory stems from multiple concurrent drivers: increased commercial activity (see section 3.5.3), population growth, swift urban development patterns, climate-induced temperature pressures, and widespread adoption of electric technologies across developing infrastructure projects. The scale and pace of this growth underscore the evolving dynamics within Belize's energy sector.

Belize's energy sector is entering a phase of rapid transformation, navigating operational challenges and promising development pathways. The steady increase in peak demand has exposed critical infrastructure limitations, particularly during the 2024 supply shortages that underscored the urgent requirement for local generation capacity enhancements. Forward projections indicate this upward demand trend will persist, creating viable prospects for modernized grid technologies, scaled renewable energy installations, and optimized generation assets.

To address the immediate demand surge, Belize expanded its generation capacity in 2024 by upgrading and introducing non-renewable thermal plants, a decision that, while necessary in the short term, conflicts with the country's long-term sustainability goals.
Moving forward, Belize's energy policy must prioritize strategic, long-term planning to implement forward-looking infrastructure strategies that balance reliability requirements with climate resilience imperatives. Prioritizing renewable integration, grid hardening measures, and capacity buffer development will prove essential for maintaining stable power delivery amidst escalating demand and intensifying environmental pressures.

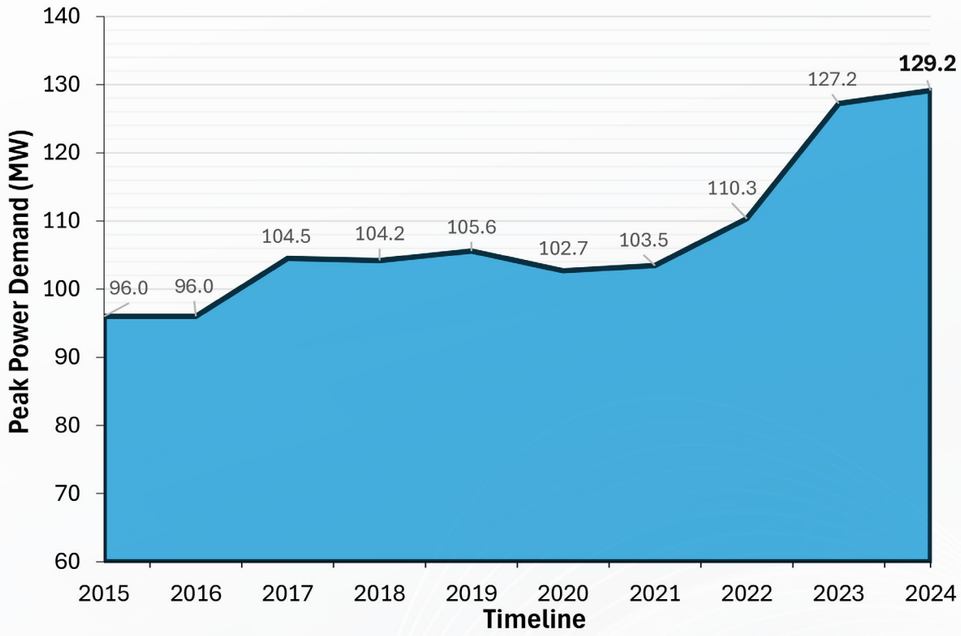


Figure 21. Timeline of Peak Electricity Demand, 2015 – 2024.

4.4 Gross Electricity Production

Over the past decade, Belize's gross electricity generation has increased by 37% following a general upward trend, from 672.7 GWh in 2015 to 922.2 GWh in 2024 (Figure 22). While generally increasing, there were modest annual increases within the first half of the last decade (2015 to 2019), followed by an evident decline in 2020, with a direct link to the economic impact of the COVID-19 pandemic. Gross generation levels then began to rebound in the subsequent years, driven by rising electricity demand linked to economic recovery activities and sector expansion as economies opened with a principally amplified energy appetite. From 2022 onward, gross generation rose significantly, reflecting substantial growth in electricity consumption among multiple sectors as a result of various factors, including the impact of climatic conditions, leading to a significant increase in cooling demand.

This trend underscores the need to bolster national generation capacity, given the large growth in demand currently being faced. In 2024, large critical infrastructure projects (power plants) were implemented within the electricity sector to meet the growing demand. Current projections stress that electricity demand will continue to increase exponentially, underscoring the importance of continued investment in diversified and resilient electricity generation sources to meet Belize's growing energy needs.

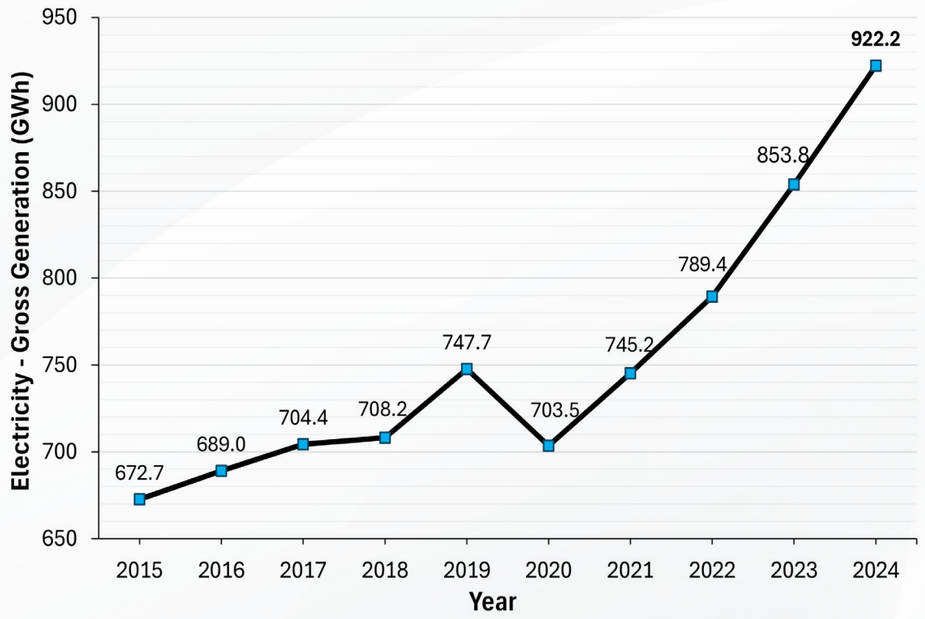


Figure 22. Historical Timeline of Electricity Gross Generation in Belize (2015 – 2024).

4.5 Electricity Production by Fuel Type

Figure 23 illustrates Belize's electricity mix over the last five years, emphasizing that electricity production in Belize comes from a mix of energy sources, both local and imported. The largest contributor to Belize's electricity mix is electricity imported from Mexico (CFE). In 2021 and 2023, imported electricity spiked, indicating Belize's heavy reliance on imported electricity. These spikes often occur when local sources, especially hydro and bagasse, are hindered by climate change-induced drought conditions or maintenance-related disruptions. In its current form, Belize's electricity sector can be subjected to unpredictable and sometimes more expensive energy, especially during regional energy shortage scenarios.

Despite this dependency, Belize has made significant strides in local renewable energy production. Notably, Belize has maintained strong generation from hydro and biofuel sources. Solar PV generation, though modest, has steadily increased each year, from 0.6 GWh in 2020 to 5.9 GWh in 2024, showcasing its untapped potential for the future in Belize's electricity market. On the other hand, non-renewable fossil fuels remain a part of the country's electricity mix, with diesel notably increasing its share of generation in the last few years. Nonetheless, the goal is to ideally decrease the amount of electricity generated from non-renewable sources over time while ensuring the reliability of the system remains secure.

Let's move beyond seeing energy as just a switch on the wall. Instead, we should understand it as part of a complex system that requires thoughtful planning and sustained investment to ensure all Belizeans have access to affordable, reliable, and sustainable electricity.

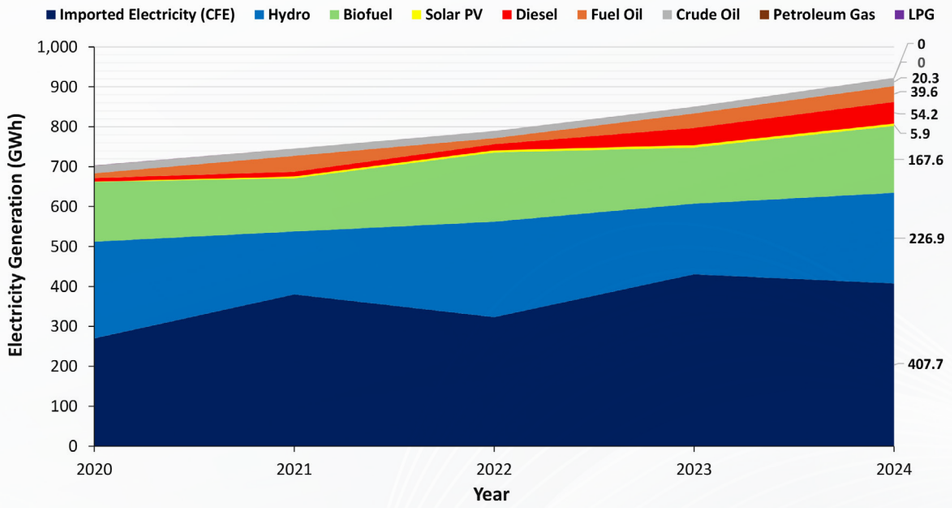


Figure 23. Electricity Generation by Source in Belize (2020 – 2024).

4.6 Electricity Production by Plant Type

Belize's electricity production relies on a mix of energy sources, resulting in a variety of power plant types that each contribute uniquely to the national grid. As depicted in Figure 24, hydroelectric plants in Belize have remained the largest local generation source, with their production exhibiting fluctuations over the years. These variations are likely due to changes in precipitation and river conditions, which have a direct impact on hydropower generation. Combined Heat and Power (CHP) plants, primarily powered by biomass (bagasse), have shown a steady contribution to electricity production in Belize and tend to follow similar production trends as hydroelectric plants, as both depend on seasonal or climatic factors.

Solar PV, while still contributing a small portion, represents a growing opportunity to expand clean energy through utility-scale and distributed generation systems. As technology advances and investment increases, solar energy is poised to become a more significant part of Belize's energy future, reinforcing the country's commitment to using renewable and locally available resources.

However, petroleum-based plants continue to play a critical role in maintaining base load capacity, especially during periods of high demand or when local renewable energy output is low. This was particularly evident in 2024, when new installations and plant upgrades were introduced to meet rising electricity needs.

As shown in Figure 24, fluctuations in generation from 2020 to 2024 demonstrate how external factors, such as climate variability and fuel supply shocks, and internal factors, such as maintenance issues, can influence the reliability of specific generation types. For the Government of Belize and its energy partners, this underscores the urgency of diversifying energy sources and investing in climate-resilient infrastructure. Moving towards a low-carbon economy in Belize will require continued innovation in solar applications, modernization of hydroelectric capacity, and efficiency improvements in petroleum-based plants.

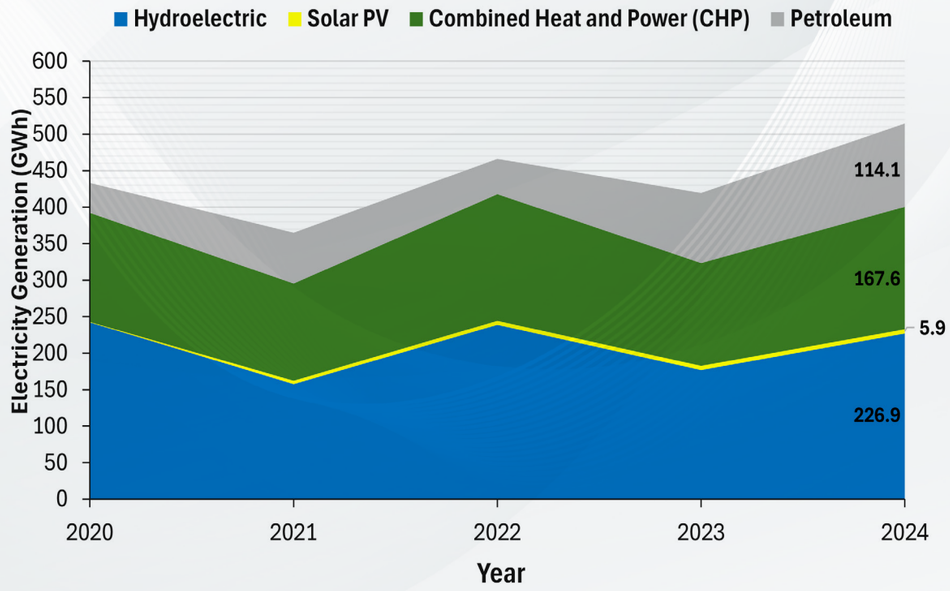


Figure 24. Electricity Generation by Plant Type in Belize (2020 – 2024).

4.7 Share of Electricity Production by Source and Fuel Type

In 2024, Belize's electricity generation landscape (Figure 25) showcased a heavy reliance on imported electricity, accounting for the largest share of total electricity supply, at 44.2%. This clearly illustrates the ongoing challenge Belize faces in meeting domestic energy demand through local generation alone.

Within the local generation mix, hydroelectric generation remained the dominant source of electricity at 24.6%, followed by biofuel generation (bagasse) at 18.2%. Together, hydroelectric and biofuel generation accounted for over 40% of the total electricity supply, reflecting Belize's strong commitment to renewable energy. Nonetheless, it must be noted that seasonal and operational limitations can hinder the full utilization of these resources. Notably, Solar PV, while present in the electricity mix, contributed less than 1%, highlighting significant untapped potential for clean energy diversification at the local level.

Carbon-based energy sources, diesel, fuel oil, and crude oil collectively contributed 12.4% of the national electricity mix in 2024. Given their role as critical backup or during peak demand, these fossil fuel sources add flexibility to the grid, albeit at a cost. These fuel sources are known to introduce volatility in generation cost and environmental impacts due to their carbon-intensive footprint and import-dependent nature.

Overall, Belize's electricity system is diversified yet vulnerable. This requires a careful balancing act: expanding local generation capacity, particularly renewable energy, while ensuring grid reliability. At the same time, Belize must work to reduce its dependency on imported energy to strengthen national energy security.

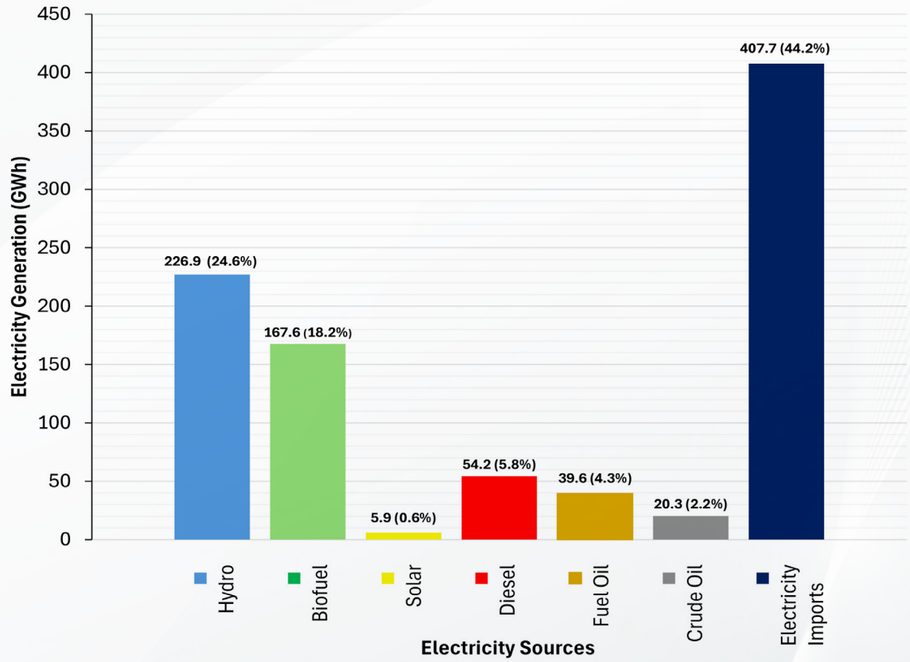


Figure 25. Annual Electricity Production by Source, 2024.

As in previous years, Belize's electricity supply in 2024 reflects both progress and dependence (Figure 26). Renewable sources, hydroelectric, biomass, and solar, accounted for 43.4% of the total electricity supply, while fossil fuels contributed 12.4%. The largest portion, at 44.2%, came from electricity imports from Mexico's CFE.

From a sustainability perspective, Belize's strong renewable energy share underscores its commitment to clean energy sources. Nonetheless, the country remains heavily reliant on imports, exposing a critical vulnerability to external supply disruptions. Non-renewable energy sources, though limited in use, play a minor role in supporting the local generation mix, especially during local shortages.

Overall, this electricity generation profile illustrates Belize's continued push toward sustainability but still constrained by structural reliance. This signals a call for investment in grid resilience, more local generation capacity, and a more diversified renewable energy portfolio to buttress the country's energy future and reduce long-term risk.

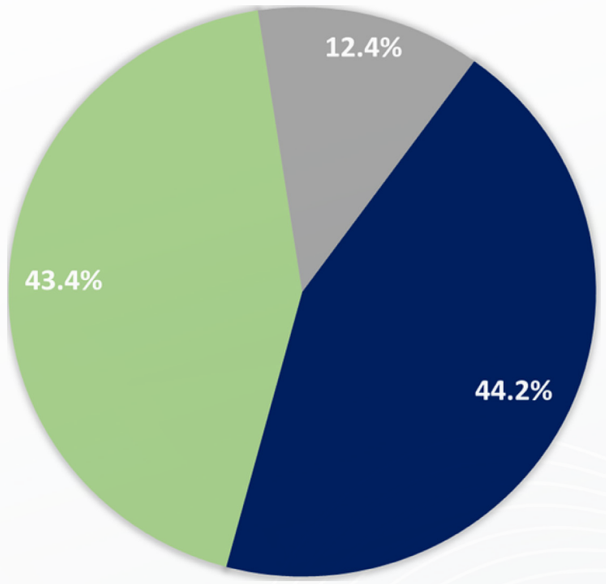


Figure 26. Share of Electricity Supply by Type, 2024.

4.8 Electricity Export and Import

The timeline of electricity imports from 2015 to 2024 reveals a clear trend: Belize has become increasingly dependent on imported energy (Figure 27). Electricity imports have nearly doubled over the past decade, rising from 255.0 GWh in 2015 to a high of 430.7 GWh in 2023, before slightly dipping to 407.7 GWh in 2024. That small decline is not a sign of lasting change but instead may reflect the effects of a major energy supply crisis that shook the electricity sector[12].

In 2024, Belize faced an abrupt and prolonged reduction in electricity supply from CFE, at a time when in-country generation capacity was unable to cover the gap. According to Riviera Maya News (2024), a CFE representative explained that external and internal constraints had unbalanced their electrical system and limited their ability to export power, thus leaving Belize with a significant shortfall. The reality is that when local generation falls short or demand spikes, Belize must turn to external sources and when both fall short, electricity must be rationed (as was the case in 2024, see section 4.10). As shown in Figure 27, the fluctuation in imports reflects a complex interaction between domestic generation, shifting energy needs, and regional grid dynamics.

12 See section 4.10 for more details.

Belize's dependence on imported electricity has far-reaching implications. As Muhammed et al. (2025) warn, energy security risks tied to supply disruptions, volatile markets, and geopolitical shifts can directly affect national economies, and by extension, households, and businesses. The prospect of rising costs, supply uncertainty, and grid instability is a real concern for Belizeans.

To move forward, enabling policy and regulatory frameworks will need to be adjusted to pivot toward self-reliance, a national priority. Adaptive policy, backed by both public and private sector commitment, is critical for achieving energy security for Belize.

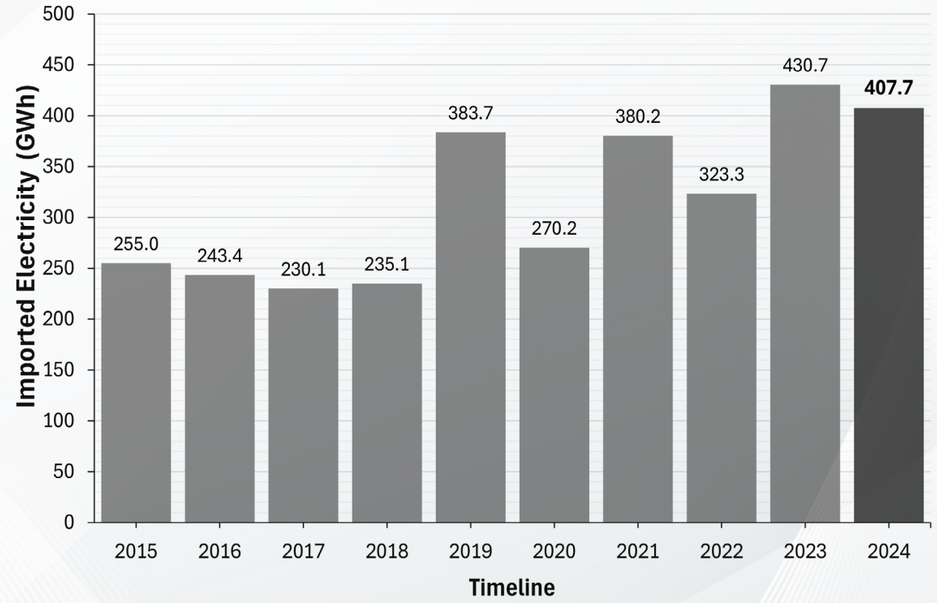


Figure 27. Historical Timeline of Electricity Imports in Belize, 2015 – 2024.

4.9 Electricity Losses

Electricity system losses refer to electrical energy lost during transmission and distribution (technical losses), as well as through fraudulent use of electrical energy (non-technical losses). Figure 28 illustrates trends in electricity system losses from 2015 to 2024[13] and tracks Belize's progress towards its NDC target of reducing these losses to 10%. Over the past decade, system losses have consistently hovered above 11%, peaking at 12.8% in 2021, and closing at 12.6% in 2024. While differences from year to year may appear minor, the overall trend remains persistently above the NDC target of 10%, set in 2021. Despite grid modernization efforts, Belize has yet to reach or maintain this benchmark.

13 National grid refers to main electrical grid in Belize under the administration of Belize Electricity Limited.

According to Niste, Pavel, Tîrnovan, Beleiu, & Misaros (2025), “On average, electricity losses in the networks of a system vary between 10% and 15% of the total electricity production”. In the context of Latin America and the Caribbean, losses above 15% are classified as high, based on assessments by the World Bank and Inter-American Development Bank (IDB) (World Bank, 2017). These classifications are consistent with global benchmarks from the International Energy Agency (IEA) and the International Renewable Energy Agency (IRENA), where losses under 10% are considered efficient, 10-15% moderate, and above 15% high (International Energy Agency, n.d.; International Renewable Energy Agency, 2019).

Based on this scale, Belize’s system losses are currently in the moderate range. However, that doesn’t mean they’re insignificant. Losses at this level reduce efficiency, may have implications on the finances of the national grid operator, and undermine the country’s progress toward its climate and energy transition goals. Addressing system losses isn’t a quick fix. It requires sustained investment in infrastructure upgrades, enforcement of loss-reduction protocols, and the integration of modern solutions such as smart grid technologies.

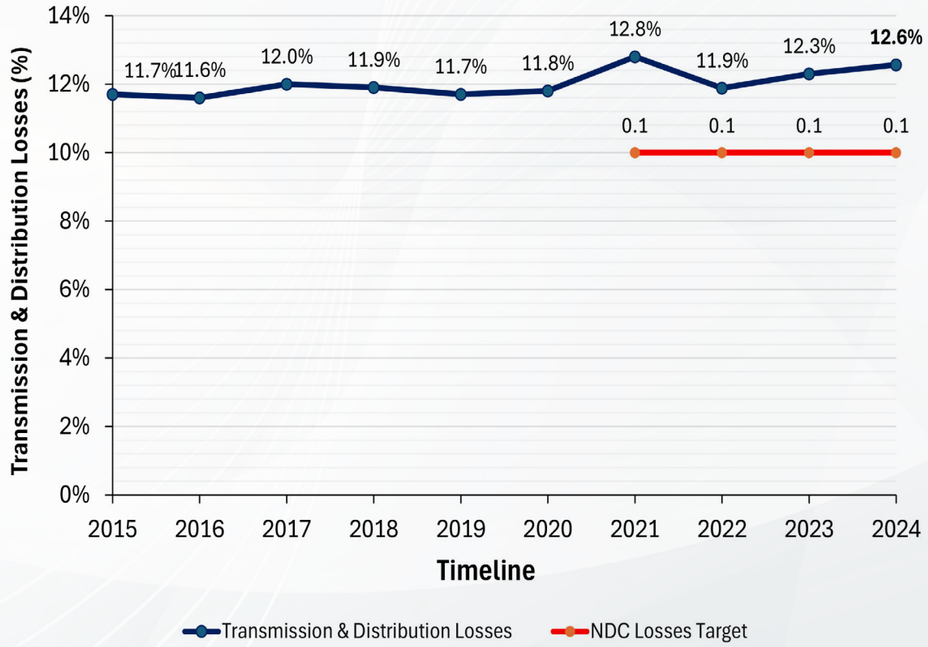


Figure 28. Timeline of Electricity System Losses in Belize, 2015 – 2024.

4.10 Energy Supply Crisis in 2024

In 2024, Belize faced an unprecedented electricity supply crisis, underscoring key vulnerabilities within its power system to respond to sudden external disruptions. The crisis, which began in April, was marked by a sharp curtailment in imported electricity from Mexico’s CFE, coupled with limitations in Belize’s domestic generation capacity. These pressures culminated in rolling blackouts across several districts and communities and prompted immediate emergency measures with a reignited focus on energy security, infrastructure resilience, and renewable energy development.

4.10.1 Background and Electricity Supply Context

In 2024, imported energy from Mexico accounted for the largest share of electricity at 44.2% (407.7 GWh) of the total supply. According to BEL (2024), CFE has been their most reliable source of power to date and continues to supply Belize with power during periods of seasonality and intermittency from renewable energy sources linked to climatic conditions and industry timeline, such as in the case of sugar production.

However, this dependence on imports has long been recognized as a vulnerability, particularly in the face of climate impacts, global energy market volatility, and infrastructural delays. Belize’s renewable energy contribution has experienced fluctuations over previous years, due in part to climatic variability affecting water levels and agricultural production and/or maintenance-related disruptions. This shift increased dependence on external electricity imports, a dependence that became a key vulnerability when upstream supply constraints emerged.

As noted by the International Energy Agency (2020), the electricity system is witnessing increasing pressure from climate change with significant implications for electricity security. From impacts on generation to transmission and distribution networks, along with an expected increase in demand for cooling, the adverse impact of a changing climate is increasing the likelihood of climate-driven disruption to the electricity sector, especially in tropical and coastal countries like Belize.

4.10.2 Crisis Onset and Immediate Effects

The supply crisis was triggered by an unexpected and sustained reduction in electricity imports from CFE. BEL confirmed this development in a press release on April 19, 2024, titled "BEL Experiences Temporary Generation Shortages due to Curtailment of Supply from CFE", which confirmed BEL's inability to fully meet demand for power between 7:30 pm to 9:00 pm on April 18, 2024. CFE cited high temperatures, drought conditions, scheduled maintenance, and equipment malfunctions within its grid as contributing factors (Riviera Maya News, 2024). This external limitation coincided with in-country shortfalls, including maintenance delays at BEL's Westlake gas turbine facility and the absence of additional generation capacity needed to meet rising demand.

As a result, this marked the beginning of widespread rolling blackouts across major load centers in Belize.

Load shedding was implemented as a short-term grid stabilization strategy and to manage peak-hour deficits. The load shedding strategy, while disruptive, was a necessary short-term measure to avoid widespread system failures.

4.10.3 Underlying Contributing Factors

Several interrelated challenges compounded the crisis:

- **Import Constraints from Mexico:** According to Riviera Maya News (2024), the Corporate Director of Strategic Planning of the CFE, Juan Antonio Fernández Correa, reported that "Unusual extreme temperatures caused by atypical heat waves and droughts impacted energy production. In addition, the generation units were in a natural maintenance process, and certain failures were reported in power plants that caused the electrical system to become unbalanced". As a result, CFE was faced with generation supply constraints to meet its demand; thus, it impacted its ability to supply energy to Belize, leading to a shortfall. BEL's reliance on CFE during a period of limited domestic supply heightened Belize's exposure.

- **Delayed Domestic Capacity Expansion:**

  BEL's generation planning and project execution faced setbacks.

  - In its "Final Decision Document – Consent to Purchase Refurbished Mobile Gas Turbine for San Pedro, Ambergris Caye", dated December 22, 2023, PUC stated that BEL "claims that the in-country generation capacity shortage situation continues to worsen due to higher-than-expected growth in demand for electricity and extended delays with bringing online key generation and transmission projects". Within its application, BEL further indicated that based on their generation plan for the next three years, "in-country firm capacity will not be able to meet the projected demand through to the end of 2024".

  - Regarding delays in alleviating pressure on Ambergris Caye, the PUC explicitly states in its Final Decision Document "Consent to Purchase One Refurbished Mobile Gas Turbine at the Cost of Approximately $30 Million Belize Dollars", dated December 22, 2023, that "the Commission cannot, now or in the future, take responsibility for any shortfall that may occur in San Pedro due to delays in deploying the second submarine cable" by BEL. As a result, BEL was now invested in the installation of a gas turbine on Ambergris Caye as an interim measure but was not yet operational during the initial months of the crisis.

  - BEL communicated that the Westlake turbine would be operational by early May and the San Pedro turbine by late May. Nevertheless, there were delays in the commissioning of both power plants, more so the San Pedro Gas Turbine. On September 12, 2024, BEL issued a press release titled "San Pedro Gas Turbine Successfully Commissioned as BEL Works to Replace Damaged Transformer at the San Pedro Generation Facility," noting, a second transformer equipment failure followed commissioning of the gas turbine delaying the turbine's integration into the grid (Belize Electricity Limited, 2024).

- **Planned and Unplanned Maintenance:** BEL's Westlake gas turbine, a vital backup resource, was undergoing an upgrade from 19 MW to 30 MW during the crisis period. According to BEL, this reduced the in-country generation capacity to 85 MW without the support from CFE (Belize Electricity Limited, 2024). BEL issued a press release on April 11, 2024, noting their full dependency on CFE as stated, "BEL will be completely dependent on the supply from CFE Mexico to meet demand during these times of the day, and the loss of supply from CFE or any other generation unit will likely result in significant power interruptions".

- **Record Heat and Increased Demand:** The National Meteorological Service (NMS) reported May 2024 as the hottest and driest month in Belize since the 1960s. According to the Chief Meteorological Officer, Mr. Ronald Gordon, "the entire month of May we were under a heat wave", to the extent that the NMS of Belize had to issue a heat alert on May 10, 2024 (Love FM Radio, 2024). The record-breaking high temperatures triggered a surge in cooling demand, straining an already limited electricity supply base.

4.10.4 Response Measures

In the immediate term, BEL's response centred on initiating load shedding and activating all available in-country generation resources to mitigate the impact on the grid and to meet the generation shortfall. In addition, BEL was quick in the issuance of public advisories and alerts, via its website and social media platforms, in particular, its request to the public to follow its "BEL Power Updates" page on Facebook (BEL Power Updates | Facebook) for daily load shedding details as they became available and to encourage energy conservation.

A short-term measure to eradicate the need for load shedding saw the commissioning of additional in-country generation capacity. BEL recommissioned the Westlake gas turbine by mid-May 2024, adding 30 MW to the domestic grid. A second gas turbine was being commissioned in San Pedro with expectations to contribute an additional 20 MW to in-country generation capacity upon full commissioning. Though installation setbacks due to multiple equipment failures delayed its operational readiness until the last quarter of 2024.

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At the diplomatic level, high-level engagement between the Government of Belize and Mexican authorities led to an agreement for CFE to increase exports to Belize to 75 MW. While this provided temporary relief, this remained a stopgap solution, with long-term energy security requiring more robust domestic solutions.

4.10.5 Recovery and Long-Term Strategy

In response to the crisis, Belize has accelerated several initiatives aligned with its National Energy Policy 2023–2040. These include:

- **New Energy Projects:** A medium-term solution to install 60 MW of utility-scale solar photovoltaic systems (Saudi Development Fund) and the installation of 40MW of Battery Energy Storage Solution (BESS) (World Bank). These systems aim to reduce the reliance on imported energy, especially during daylight hours when solar output is highest, while BESS will assist in stabilizing the grid and offer other services such as voltage and frequency regulation.

- **Regulatory Modernization:** On April 11, 2024, the PUC notified the public of its final decision on the agreed adoption of BEL's new customer classifications and associated tariff schedules (Public Utilities Commission, 2024). Furthermore, the PUC informed the public on June 10, 2024, of a new "Request for Proposal Regulations, 2024, that "outlines clear guidelines to foster transparency, enhance open competition, and build investor confidence to participate in the utility sectors procurement process" (Public Utilities Commission, 2024). These reforms aim to strengthen procurement processes for future energy infrastructure and accelerate the integration of renewable sources.

- **National Energy Policy Goals: Renewable Energy Commitments:** Belize's National Energy Policy 2023 – 2040 emphasizes reducing dependency on imports, increasing domestic renewable capacity, and ensuring energy security through diversification and infrastructure investment (Ministry of Public Utilities, Energy, Logistics, and E-Governance (MPUELE), 2023).

The 2024 electricity crisis revealed the complex interdependencies and structural challenges within Belize's energy system. While the crisis created short-term disruptions, it also served as a catalyst for renewed commitment to energy planning, resilient infrastructure, and climate adaptation. The combination of immediate responses, stakeholder collaboration, and forward-looking investment in solar and battery storage presents an opportunity to rebuild a stronger, more self-reliant electricity sector, that ensures energy security for all Belizeans while advancing the country's long-term development and climate goals.

5 Energy Prices

5.1 Crude Oil Prices

The global price of crude oil, though subjected to intense scrutiny as the harbinger of economic shifts, not only for petroleum products' prices but also for the transportation of other goods, is well known for its volatility and sensitivity to 'geopolitical events, changes in demand and supply, and global economic conditions' (Petrosync, 2025), which makes it difficult to track in terms of generalized trends. Still, the price of crude oil serves as a useful backdrop for, and is often the predictor of, petroleum-based commodity prices that the everyday consumer will encounter. The five years of annual averages are taken from one of the main global crude markets, Brent Crude (Figure 29). Other crude markets, such as West Texas Intermediate (WTI) and the Organization of Petroleum Exporting Countries (OPEC) show slight variations in price compared to Brent Crude, but they generally experience parallel fluctuations (Statista, 2025). In terms of implications for 2024 and onwards, we can see from the chart that the past four years have seen prices staying close to the heights they attained in 2021 and 2022, with slight decreases. We can therefore expect the prices of fuels like kerosene, LPG, and gasoline to vary little, remaining steady in the present and near future, or at least until one or more of the shocks previously mentioned occur soon.

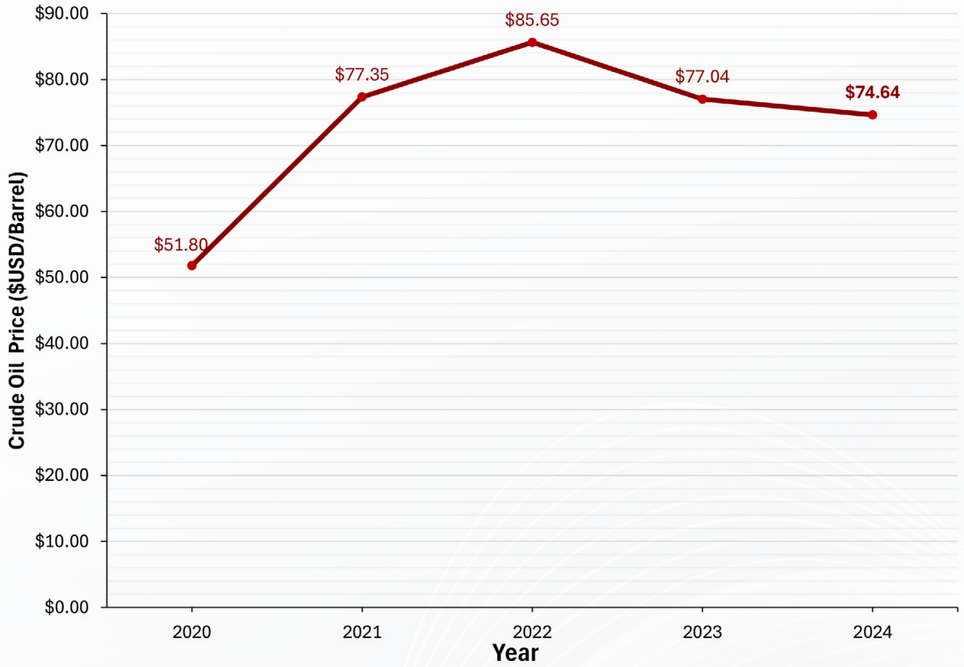


Figure 29. International Price of Crude – Brent Crude Annual Average.

Figure 30. Average Pump Prices of Refined Fuels in 2024.

5.2 Petroleum Products Price

5.2.1 Average Pump Price for Refined Petroleum Fuels

This reporting period saw decreases in general for the local average prices in refined liquid fuels sold at pump stations across Belize, except diesel, which saw a 20% increase from the 2023 average, and which, for now, rivals the cost of regular gasoline, though once often considered the cheaper fuel of the two. Premium gasoline represents the smallest import share, but the largest average price-at-the-pump. The smallest price average belongs to pumped kerosene, a fact which has inevitably led to diversifications of its uses beyond those related to emergency/non-electric lighting. It is anecdotally being employed as a fuel-stretching additive by a notable, though as-of-yet unmonitored, proportion of Belizean fuel consumers.

The year 2022 remains the recent peak cost for each of the refined pump fuels, and in the two reporting periods since then, prices have seen slow changes, albeit with decreases overall. Figure 30 shows the relative differences between the average prices for 2024.

The last five years have witnessed a notable volatility in the price of diesel oil, more so perhaps, at the local level than at the international level. Figure 31 demonstrates how Central American diesel prices (Comisión Económica para América Latina (CEPAL), 2025) have remained mostly stable since their steady climb from 2020 to 2022. A similar trend scenario unfolded in the Eastern Caribbean States, where diesel rose from XCD$11.03 (BZD$8.17) per Imperial gallon in 2020 to XCD$16.36 (BZD$12.11) in 2022, then saw slight decreases to XCD$15.93 (BZD$11.78) in 2023, then to XCD$15.36 (BZD$11.36) in 2024. (Eastern Caribbean Central Bank, 2025) (Forbes Advisor, 2024). This analysis does not yet possess data to determine whether Belize's significant diesel price increase was also a regional phenomenon in 2024.

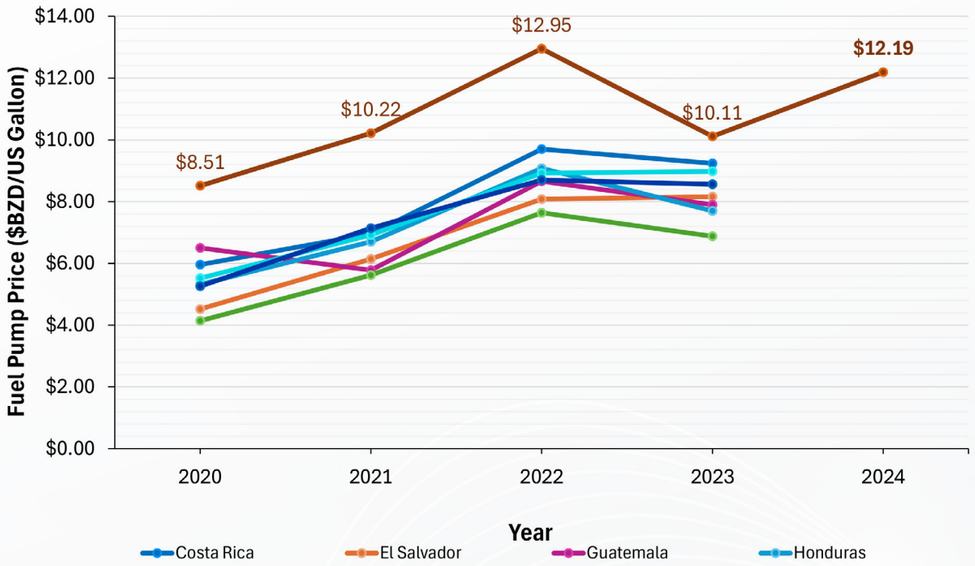


Figure 31. Diesel Prices 5-year Regional Comparison[14].

As the gasoline grade with the highest-octane rating, premium gasoline (Figure 32) remains consistently the most expensive across the pricing history. Since the 2022 price peak, its cost has decreased slightly by $1.65 over the past two years. Interestingly, its stability is reflected in other Central American countries as well (Comisión Económica para América Latina (CEPAL), 2025). As Belize's price lead over its fuel-subsidized neighbours persists across fuel types, Belizeans in the habit of buying fuel over the border may well feel justified in treating their vehicles to a full tank of 'gasolina prémium sin plomo'.

14 Source: Información preliminar de CEPAL, 2025, "Centroamérica y la República Dominicana: estadísticas de hidrocarburos, 2023".

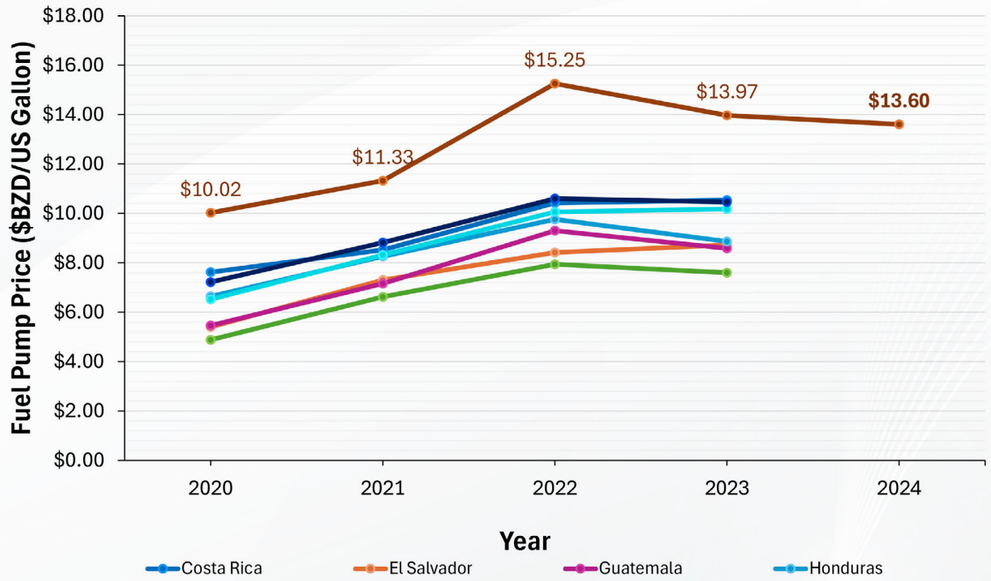


Figure 32. Premium Gasoline Prices 5-year Regional Comparison[15]

Regular gasoline is the largest liquid fuel import by volume in the country. In terms of annual price averages being presented in this section, it is also the most stable, losing only $0.72 since the price peak in 2022 (Figure 33). In comparing gasoline to other Central American countries (Comisión Económica para América Latina (CEPAL), 2025), gasoline price trends have also demonstrated the greatest regional concordance, whereas diesel and premium show a greater degree of trend-independence. Like Belize and Central America, Eastern Caribbean states have also seen comparative stability since 2022, decreasing from XCD$16.35 (BZD$12.09) to XCD$15.67 (BZD$11.60) over the past two years, a decrease of nearly BZD$0.50 (Eastern Caribbean Central Bank, 2025) (Forbes Advisor, 2024).

15 Información preliminar de CEPAL, 2025, "Centroamérica y la República Dominicana: estadísticas de hidrocarburos, 2023".

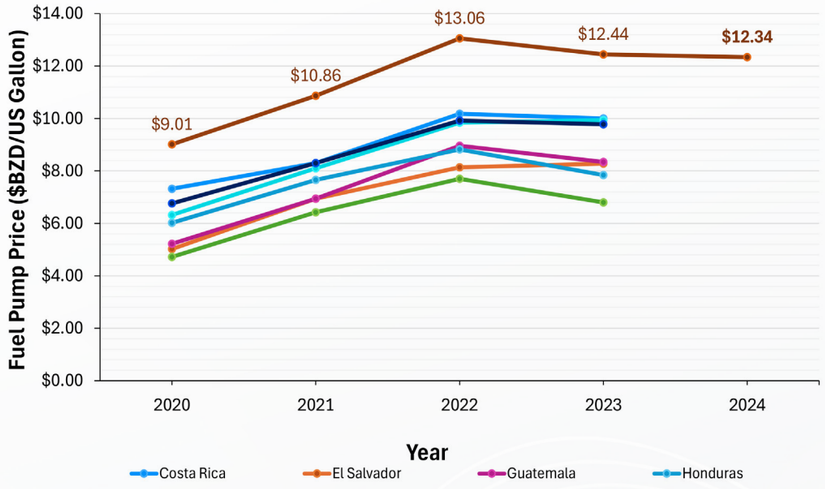


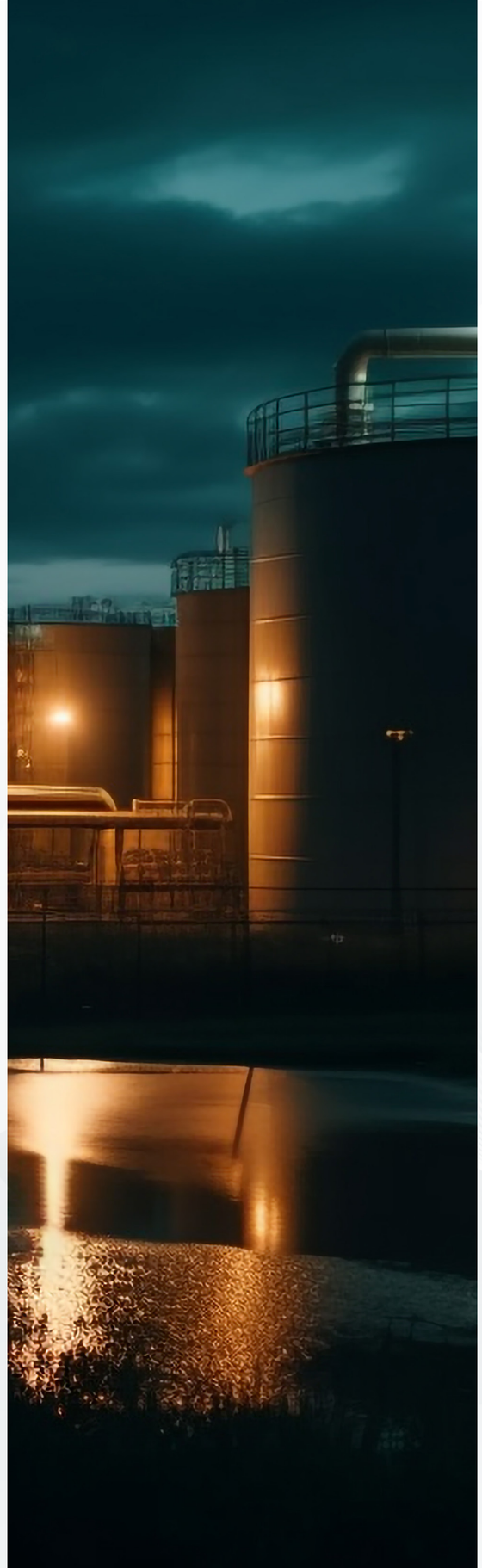
Figure 33. Regular Gasoline Prices 5-year Regional Comparison[16].

5.2.2 Annual Average Price for Liquified Petroleum Gas (LPG)

In 2024, the national average price of LPG has shown a slight increase since 2023 (Figure 34) but did not reach the peak of $1.46 per pound seen in 2022. This is consistent with trends visible in other petroleum derivatives, the prices for which, along with the international crude price, definitively surged in 2022. This is further highlighted by the fact that similar patterns are evident in several other Central American countries (Comisión Económica para América Latina y el Caribe (CEPAL), 2025), and in contravention of the fact that Belize has government control over LPG prices (other Central American countries apply various subsidies). Therefore, while the government may cap the LPG price within certain timeframes, it must still reflect regional and international fluctuations in the costs of petroleum products.

LPG is imported into Belize by the National Gas Company, which distributes it to retailers throughout the country. The controlled prices are determined and published by the Supplies Control Unit, currently within the Ministry of Agriculture, as it has been since 2021, when it was moved from under the jurisdiction of the Belize Bureau of Standards (BBS).

16 Source: Información preliminar de CEPAL, 2025, "Centroamérica y la República Dominicana: estadísticas de hidrocarburos, 2023".



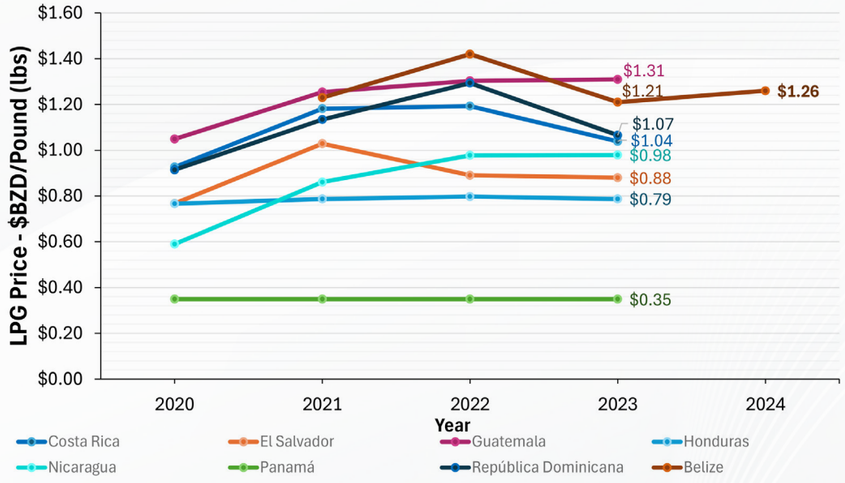


Figure 34. Regional comparison for 5 years of Historical LPG Prices[17] [18].

5.3 Mean Electricity Rate

While the national utility's mean electricity rate (MER) has remained relatively steady over the past decade, with the past few years being particularly uneventful. According to Figure 35, there are underlying factors that are in the consumers' interests to keep in mind. The MER is an indicator that represents the average cost of electricity in Belize and is driven by the costs that the national utility disburses to buy or produce electricity, along with operation and maintenance costs. However, the utility can only set prices with the approval of the Public Utilities Commission (PUC), whose mandate is to assess whether the public is paying a fair price for a necessary commodity. With a full review being conducted every four years (see section 7.2), the review conducted in 2024 decreed that no major changes be made to the existing tariff schedule. This implied the utility is absorbing much of the financial variances introduced by the COVID-19 pandemic in 2021, as well as the rising demand challenges faced by the country in 2023 and 2024. Belize's increasing reliance on Mexico's CFE (see section 4.5), together with the use of fossil fuel generation to meet rising energy demands (see section 5.4), will ultimately affect consumers financially. Such conditions are expected to become more pronounced in the years ahead. Even the most optimistic global climate projection scenarios, which see carbon emissions drastically reduced, still foresee a measure of global temperature increase (Lindsey, Dahlman, & Blunden, 2024).

17 Source: Información preliminar de CEPAL, 2025, "Centroamérica y la República Dominicana: estadísticas de hidrocarburos, 2023".

18 Any comparison should take into account that Costa Rica, Panamá, Rep. Dominica, Honduras and El Salvador employ government fuel subsidies for LPG (Secretaría de Energía (SEN) de Honduras, 2024), whereas Belize has LPG prices controlled by the Supplies Control Unit.

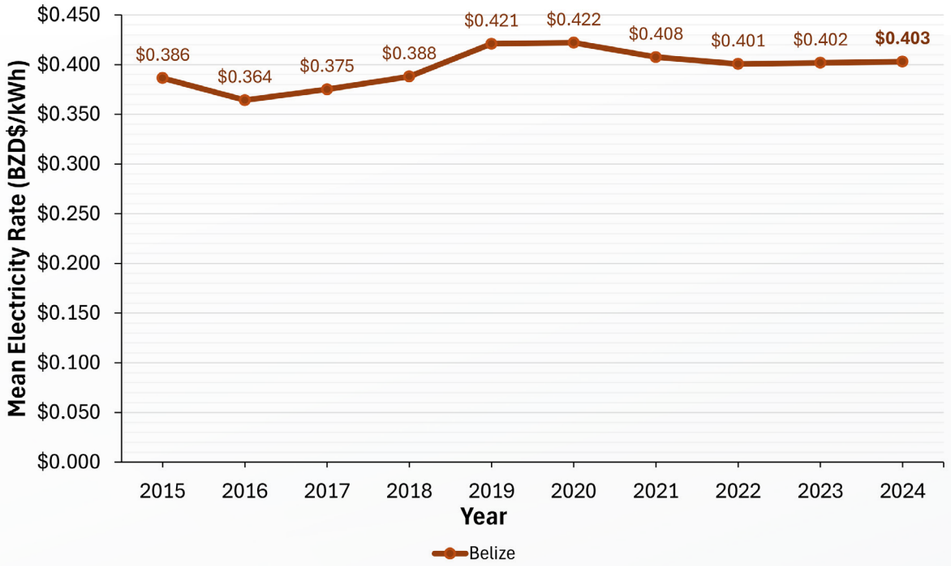


Figure 35. Historical Mean Electricity Rate for Belize Electricity Limited.

In the regional landscape shown in Figure 36 (Comisión Económica para América Latina y el Caribe (CEPAL), 2025), Belize's MER has historically ranked among the highest in Central America. However, over the past two years, Honduras and Guatemala have surpassed Belize, shifting the country's position toward the middle of the regional price range.

Given the substantial differences in size, resource distribution, policy, and regulatory frameworks across Central American countries, direct side-by-side price comparisons can be misleading. Still, it is notable that the three lowest-cost markets, Panama and Costa Rica, with close to 70% hydro, and the Dominican Republic, with 84% fossil fuel penetration, represent very different generation profiles. Meanwhile, the two most expensive countries have more diverse mixes where hydro, biofuels, and fossil fuels account for the largest shares (International Energy Agency (IEA), 2022). It is therefore difficult to generalize as to what type of generation mix will be most economical for a given country's consumers, making it necessary to tailor Belize's energy supply goals to its own needs.

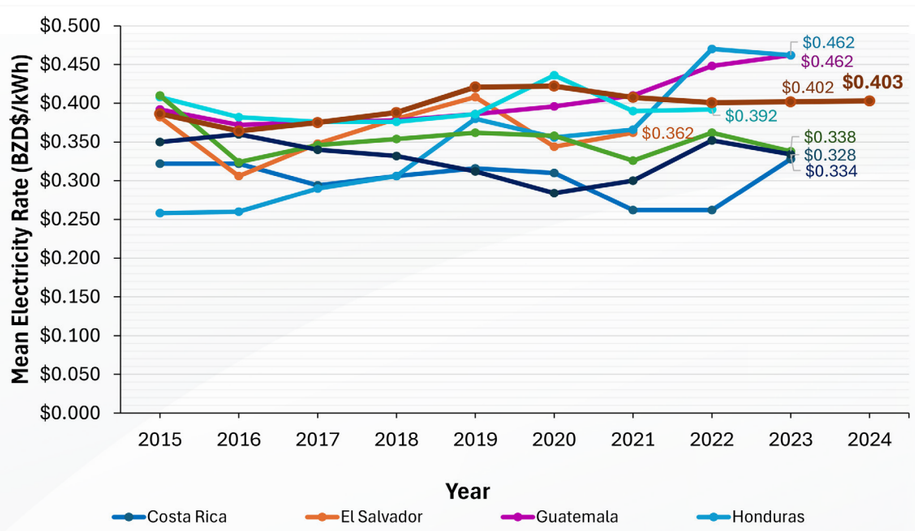


Figure 36. Mean Electricity Rates: 10-year Regional Comparison[19].

5.4 Average Cost of Power

5.4.1 Average Cost of Power

Figure 37 illustrates the changes in the average 'cost of power' over the last five years, referred to as the typical price that the national utility pays for each kWh of power it distributes, whether produced by the utility itself or purchased from Independent Power Producers (IPPs). The figures present stability in pricing over the years, with the BZD $0.23 per kWh being a slight improvement of a few cents since in comparison to the previous year. The average cost of power recorded a range of only about 7 cents between the minimum and maximum values over the timeline. This pricing mechanism is significant in acting as an indicator or proxy for what the final tariffs will be. This is because the laws of Belize stipulate that any approved electricity tariff must provide "a reasonable opportunity to recover the reasonable costs of providing service and secure a reasonable rate of return on investment when operating in a manner compatible with international standards of an efficiently operated power system." (Government of Belize, 2011). Nevertheless, while the cost of power appears stable for the past few years, other factors, such as the proportions in the electricity mix or changes in demand, may influence the end-user tariffs.

19 Source: Información preliminar de CEPAL, 2025, "Estadísticas del Subsector Eléctrico de los Países del Sistema de Integración Centroamericana (SICA), 2023".

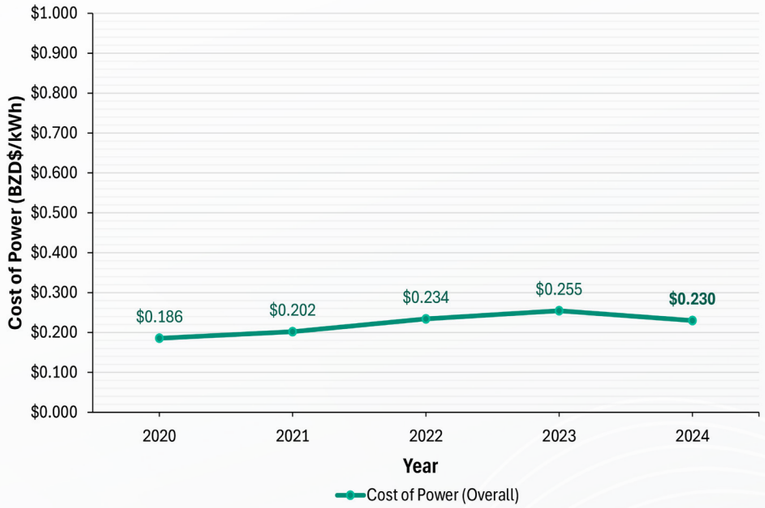
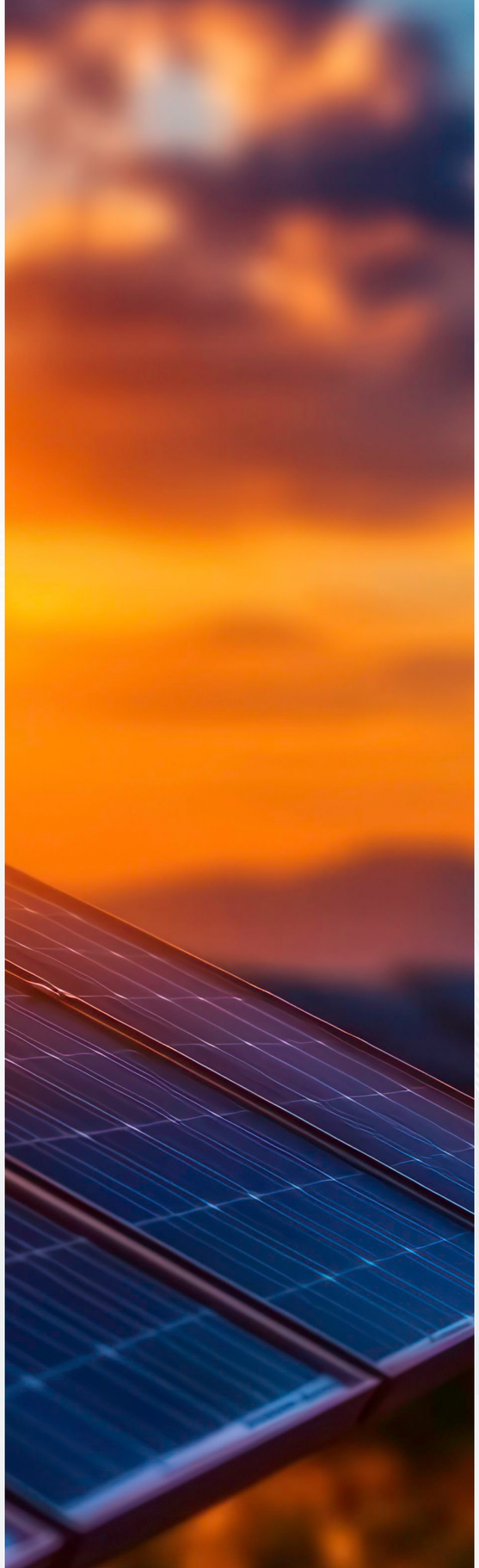


Figure 37. Historical Cost of Power – Averaged from All Utility Power Sources.

5.4.2 Average Cost of Power by Technology Types

Figure 38 displays the average cost of power separated by energy source type. It demonstrates how much more complex the interplay of various price-points is, the result of which is the overall cost of power seen above. The considerably more expensive local non-RE thermals, for which the line chart demonstrates price volatility and tendency to extremes, also represented a smaller share in overall costs. This may be the case due to the bulk of Belize's power being sourced from Mexican imports and local hydro production. Notably, most sources have remained stably priced since 2023, with solar, bagasse (Combined heat and power), imports, and fossil thermals remaining at their levels, while hydropower has cheapened by about half, a factor which must have contributed to the small but notable lowering of the overall cost of power. Interestingly, even a small snapshot of 5 years, as illustrated in Figure 38, demonstrates what Melodia and Karlsson (2022) described as the 'inherent volatility of oil and gas prices', a characteristic which remains a continual consideration for any sustainable planning within the energy sector, as well as exhibiting the clear market benefits of diversifying the electricity mix.



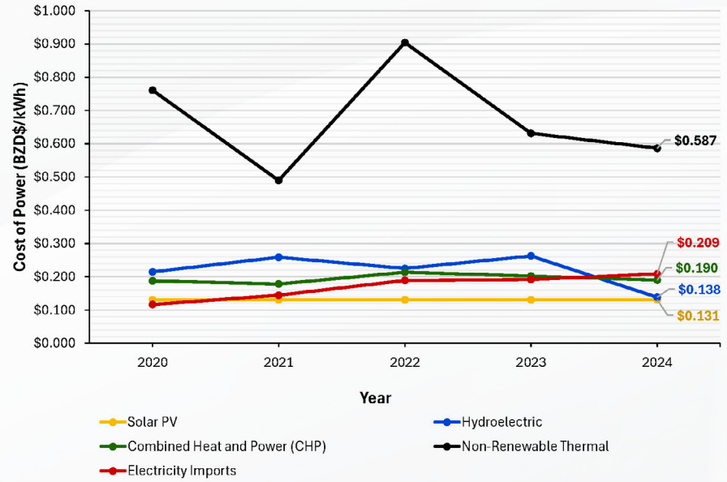


Figure 38. Historical cost of power on national utility grid, by source type.

5.5 Electricity End-User Tariff

One of the major outcomes from 2024's Full Tariff Review Process (detailed in section 7.2) is that the existing tariff schedule is to remain unchanged. As demonstrated in Table 2, the rates range from the cheapest per kWh price in the social rate at BZD $0.25 to the most expensive in the streetlights rate at forty-five cents per kWh, which is paid by the government of Belize as a public service (Belize Electricity Limited, 2024). The majority of the general public would fall within the Residential rate, with the social rate being reserved for residential meters that register very low consumption and/or are attached to a low-income context. Customers whose consumption is designated for commercial uses, but which does not surpass 2,500 kWh per month, are assigned the Commercial 1 rate. Customers with a similar consumption purpose, but with usage surpassing 2,500 kWh, are classified under the Commercial 2 rate. The Industrial rates are reserved for consumers requiring a higher-voltage connection that comes with higher demand and service charges, as seen in Table 2. Information on customer classifications and connection fees can be found on BEL's website.

Table 2. 2024 Tariff Schedules for BEL Customers.

Tariff Rates		
Social Rate		
Block	**kWh**	**Rate ($BZD/kWh)**
1	0-60	$0.22
Minimum Charge		$5.00
Residential Rates		
Block	**kWh**	**Rate ($BZD/kWh)**
1	0-50	$0.33
2	51-200	$0.38
3	Above 200	$0.43
Minimum Charge		$10.00
Commercial 1 Rates		
Block	**kWh**	**Rate ($BZD/kWh)**
1	0-50	$0.33
2	51-200	$0.38
3	Above 200	$0.43
Minimum Charge		$10.00
Commercial 2 Rates		
Block	**kWh**	**Rate ($BZD/kWh)**
1	0-10,000	$0.41
2	10,001-20,000	$0.39
3	Above 20,000	$0.38
Service Charge		$150.00
Industrial 1 Rates		
		Rate ($BZD/kWh)
Demand (per KVA)		$35.82
Energy		$0.30
Service Charge		$250.00
Industrial 2 Rates		
		Rate ($BZD/kWh)
Demand (per KVA)		$23.00
Energy		$0.26
Service Charge		$250.00
Streetlights		
kWh		**Rate ($BZD/kWh)**
1		$0.45

During 2024, the classic tariff structure was augmented by the addition of a separate tariff "Demand Charge Rate" for customers who are defined as 'prosumers' under the 2024 Electricity Licensing and Consent Regulation (for context and background see section 7.3). Such customers are automatically classified under this 'Demand Charge" rate listed in Table 3 and charged the general fees listed therein. Regardless of which customer classification they or their business were originally registered under, they can be paid BZD$0.13/kWh for electricity supplied to the grid. However, this 'sandbox regulation', which was approved for a probationary period from September 1st, 2024, to June 30th, 2025, also states that any of the regular, non-prosumer customers may voluntarily apply to be transferred to the newly approved 'Demand Charge rate'. (Public Utilities Commission, 2024). Potential customers may wish to take advantage of the peak/off-peak rates, which are designed to increase energy-efficient consumption patterns by distributing electricity use to other parts of the daily consumption cycle.

Table 3. Demand Rate Tariff – a 'Sandbox' framework approved by PUC.

Demand Rate	
All Classes	
	Rate ($BZD/kWh)
Demand (per KVA)	30
Energy: Peak	0.35
Energy: Off-peak	0.3
Feed-In Tariffs	
All Classes	
	Rate ($BZD/kWh)
Energy	0.13

6 Environment and Climate Protection

6.1 Energy Goals

This year marks the mid-point along the decade-long timeline to 2030, a period increasingly defined by rising awareness of climate change and its far-reaching effects. Amid this growing urgency, spurred in part by the Intergovernmental Panel on Climate Change's (IPCC) sixth Assessment Report (AR6) (Intergovernmental Panel on Climate Change, 2023), the global energy transition has emerged as a critical pathway to cut harmful greenhouse gases, enhance energy security, and build climate-resilient economies (Clarke, et al., 2022). The term 'energy transition' refers to the ongoing global shift away from fossil fuel-based systems towards more sustainable, low-carbon, and renewable-based energy models (International Renewable Energy Agency, 2023).

According to the UNDP's Climate Promise (2025), "Without a swift energy transition, it will be impossible to meet the vast emissions reductions needed for climate change mitigation." As decarbonization efforts accelerate globally, energy sustainability has become deeply embedded in climate action, offering multiple socio-economic benefits and advancing a more inclusive energy future.

Section 2.2, Energy Indicators, provides an overview of essential metrics used to monitor progress in Belize's energy sector, both nationally and regionally, and how these indicators align with key frameworks for climate change and sustainable development, including the Sustainable Development Goals (SDGs).

6.1.1 Sustainable Development Goal 7

The transition away from fossil fuel-based energy systems to more sustainable, low-carbon energy sources is not only essential for meeting international climate commitments, such as the Paris Agreement, but also for achieving broader SDGs. The United Nations SDG 7: Affordable and Clean Energy, aims to ensure access to affordable, reliable, sustainable, and modern energy for all by 2030. It serves as one of the primary global frameworks for advancing energy-related objectives.

This goal is supported by a set of specific targets and indicators, as outlined in Table 4.

Table 4. Sustainable Development Goal 7: Targets.

Target	Target Description
7.1	By 2030, ensure universal access to affordable, reliable, and modern energy services.
7.2	By 2030, increase substantially the share of renewable energy in the global energy mix.
7.3	By 2030, double the global rate of improvement in energy efficiency.
7.4	By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency, and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.
7.3	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, per their respective programmes of support.

6.1.2 Nationally Determined Contributions (NDCs)

As a signatory to the Paris Agreement, Belize is expected to submit a Nationally Determined Contribution (NDC), which outlines the country's commitments to reduce greenhouse gas emissions and strengthen resilience to climate change. These commitments under the Paris Agreement are in direct alignment with the 2030 Agenda and place much urgency on climate actions to limit warming well below 2°C. By placing energy at the center of its climate mitigation policy, Belize's NDC reaffirms its commitment to a climate-resilient and low-carbon development pathway.

With technical and institutional support from partners that included Climate Analytics, GIZ, IKI, and the NDC Partnership, Belize began the process of updating its third iteration of its NDC, referred to as NDC 3.0, in 2024. The goal of this update is to build upon the ambition established in the NDC 2.0 (2021) and significantly enhance Belize's climate commitments by extending target timelines and placing greater emphasis on adaptation and resilience.

Table 5 outlines key targets and actions in the energy sector under Belize's NDC 2.0 (2021). In this context, the ongoing development of NDC 3.0 presents an opportunity not only to enhance emission reduction goals but also to align with national energy and climate development strategies.

The current cycle of updated NDCs provides a strategic moment for Belize and other nations to define clear, measurable energy sector targets that integrate seamlessly with national climate, energy, and development policies. These updates also offer a platform to highlight investment pathways that can mobilize both public and private sector support, ultimately advancing a more coordinated and finance-ready approach to implementing energy and climate commitments.

Table 5. Belize's Energy Sector Targets and Actions under NDC 2.0 (2021).

Type	Commitment	SDG Linkages
Target	**Avoid emissions from the power sector equivalent to 19 KtCO2e per year through system and consumption efficiency measures amounting to at least 100 GWh/year by 2030**	**SDG 7, 13**
Action	Reduction in transmission and distribution losses from 12% to 10% by 2030, resulting in reduced electricity demand and better quality of supply	SDG 7, 13
Action	Improve energy efficiency and conservation by at least 10% by 2030 compared to a BAU baseline projection, including through an increase of appliance efficiency in buildings and implementation of building codes, appliance standards and labels, and promotion of energy efficient technology in the tourism sector	SDG 7, 13
Target	**Avoid 44 KtCO2e in the national electricity supply by 2030 through the introduction of expanded capacity from renewable energy sources**	**SDG 7, 13**
Action	Achieve 75% gross generation of electricity from renewable energy sources by 2030 through the implementation of hydropower, solar, wind, and biomass, including in the tourism sector	SDG 7, 13
Action	Reduce emissions from high-carbon electricity sources, including taking 2MW diesel generation offline by 2022 and converting new LPG generation to CNG by 2026	SDG 7, 13

Action	Install 40 MW of utility-scale solar power by 2025	SDG 7, 13
Action	Implement an interconnection policy and regulatory framework to facilitate distributed renewable power generation by 2022	SDG 7
Action	Expand the use of biomass, including bagasse, for electricity generation	SDG 2, 7, 13
Action	Explore the feasibility of onshore wind power generation and flexible storage technologies to complement high levels of variable renewable power sources	SDG 7, 13
Target	**Avoid 117 KtCO2e/year from the transport sector by 2030 through a 15% reduction in conventional transportation fuel use and achieve 15% efficiency per passenger- and tonne-kilometre through appropriate policies and investments**	**SDG 7, 13**
Action	Improve efficiency in the public transit system through the deployment of 77 hybrid and electric buses by 2030 (17 by 2025)	SDG 7, 11, 13
Action	Implement a policy framework to promote more efficient vehicles and alternative fuels/blends through incorporation of fuel economy labels; emissions testing; fuel economy standards, limitations, and emissions-based taxes/feebates for imported vehicles by 2025	SDG 2, 7, 13
Action	Facilitate adoption of electric vehicles in the passenger fleet by conducting a feasibility study for EV penetration, including assessment of potential incentives, and investing in EV charging infrastructure	SDG 7, 11, 13

6.1.3 National Energy Policy 2023

Belize's National Energy Policy (2023-2040) sets forth a clear vision and measurable targets to guide the country's transition toward a modern, inclusive, and resilient energy system[20]. These policy targets and goals, while designed to strengthen energy security and reduce dependency on imported fossil fuels, also aim to support Belize's broader climate commitments under the Paris Agreement and its sustainable development objectives, inclusive of SDG 7.

By setting ambitious yet achievable targets, ranging from increased renewable energy penetration and improved energy efficiency to expanded rural electrification and stronger institutional capacity, the policy aligns Belize with global and regional efforts to decarbonize energy systems. Table 6 below outlines the key targets and goals established under the National Energy Policy 2023–2040, which form the backbone of Belize's long-term energy transformation.

Table 6. Belize National Energy Policy 2023-2040 Targets and Goals.

Goal	Description	Target
Enhance Energy Efficiency	Reducing energy intensity across all sectors through collaboration	Reduce energy consumption by 10%, with a projection to reduce energy intensity to 0.141 toe/ USD000s of GDP
Increase Renewable Energy Share	Raise the share of renewables in the energy supply mix, to include bio-fuels, as well as more solar, hydro, and biomass.	Renewable energy share in the national energy supply mix is above 60% by 2040.
Increase Renewable Energy Share	Increase renewable energy penetration in the electricity mix	Increase renewable energy electricity penetration to 75% by 2030.
Greenhouse Gas Emissions	Reduction of energy-related greenhouse gas emissions, in line with NDC commitments.	Achieve a 30% reduction in GHG emissions by 2030.
Expand Energy Access	Expand access to modern energy services, especially in rural areas.	Ensure 100% access to reliable and affordable electricity by 2030.
Energy-related Expenditure	Decrease the energy expenditure in relation to GDP	Reduce energy expenditure to 15% of GDP by 2030, in comparison to 21% of GDP in 2021.

20 One key assumption made in developing the sector targets is that all stated policies would have been successfully

6.2 GHG Emissions from the Energy Sector

It is well established that activities in the energy sector account for the largest source of CO^2 emissions globally, driving rising temperatures and more frequent extreme weather events (Clarke, et al., 2022). As a result, reducing energy-related emissions is essential to curbing global warming. To meet this goal, governments must prioritize the energy transition, with targeted activities to increase the adoption of renewables, improvements in energy efficiency, and policies that promote the electrification of end-use sectors such as transport and heating (Intergovernmental Panel on Climate Change (IPCC), 2022).

Belize reaffirmed its climate commitment through the development of its Fifth National Inventory Report, which provides a comprehensive review of national greenhouse gas emissions and outlines specific areas for enhancement in support of its Nationally Determined Contributions (NDCs).

Figure 39 presents Belize's total GHG emissions by sector for 2022[21], revealing a distinctive national emissions profile. Among all sectors, energy ranked as a leading emitter, responsible for 722.79 kilotonnes of CO_2 equivalent (kt CO_2 eq), representing 26% of total national emissions in 2022 (Ministry of Sustainable Development, Climate Change and Disaster Management, 2024). The energy sector was the second largest source of emissions, surpassed only by the waste sector.

Notably, the land use, land use change, and forestry (LULUCF) sector reported significant removals, with net GHG removals totalling -2191.48 kt CO_2 eq in 2022. This confirmed Belize's position as a net carbon sink and emphasized the country's important role in global carbon removal. Despite facing significant risks from climate-related impacts, Belize's net greenhouse gas emissions represent only a tiny share of the global total, underscoring its limited role in driving climate change (Ministry of Sustainable Development, Climate Change and Disaster Management, 2024).

21 Most recent year for national inventory estimates.

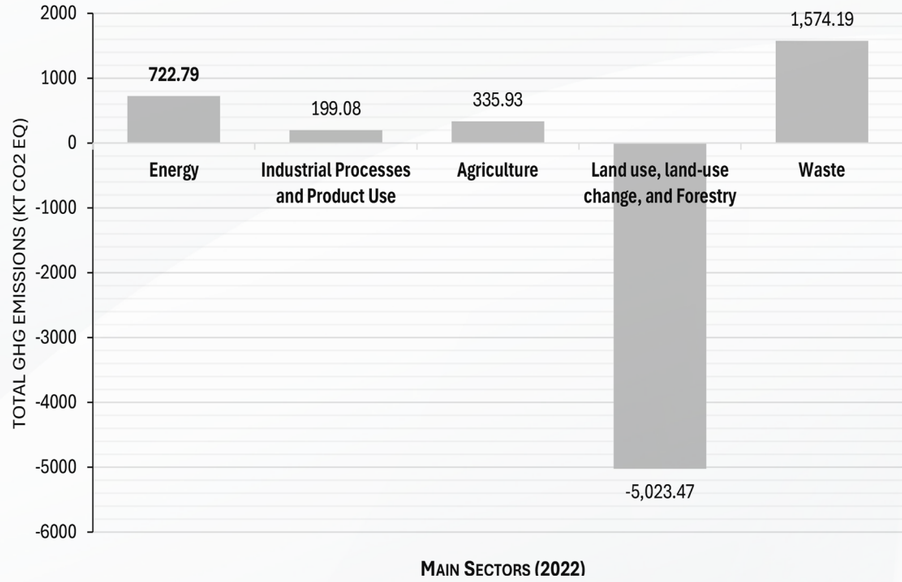


Figure 39. Total Greenhouse Gas Emissions by Sector, 2022.

Figure 40 illustrates total GHG emissions from Belize's energy sector between 2015 and 2022, measured in kilotonnes of CO_2 equivalent (kt CO_2 eq). The trend reflects relative stability with some moderate fluctuations in energy sector emissions over this period. Emissions increased slightly from 2015, reaching a peak of 849.91 kt CO_2 eq in 2019, just before the COVID-19 pandemic. In 2020, emissions dropped noticeably to 684.21 kt CO_2 eq, largely due to the pandemic's economic slowdown effect. Since then, emissions have gradually rebounded, reaching 722.79 kt CO_2 eq in 2022, as economic activity resumed.

Notably, energy-related emissions have remained below pre-pandemic levels, presenting an opportunity for Belize to shape its long-term emission trajectory through forward-looking policy and targeted investments. Maintaining a lower-emission development path will require continued efforts to expand renewable energy, enhance energy efficiency, and accelerate the electrification of key end-use sectors.

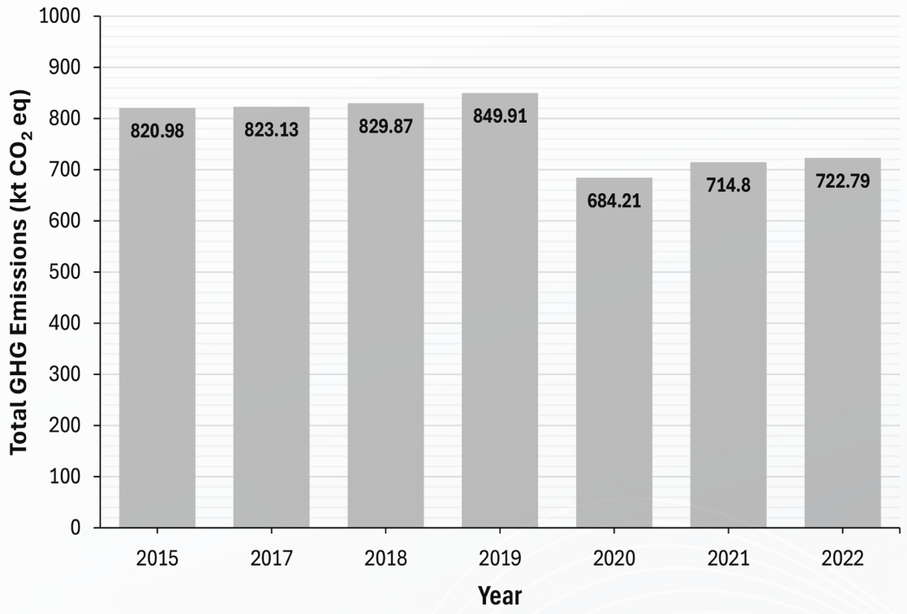


Figure 40. Annual Energy Sector GHG Emissions.

In 2022, the transport sub-sector accounted for 69.8% of the energy sector's net emissions, primarily due to road transportation, which contributed 67.9% of total emissions from the energy sector (Figure 41). Within the transport sub-sector, domestic aviation and domestic water navigation contributed only 1.78% and 0.15% respectively to the sector's overall emissions. Overall, transport played a major role in Belize's national emissions, representing 18% of total emissions across all sectors in 2022.

The next largest contributor within the energy sector was the 'other sectors' category, which includes households and commercial energy use, contributing 22.63% of total energy sector emissions. This was followed by the energy industries sub-sector, which contributed 7.55%, mostly from fossil fuel combustion (diesel, crude oil, and fuel oil) for electricity generation[22] The Manufacturing and construction sub-sector, while acknowledged, was not reported for 2022 in Belize's Fifth National Inventory Document[23].

Under fugitive emissions, natural gas flaring was the only reported source, contributing a negligible 0.00027% of total energy sector emissions. Belize does not currently have any carbon dioxide transport or storage activities, and therefore, none were reported.

22 Emission estimates for imported electricity from Mexico is not included in Belize's Greenhouse Inventory Report in accordance with the IPCC Inventory Guidelines.

23 Data refinement will likely follow; any updates to emissions estimates will be documented and republished.

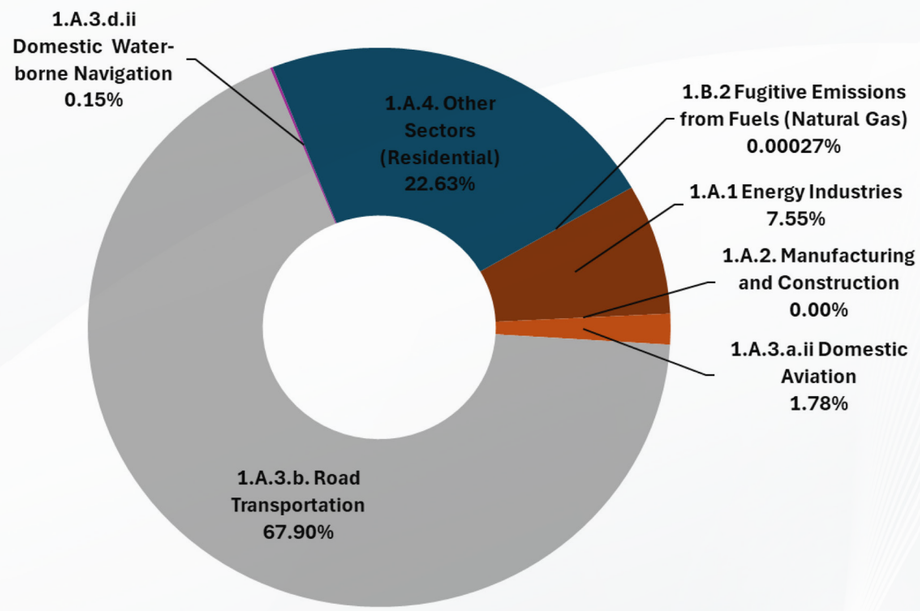


Figure 41. GHG Emission Share by Energy sub-sector, 2022.

Figure 42 illustrates the share of GHG emissions from Belize's energy sector by gas type in 2022. Carbon dioxide (CO2) accounted for the vast majority of emissions, contributing 96% of the sector's total. Methane (CH4) and nitrous oxide (N20) each contributed 2% of the remaining emissions.

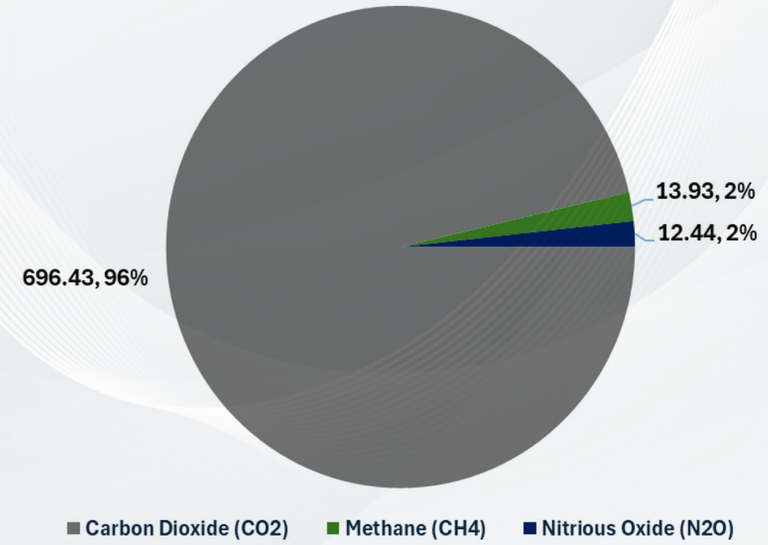


Figure 42. Energy Sector GHG Emissions by Gas (kt CO2 eq), 2022.

6.3 Grid Emission Factor for Belize

Belize's Grid Emission Factor (GEF) is a critical metric used to measure the amount of carbon dioxide (CO2) emitted per megawatt-hour (MWh) of electricity delivered through the national grid[24]. This figure offers a snapshot of the carbon footprint of Belize's electricity supply by accounting for emissions from both imported and domestically produced electricity. The most recent GEF for Belize, calculated using the UNFCCC-approved Clean Development Mechanism (CDM) methodology/tool, went into effect in August 2021 and remained valid until August 23, 2024. Developed in partnership with the Belize National Climate Change Office, this standardized baseline can be used for assessing emission levels in energy-related projects and serves as a national reference point for GHG accounting in the power sector. Table 7 summarizes the most recent officially recognized grid emission factor for Belize.

With the expiration of this baseline, there is an urgent need to revise the GEF so that it accurately reflects Belize's current electricity mix and updated power purchase agreements. As the government advances its national decarbonization agenda and works to increase local generation capacity, Belize's power sector is expected to undergo a major transformation. These efforts include scaling up domestic renewable energy production, investing in battery storage, and strengthening grid reliability.

As a result, the GEF will not only remain a foundational tool for emissions tracking and national GHG inventories but will also serve as a valuable component in climate finance proposals that aim to attract investment in clean energy solutions. In this sense, the GEF's value for Belize extends beyond compliance or reporting, serving as a strategic signal of progress on climate goals. Looking ahead, maintaining a lower and regularly updated GEF will be a key benchmark of Belize's shift toward a more sustainable, low-emission energy future.

Table 7. Grid Emission Factor for Belize.

Parameter	SI Unit	Description	Value
EFgrid,OM,y	tCO2/MWh	Operating margin CO2 emission factor for the BEL	0.49
EFgrid,BM,y	tCO2/MWh	Build margin CO2 emission factor for the BEL	0.21
EFgrid,CM,y	tCO2/MWh	Combined margin CO2 emission factor for the BEL applicable to the project activities of wind and solar power generation	0.42
EFgrid,CM,y	tCO2/MWh	Combined margin CO2 emission factor for the BEL applicable to all project activities other than wind and solar power generation project activities for the first crediting period	0.35
EFgrid,CM,y	tCO2/MWh	Combined margin CO2 emission factor for the BEL applicable to all project activities other than wind and solar power generation project activities for the second and third crediting period	0.42

24 Power grid under the management of Belize Electricity Limited.

7 Strategic Energy Sector Initiatives

7.1 National Energy Policy 2023

In November 2023, the Government of Belize officially launched the National Energy Policy 2023–2040 (NEP), an important initiative that signals a key moment in the country's long-term push toward energy sustainability, economic stability, and climate responsibility. Approved by Cabinet and shaped under the guidance of the Ministry of Public Utilities, Energy, Logistics, and E-Governance (MPUELE), the NEP sets out a practical and forward-looking plan to steer Belize's energy development over the next twenty years.

> **At its heart, the NEP paints a vision of Belize as a "Low-carbon, energy-efficient, and environmentally responsible nation by 2040."**

It identifies energy not just as a standalone sector but as a vital link across all areas of national development. The policy also outlines clear measures to reduce Belize's dependence on imported fossil fuels, which currently account for over 60% of the energy supply mix, while encouraging greater investment in locally produced renewable sources and ensuring fairer access to energy across the population.

The policy's strength lies in how closely it ties into the broader national goals of the country, particularly those outlined in Belize's Medium-Term Development Strategy (2022–2026), as well as its global commitments under the NDCs (NDC 2021) and the United Nations SDGs. With a wide-reaching, cross-sectoral approach, the NEP sets out to lower energy intensity by 25%, raise renewable energy's share to 75%, and reduce the national energy bill to 15% of GDP by 2030 (Ministry of Public Utilities, Energy, Logistics, and E-Governance (MPUELE), 2023).

The main goals and objectives of the NEP are as follows:

- **Reduce Cost of Energy Services:** Focused on improving energy efficiency, managing demand better, and finding innovative ways to finance improvements.
- **Increase Indigenous Energy Sources:** Backing solar, biofuels, wind, biomass, and waste-to-energy through research and transparent investment processes.
- **Universal Energy Access:** Aiming to make clean, affordable energy available to all Belizeans by 2030.
- **Meet Climate Commitments:** Ensuring the energy sector stays on track to meet Belize's updated NDC goals.
- **Strengthen Governance:** Includes plans to form a dedicated Department of Energy, upgrade the Public Utilities Commission, and launch a national energy company.
- **Enhance Energy Management:** Developing institutional and technical capabilities for smarter planning, procurement, and implementation.
- **Improve Energy Data Access:** Creating a centralized information system to help stakeholders make more informed energy decisions.

The NEP goes beyond just sector-specific improvements. It recognizes that Belize must adapt to an increasingly unpredictable global energy environment. Soaring fossil fuel prices, geopolitical tensions, and the growing effects of climate change all add to the urgency. Domestic concerns, such as rising urban demand, continued migration, and more frequent climate-related disasters, further exacerbate the strain. In this light, the NEP's focus on building a more resilient, self-reliant, and diverse energy system is both timely and necessary.

There are real challenges ahead: from funding shortages and regulatory limitations to infrastructure gaps. Still, the policy lays out a thoughtful and achievable pathway. It targets the kind of structural changes and investment focus needed to reshape the energy sector into a backbone of national development, fueling economic opportunity, driving climate progress, and enhancing Belize's overall competitiveness. Just as importantly, the NEP acknowledges that reaching these goals will require a shared commitment across government, civil society, private enterprise, and the public.

Ultimately, the National Energy Policy 2023–2040 is more than a planning document. It is Belize's working roadmap for building an energy future that is practical, fair, and built on a foundation of shared vision and collective effort.

7.2 Electricity: Full Tariff Review Proceedings

A Full Tariff Review Process (FTRP) for BEL was conducted in 2024, bringing the 2020 to 2024 tariff period to a close and ushering in the 2024 to 2028 tariff period. Carried out at four-year intervals, the FTRP is spearheaded by the Public Utilities Commission and is intended to assess BEL's economic and operational performance for the previous period, as well as to set spending and revenue benchmarks for the coming 4-year period (Figure 43). The FTRP balances the operational costs incurred by BEL with the PUC's mandate to ensure electricity rates paid by consumers are reasonable and fair.

The Electricity Act recognizes that the national utility must recover its operational expenses through the collective payment of electricity bills and empowers the PUC to set tariffs that "afford a licensee a reasonable opportunity to recover the reasonable costs of providing service and secure a reasonable rate of return on investment", which also "reasonably allocates to particular customer classes the cost of serving such customers" (Public Utilities Commission, 2020).

In lieu of this mandate, the Full Tariff Review Process starts with BEL submitting an application to the PUC, outlining its revenue needs that a proposed tariff schedule would cover, along with supporting evidence such as accounting statements, expansion plans, forecasts, and models. Once an application is submitted, the PUC makes it public, inviting electricity sector experts and the public to give feedback on the application. Based on this review, the PUC releases its initial decision, indicating whether it accepts BEL's application and approves the proposed tariffs or whether adjustments are necessary. At this stage, BEL can object if it wishes to the PUC's initial decision, leading to one of two possible steps. If BEL does not oppose the decision, it is approved and becomes the PUC's final decision. Alternatively, if BEL opposes the decision, an additional review is conducted, where an independent expert, agreed upon by both parties, is hired to analyse and review the case. The findings of this expert are then examined by both parties to ensure consensus on the basis and assumptions. Again, the public and electricity sector experts are invited to submit comments. Based on this second review, the PUC issues its final decision.

In addition to the 4-year Full Tariff Review Process, an Annual Tariff Review is carried out at 12-month intervals after the FTRP (usually coinciding with the mid-year). This process is meant to refine or tune the necessities that were already agreed on in the FTRP, taking extenuating circumstances into account, and monitoring the execution of the FTRP's plan.

The result of the 2024 FTRP is that the electricity tariffs for customers that were in effect from 2020 to 2024 remain unchanged and carry over into the new FTR period. However, new customer classifications and tariff schedules were approved in 2024, which are currently being tested under what PUC terms a 'regulatory sandbox', the results of which will be determined in 2025 (see the following section for more details).

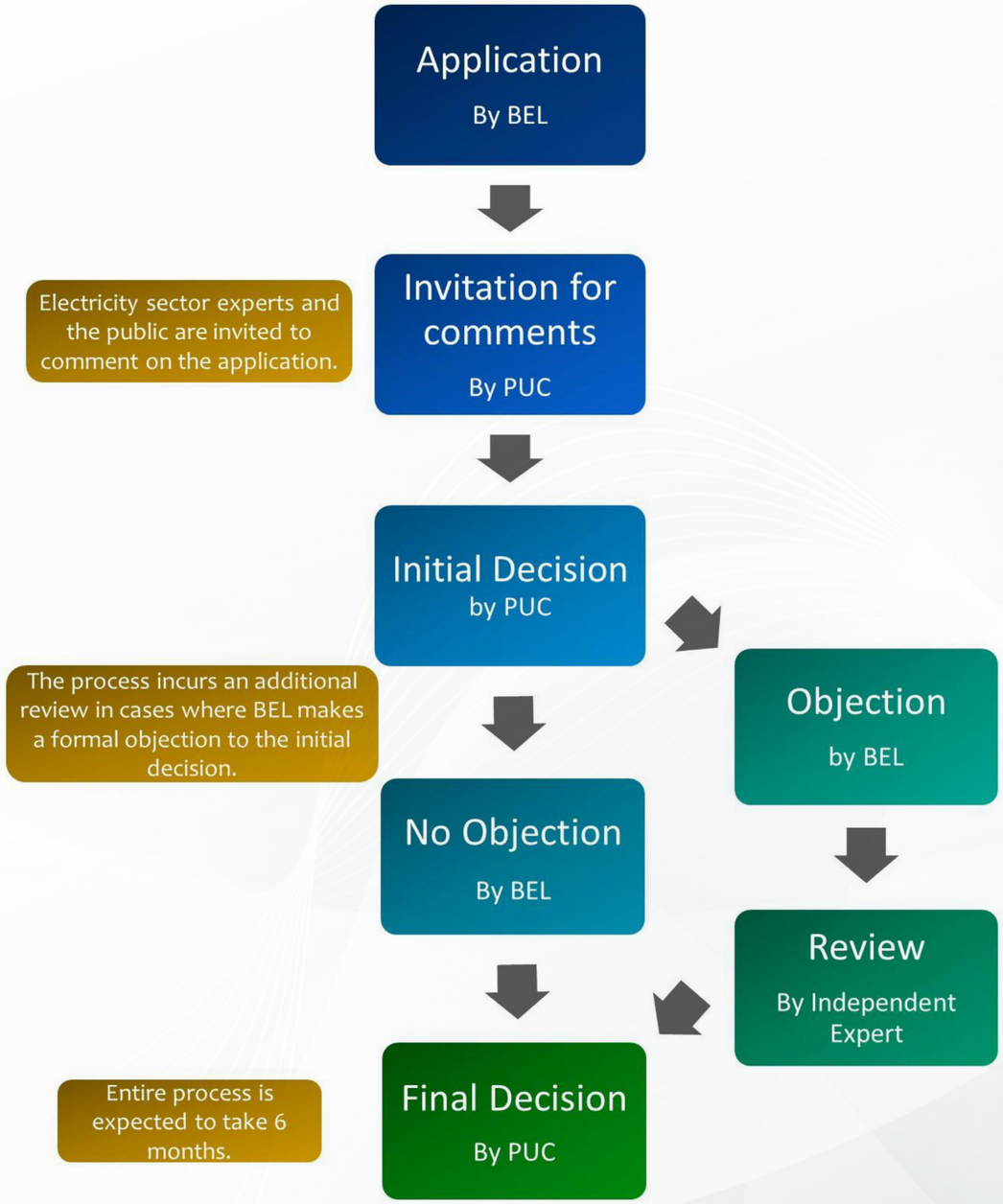


Figure 43. Full Tariff Review Proceedings Flowchart.

The national MER is the result of the tariff review process; it is the price of electricity that has been calculated to cover all purchasing costs, operational costs, and the utility's approved profit margin. The MER is then distributed or allocated among the various tariff rates discussed in Section 5.5, according to the following principles and presumptions. The Social rate is quantitatively the smallest and can absorb the financial boon granted to the poorest customers. Customers in the Residential and Commercial 1 rates pay a tariff closest in value to the true MER, as the largest consumer group is encouraged to reduce power consumption by raising the rate in direct proportion to consumption. Commercial 2 consumers are considered to have their electricity as part of their marketed product, thereby earning a profit for them and justifying a higher rate than the MER. However, in this tariff, rates decrease in proportion to increased consumption, to the end of encouraging investments in Belize's commercial sector. Finally, the Industrial consumers are connected at such high voltages that losses and regular distribution costs to the utility are minimal, resulting in a lower rate than the MER. These rationales are publicly available through the PUC's publications (Public Utilities Commission, 2023).

7.3 Electricity: New Customer Classifications and Associated Tariff Schedules

7.3.1 Background

On April 2, 2023, BEL submitted an application to the PUC based on four key requests:

1. To determine the Regulated Values, Mean Electricity Rates, Tariffs, Fees, and Charges in its Annual Review Proceedings Submission for the remaining Annual Tariff Period of the Full Tariff Period from July 1, 2023, to June 20, 2024.
2. To approve new customer classifications and associated tariff schedules for Distributed Generation, Electric Vehicle charging, Spanish Lookout, and Tourism;
3. To adopt/approve the Least Cost Expansion Plan (LCEP) filed on March 22, 2023, and
4. refiled on April 28, 2023; and
5. To adopt/approve BEL's new Connection Policy (Public Utilities Commission, 2023).

In its Consultative Paper titled "BEL Proposed Additional Customer Classifications & Associated Tariffs" (dated August 18, 2023), the PUC stated that on June 30, 2023, it had made a final decision regarding the first request above and deferred decisions on the remaining items (items 2 through 4).

BEL's request to introduce additional customer categories specifically included:

- **Grid-tied Distributed Generation Rate and Feed-In;**
- **Electric Vehicle Charging;**
- **Spanish Lookout; and**
- **Tourism Rate.**

For further details, please refer to Appendix B: Detailed Tables, 2 - 5, outlining the proposed tariffs.

As part of the consultation process, the PUC invited input from stakeholders regarding the new customer categories and tariff structures (consultative paper). Following multiple requests, the deadline for submissions was extended to October 2023. In the months that followed, the PUC published excerpts from stakeholder responses along with its commentary (Public Utilities Comissions, 2023). A recurring theme in the feedback was the demand for a "level playing field", particularly for Electric Vehicle charging services and rooftop solar PV installations.

In response to these concerns, BEL issued a letter to the PUC on February 9, 2024[25], providing formal feedback and calling for a collaborative review of the proposed classifications. The letter encouraged both parties to work together on defining rate structures, principles, and initial tariffs for these new service categories.

7.3.2 The Decision

On March 1, 2024, the Government of Belize enacted new Electricity Licensing and Consent Regulations through Statutory Instrument (S.I.) 39 of 2024[26], as announced by the PUC (Public Utilities Commission, 2024).

These updated regulations marked a major milestone in the country's effort to modernize its electricity sector. The framework promotes decentralization, encourages private investment, and enables open access to the national grid.

25 Letter published by PUC can be found at: BEL Responses to Stakeholder Questions on Proposed Pricing for Additional Customer Classifications & Associated Tariffs – Belize Public Utilities Commission

26 Regulations can be found at: New SI No 39 of 2024 Electricity Licensing and Consent Regulations – Belize Public Utilities Commission

Its aim is not only to promote greater transparency but also to encourage fair and healthy competition by establishing a clear, inclusive approach to regulation. The regulations define specific licensing requirements for energy-related activities and detail the process for obtaining approval to build and operate power facilities (Public Utilities Commission, 2024).

Building on this momentum, the PUC issued its Final Determination and Order on April 10, 2024, officially introducing new customer classifications[27] and tariff schedules for: Grid-tied Distribution Generation with Feed-in capabilities, Electric Vehicle Charging, Spanish Lookout, and Tourism (Public Utilities Commission, 2024). These classifications reflect the evolving nature of Belize's energy system and its need to accommodate the growing diversification of energy use and production models across the country.

Key elements of the Commission's decision and orders:

- **Creation of a new "Demand Charge Rate":** A new rate category based on kilovolt-ampere (kVA) usage and time-of-use pricing[28]. This rate will apply mandatorily to BEL-operated and affiliated electric vehicle charging stations and be optional for others who prefer time-of-use billing.
- **Approved Feed-In Tariff:** The PUC approved a Feed-in tariff of $0.1300 per kWh for electricity exported to the grid from distributed generation systems, calculated based on avoided cost principles.
- **Metering and Interconnection Requirements:** All distributed generation and electric vehicle charging stations customers must use bi-directional meters and comply with clearly defined technical interconnection criteria to improve bill transparency and customer access to real-time energy data, grid stability, and safe integration of renewable energy.
- **EV Charging infrastructure:** BEL is authorized to build and operate both public and fleet charging stations under a distinct tariff structure aimed at supporting Belize's national electrification goals. The Commission emphasized that the retail EV charging market will remain open and unregulated for now to stimulate competition.
- **Establishment of a Regulatory Sandbox:** The PUC introduced a controlled testing environment for new energy technologies and pricing models, such as peer-to-peer energy trading and smart grid innovations, before wider implementation.

27 These classifications are complemented by updated tariff schedules and technical standards that are tailored to the operational realities and policy goals of each category.

28 Monthly demand charge of $30.00 per kVA, a peak energy charge of $0.3500 per kWh, and an off-peak rate of $0.3000 per kWh.

Belize's updated customer classifications and electricity tariffs represent a bold step toward transforming the country's energy system. By creating space for distributed energy producers, electric vehicle infrastructure, and tailored service models, this new framework encourages private sector innovation. It gives consumers more control over how they use and produce energy and lays the foundation for a more flexible, transparent, and sustainable energy future that aligns with both technological advancements and national development goals. While these policy shifts create exciting opportunities, their success will depend on effective implementation and making sure that the benefits reach communities across the country, not just early adopters or urban areas.

7.4 Least-Cost Rural Electrification Plan

The Least Cost Electrification Plan is based on a geospatial model that considers four options for delivering universal electrical service by 2030: (i) densification of the existing electricity grid, (ii) extension of the existing grid, (iii) mini-grids, and (iv) individual solar home systems[29] (Figure 44). By providing geospatial analysis with location-specific details and budget estimates, this analysis supports informed decision-making for future electricity projects. This plan will guide the Government of Belize (GoB) in identifying optimized electrification strategies to achieve universal access and inform the development of a long-term national electrification roadmap. The analysis generated can also support utility-level planning, aiding the expansion of existing infrastructure and directing investment toward cost-effective off-grid systems.

29 In the context of the Least Cost Rural Electrification Plan, the terms 'standalone systems', 'individual solar home systems', and 'solar home systems (SHS)' are considered equivalent.

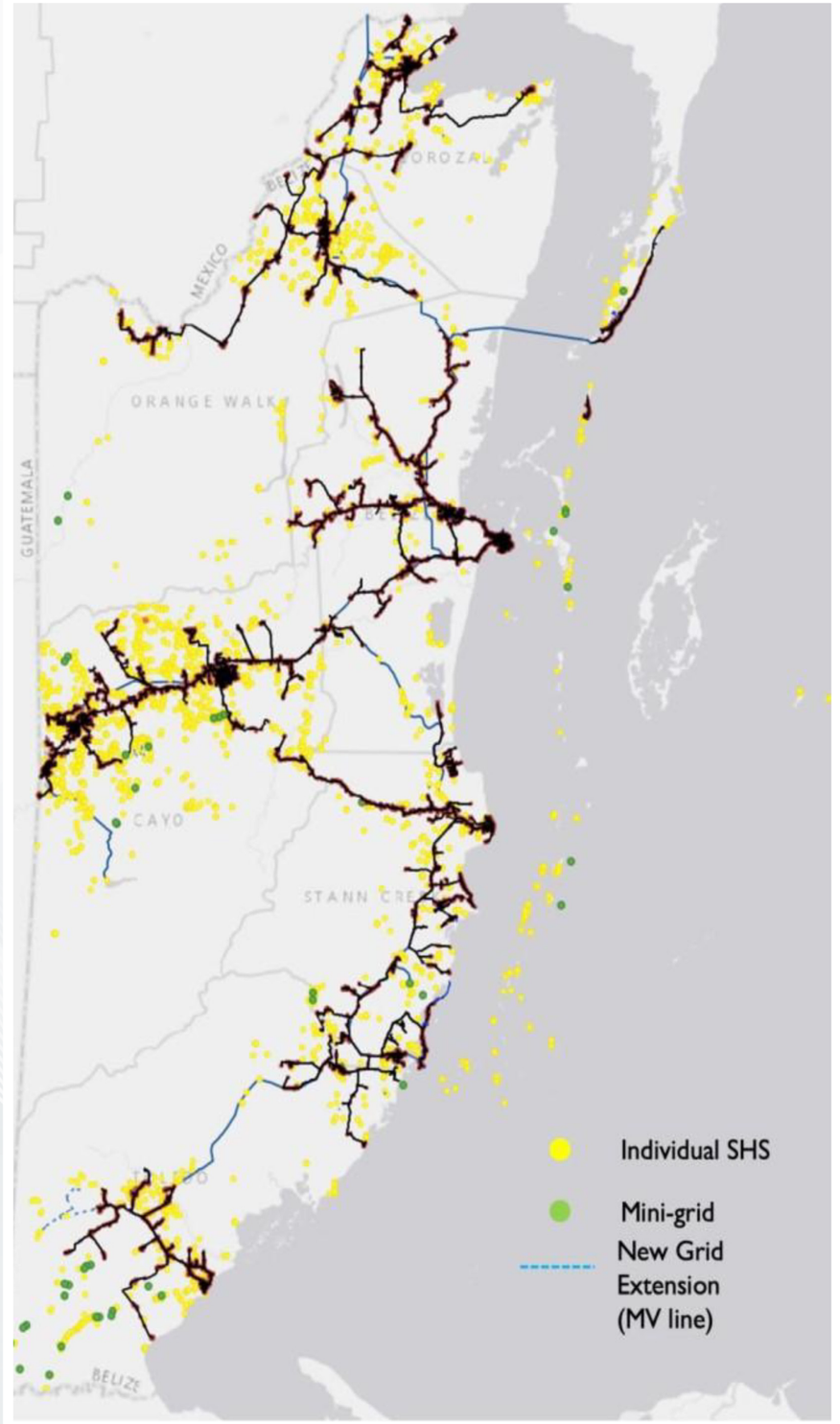


Figure 44. Least-cost electrification plan: grid extension, mini-grids, and SHS locations around the country (Base case: Low demand).

7.4.1 Methodology and Data Mapping

The methodology used involved collecting, processing, and geo-enriching data to estimate relevant characteristics of different types of electricity consumers across Belize. This information informed demand forecasts, GIS mapping, and least-cost off-grid system design. The next step involved determining the optimal cost electrification method: grid extension at the distribution level, mini-grids, or stand-alone systems, to plan electrification across the entire country. Detailed network designs were produced down to the individual connection level to support universal access. The 2022 census was used to project potential customer numbers under each electrification mode through 2030 (see Appendix B: Detailed Tables 6).

To identify electrified areas, a 500-meter buffer was applied around the existing medium-voltage grid network (Figure 45). Additional buffers of 100 meters around low-voltage lines and 10 meters around electric meters were also used. Any customers located within these buffer zones were considered electrified or classified under the grid densification category.

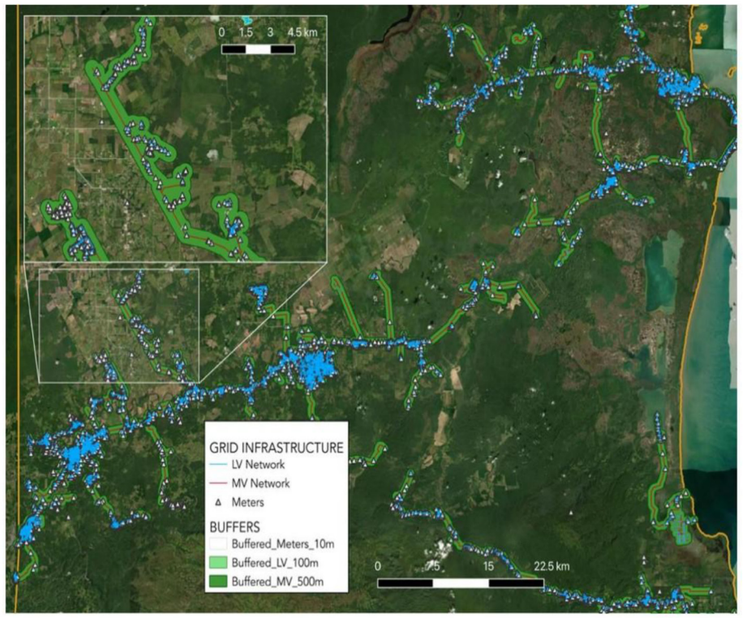


Figure 45. Buffer zone around the grid infrastructure.

7.4.2 Importance of Rural Electrification

Rural electrification in Belize continues to be of high priority for the Government. It is coordinated by the Ministry of Public Utilities, Energy, and Logistics in partnership with key stakeholders such as the Ministry of Rural Transformation and Belize Electricity Limited.

The plan, developed in 2024, identifies approximately 3,773 isolated systems, 1,969 households that could be served by microgrids, and 1,572 homes best suited for grid line extension by 2030 (Table 8). It is important to have a robust and diverse portfolio of initiatives to support a dynamic endeavour such as universal access. This initiative unfolds against the backdrop of climate change and the expansion of rural and urban areas within Belize, along with the difficulty of subsistence farms and commercial farmers to provide for their families and communities.

Table 8. Customers by Initiative.

	Isolated System	Mini Grids	Grid Extension	Total
Number of Customers (By 2030)	3,773	1,969	1,572	7,314

Source: (REM simulation) Waya analysis

The Least Cost Rural Electrification plan is a central document in Belize's efforts to achieve the goal of universal access by 2030. The Ministry has been engaged in energy access initiatives for over 12 years. With the support of the Inter-American Development Bank (IDB), lessons learnt along the way were incorporated into the plan. The IDB brought a unique concept to the analysis with the georeferencing of the different communities. IDB's technical support ensured that the analysis was flexible within a certain level of confidence, which will allow the ministry to adjust the plan along the way.

The Ministry of Public Utilities, Energy, and Logistics has implemented several energy access projects since 2014. The current plan introduced a cost-effective strategy that incorporates a techno-economic geospatial optimization tool to determine the most economical combination of grid extension and off-grid technologies to achieve universal electrification in Belize by 2030. The plan encompasses rural and peri-urban areas as well as key sectors such as tourism. It is expected to catalyse sustainable development, offering long-term benefits across important sectors such as health, education, economic development, and social equity.

Appendices

Appendix A: Glossary of Terms

Biomass: Organic non-fossil material of biological origin constituting a renewable energy source.

Energy: The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy).

Energy Access: A household having reliable and affordable access to both clean cooking facilities and electricity.

Energy Balance: An accounting framework for compilation and reconciliation of data on all energy products entering, exiting, and used within a country or area during a reference period (in this publication, a year).

Energy Efficiency: Refers to the use of technology to reduce the energy needed for a given purpose or service (a ratio of service provided to energy input). Unlike conservation, which involves some service reduction, energy efficiency provides energy reductions without sacrificing service.

Energy Indicators: These are key statistic markers that offer a snapshot of the energy sector.

Energy Intensity: A ratio of energy consumption to another metric, typically national gross domestic product in the case of a country's energy intensity.

Energy Security: The uninterrupted availability of energy sources at an affordable price.
Fossil Fuel: An energy source formed in the Earth's crust from decayed organic material. The common fossil fuels are petroleum, coal, and natural gas.

Grid Extension: In the context of the **Least Cost Rural Electrification Plan**, the act of creating a connection to the main electrical grid for homes and communities located more than 500 meters from the existing grid.

Grid Densification: In the context of the **Least Cost Rural Electrification Plan**, the act of creating a connection to the main electrical grid for homes and communities located less than 500 meters from the existing grid.

Gross Domestic Product: The total value, expressed in currency, of all goods and services produced within a country, region, municipality, economic sector, or any other defined space or activity, within a stated reference period.

Gross Domestic Product at Current Prices: The Gross Domestic Product associated with some defined area or activities, expressed in the apparent value of a stated currency, that is, the value it is assumed to have at that stated point in time, using the current year as the reference point.

Gross Domestic Product at Constant Prices: The Gross Domestic Product associated with some defined area or activities, expressed in a currency adjusted for inflation across a set, stated period of time, that is, using a point in the past as a reference point for current values of money.

Gross Electricity Production: The sum of the electrical energy production by all generating units/installations concerned (including pumped storage) in one year, measured at the output terminals of the generators. (International Recommendations on Energy Statistics, IRES)

Hydroelectric/Hydro Power: The use of flowing water to produce electrical energy.

Independent Power Producer: A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation of electricity for use primarily by the public and that is not an electric utility.

Indigenous Energy Production: Any kind of extraction of energy products from natural sources within the national territory which results in conversion to a usable form.

Individual Home Systems: An electrical supply system designed to service a single building or household, unconnected to the main electrical grid. The same as ‘standalone systems’.

Installed Capacity: Sometimes termed peak installed capacity or rated capacity, means the capacity of the facility (expressed in MW) were it to be operated continually at the maximum capacity possible without causing damage to it (assuming any source of power used by it to generate electricity was available to it without interruption).

Mean Electricity Rate: Annual average unit cost of power sold.

Minigrid: An electrical supply system designed to service a community or a community-scale demand, generally isolated from the main electrical grid.

Nationally Determined Contributions: These are national climate plans highlighting climate actions, including climate-related targets, policies, and measures governments aim to implement in response to climate change and as a contribution to global climate action.

Peak Load Demand: The highest simultaneous demand for electricity satisfied during the year. Note that the electricity supply at the time of peak demand may include demand satisfied by imported electricity, or alternatively, the demand may include exports of electricity. (IRES)

Primary Energy: Energy sources as found in their natural state before any transformation to secondary or tertiary forms of energy.

Refined Petroleum Products: Products obtained from the processing of crude oil (including lease condensate), natural gas, and other hydrocarbon compounds. Refined petroleum products include but are not limited to gasolines, kerosene, distillates (including No. 2 fuel oil), liquefied petroleum gas, asphalt, lubricating oils, diesel fuels, and residual fuels.

Renewable energy resources: Energy resources that are naturally replenishing but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy available per unit of time. Renewable energy resources include biomass, hydro, geothermal, solar, wind, ocean thermal, wave action, and tidal action. (US EIA Glossary)

Secondary Energy: Refers to the more convenient forms of energy which are transformed from other primary, energy sources through energy conversion processes.

Standalone System: An electrical supply system designed to service a single building or household, unconnected to the main electrical grid. The same as 'Individual Home Systems'.

Solar Home System: A type of standalone system specifically sourced from Solar PV, together with any associated electrical storage system.

Solar Photovoltaic (PV): These are arrays of cells containing a material that converts solar radiation into DC electricity.

Total Energy Supply: Is defined as flows representing energy entering the national territory for the first time, energy removed from the national territory and stock changes. The entering flows consist of production of primary energy products and imports of both primary and secondary energy products. The flows removing energy from the national territory are exports of primary and secondary energy products and international bunkers.

Appendix B: Data Tables

Table 9: Detailed Energy Balance Table

Energy Flows / Energy Products	Crude oil	Natural gas	Oil products							Hydro	Solar[2]	Wind	Biofuels		Electricity[4]	Heat	Total
			Motor Gasoline[1]	Diesel Oil	Kerosene	Fuel Oil[1]	Aviation Fuel[1]	LPG	Non-Energy Oil Products				Bagasse	Firewood[3]			
Indigenous Production	851.86	27.89	-	-	-	-	-	-	-	816.95	21.33	-	4,615.28	747.93	-	-	7,081.24
Imports	-	-	4,110.31	3,922.50	1,259.69	408.29	1,355.36	1,533.52	NR		-	-	-	-	1,467.76	-	14,057.44
Exports	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
International marine bunkers	-	-	-2.68	-	-	-	-	-	-	-	-	-	-	-	-	-	-2.68
International aviation bunkers	-	-	-	-	-	-	-1,140.13	-	-	-	-	-	-	-	-	-	-1,140.13
Stock changes (+/-)	-40.81	-	-	-	-	-	-	-	-	-	-	-	-284.59	-	-	-	-325.40
Total Energy Supply (TES)	**811.05**	**27.89**	**4,107.63**	**3,922.50**	**1,259.69**	**408.29**	**215.24**	**1,533.52**	**0.00**	**816.95**	**21.33**	**0.00**	**4,330.69**	**747.93**	**1,467.76**	**0.00**	**19,670.47**
Statistical Difference	**-7.15**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**-0.17**	**0.00**	**-7.32**
Transfers	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Transformation Processes	**-202.29**	**0.00**	**0.00**	**-626.48**	**0.00**	**-408.29**	**0.00**	**0.00**	**0.00**	**-816.95**	**-21.33**	**0.00**	**-4,330.69**	**0.00**	**1,852.29**	**0.00**	**-4,553.73**
Electricity plants	-	-	-	-626.48	-	-408.29	-	-	-	-816.95	-21.33	-	-	-	1,175.80	-	-697.24
CHP plants	-202.29	-	-	-	-	-	-	-	-	-	-	-	-4,330.69	-	676.49	NR	-3,856.49
Heat plants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Gas works (and other conversion to gases)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Natural Gas Blending Plants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Charcoal Plants	-	-	-	-	-	-	-	-	-	-	-	-	-	NR	-	-	0.00
Other Transformation processes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Energy Industry Own Use	**-7.15**	**0.00**	**0.00**	**-0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**-317.89**	**0.00**	**-325.06**
Losses	**0.00**	**-27.89**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**-374.34**	**0.00**	**-402.23**
Total Final Energy Consumption	**608.77**	**0.00**	**4,107.63**	**3,296.01**	**1,259.69**	**0.00**	**215.24**	**1,533.52**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**747.93**	**2,627.99**	**0.00**	**14,396.77**
Manufacturing, Construction, Non-fuel Mining Industries	-	-	-	-	-	-	-	-	-	-	-	-	-	-	126.71	-	126.71
Non-metallic minerals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Machinery	35.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.16
Mining and quarrying	15.63	-	-	NR	-	-	-	-	-	-	-	-	-	-	-	-	15.63
Food, beverages, and tobacco	71.44	-	-	NR	-	-	-	NR	-	-	-	-	-	-	-	-	71.44
Paper, pulp and print	-	-	-	NR	-	-	-	NR	-	-	-	-	-	-	-	-	0.00
Wood and wood products	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Construction	26.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.05
Not elsewhere specified	170.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	170.21
TRANSPORT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Road	-	-	4,091.35	3,296.01	NR	-	-	NR	-	-	-	-	-	-	NR	-	7,387.36
Domestic Aviation	-	-	-	-	-	-	215.24	-	-	-	-	-	-	-	-	-	215.24
Domestic Marine Navigation	-	-	16.27	-	-	-	-	-	-	-	-	-	-	-	-	-	16.27
Not elsewhere specified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
OTHER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Agriculture and Forestry	225.39	-	-	NR	-	-	-	-	-	-	-	-	-	-	-	-	225.39
Fishing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Commerce and public services	64.88	-	-	-	-	-	-	NR	-	-	-	-	-	-	1,468.65	-	1,533.53
Households	-	-	NR	-	1,259.69	-	-	1,533.52	-	-	-	-	-	747.93	1,032.63	-	4,573.78
Not elsewhere specified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
NON-ENERGY USE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
in Industry/Transformation/energy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
of which: feedstocks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
in transport	-	-	-	-	-	-	-	-	NR	-	-	-	-	-	-	-	0.00
in other	-	-	-	-	-	-	-	-	NR	-	-	-	-	-	-	-	0.00
Electricity and Heat Output																	
Total Electricity Generated5 - MWh	**20,345.2**	**0.0**	**0.0**	**54,173.4**	**0.0**	**39,582.7**	**0.0**	**0.0**	**0.0**	**226,930.8**	**5,925.0**	**0.0**	**167,568.6**	**0.0**	**0.0**	**0.0**	**514,525.6**
Electric Utility	-	-	-	54,172.5	-	-	-	-	-	-	-	-	-	-	-	-	54,172.5
Electricity plants (IPPs)	-	-	-	-	-	39,582.7	-	-	-	226,930.8	5,925.0	-	-	-	-	-	272,438.5
CHP plants (IPPs)	20,054.9	-	-	-	-	-	-	-	-	-	-	-	167,568.6	-	-	-	187,623.5
Electricity Autoproducers	290.3	-	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	291.1

Notations:

- = Data Not Applicable

NR = Data Not Reported

Notes:

1 Motor Gasoline (Premium and Regular), Fuel Oil (Heavy), Aviation Fuel (Aviation Gasoline and Jet Fuel Kerosene), LPG (Liquified Petroleum Gas)

2 Figures exclude distributed generation from renewable sources.

3 Firewood estimates based on calculation using Labour Force Survey results from the Statistical Institute of Belize

4 Electricity Final Consumption classification includes data from Belize Electricity Limited and Farmers Light Plant Corporation

5 Refers only to total electricity generated in country (excludes imported electricity from CFE-Mexico, 407,710.5 MWh).

Source: Energy Unit/Ministry of Public Utilities, Energy, & Logistics

Last Updated: 24/07/2025

Table 10: In-country installed generation capacity breakdown in 2024.

Source	Capacity (MW)	Share of In-Country Capacity (%)	Share of Total Installed Capacity (%)
Hydroelectric (On-Grid)	54.65	32.20%	24.30%
Biomass (On-Grid)	19.5	11.50%	8.70%
Solar PV (On-Grid)	1.33	0.80%	0.60%
Solar PV (Off-Grid)	3.91	2.30%	1.70%
Non-RE Thermoelectric (On-Grid)	74.5	43.90%	33.10%
Non-RE Thermoelectric (Off-Grid)	15.9	9.40%	7.10%

BEL's Proposed New Customer Classes (Public Utilities Commission, 2023):

Grid-tied Distributed Generation Rate: a proposed rate based on the cost of service and cost reflectivity principles. Table 2 shows BEL's proposed rate for grid-tied DG customers.

Table 11. Proposed Grid-Tied DG Rates

Category	Rate
Demand Charge (per KVA per month)	30
Peak Energy Charge (per kWh)	0.35
Off-Peak Energy Charge (per kWh)	0.3
Feed-in Tariff	0.13

Electric Vehicle Charging: a proposed tariff structure for electric vehicle charging. Table 3 displays BEL's proposed rate for this category.

Table 12. Proposed Electric Vehicle Charging Rates

Category	Rate
Demand Charge (per KVA per month)	30
Peak Energy Charge (per kWh)	0.35
Off-Peak Energy Charge (per kWh)	0.3

Special rate to interconnect Spanish Lookout: BEL proposed a "wholesale rate structure for Spanish Lookout community (SPLC) in the first instance and noted that interconnecting the community at a PUC-approved whole rate is a first step in regularizing electricity services in the SPLC and ensuring equal access to sustainably priced energy solutions throughout all services areas in the country". Table 4 displays the BEL proposed wholesale rate to interconnect SPLC.

Table 13. BEL proposed SPLC Tariff rates.

Category	First 10 Years	After 10 Years
Demand Charge (per KVA per month)	25	8.33
Peak Energy Charge (per kWh)	0.3	0.3
Off-Peak Energy Charge (per kWh)	0.26	0.26

Tourism Tariff: BEL notes "Through the provision of an incentivised tourism rate to attract sales, BEL anticipates that this new class of customers will account for 17% of BEL's revenues over 2023-2027. Improved performance in this sector will translate to greater indirect and induced benefits to complementary services in the economy and support BEL's growth strategy". Table 5 displays BEL's proposed Tourism Tariff.

Table 14. BEL proposed Tourism Tariff

Category	Rate
Demand Charge (per KVA per month)	30
Peak Energy Charge (per kWh)	0.35
Off-Peak Energy Charge (per kWh)	0.3

Table 15. Projected customers to 2030.

Year	2022	2023	2024	2025	2026	2027	2028	2029
Total Population	398,405	404,198	410,919	417,634	424,342	431,037	437,714	444,370
Household Count	110,669	112,278	114,145	116,010	117,873	119,733	121,588	123,430

Source: Belize Census 2022 (2022 Census Summary results)

Appendix C: Methodological Notes

The following section clarifies issues related to data quality, coverage, management, methodological treatments, and other relevant areas to ensure transparency and visibility for data users. The methodological notes are described below:

Section 2.1 Energy Balance:

Belize's 2024 energy balance table is presented in both detailed and simplified versions as recommended by IRES. The degree of detail provided depended on data and resource availability, as well as the classifications used in context with Belize's energy landscape. For a detailed definition of energy products and flows in Belize's 2024 Energy Balance Table, please refer to the IRES document (Chapter 3, D. Definition of Energy Products & Chapter 8, C. Structure of Energy Balance). Note that some prerequisite energy data on final consumption by sectors in Belize is currently underreported or not available in some cases.

For biofuels (bagasse), the TREND Excel function was employed for the calculation of steam production data for Belcogen in 2024, using data from the previous five years (2017 – 2021) for which both bagasse and steam production were given. The Excel function returns a statistical value based on the estimated linear correlation between bagasse combusted and steam produced.

Firewood estimates for 2024 were calculated using "Households by Major Administrative Area and Main Type of Cooking Fuel" data, requisitioned from SIB via data request.

For international bunkers (aviation fuels), its volume is assumed to equate to Total Imports minus domestic aviation fuel consumption (done separately for aviation gasoline and jet fuel kerosene).

Section 2.2 Energy Indicators:

For energy intensity, the unit of measure remains as tons of oil equivalent per USD $1,000 of GDP, as stipulated by the International Energy Agency and the International Atomic Energy Agency (2005). Annual GDP statistics for 2024 from SIB were unavailable during the production of this report. Hence, once updated GDP data for 2024 becomes available, the updated energy intensity parameter for Belize will be calculated and published.

2.2.1 Energy Intensity Measure in Terms of Primary Energy and GDP

The indicator 'energy intensity in terms of constant GDP' dataset was recalculated due to SIB's revising of the annual national GDP figures on the 17th of December 2024. Revisions were also made to the definition of 'bagasse supply', which in turn changed the Total Energy Supply across the timeline.

2.2.2 Energy Import as a Share of Total Primary Energy Supply (TPES)

Changes to this indicator 'Import share of Total Primary Energy Supply' timeline, are the result of updates to the definition of 'bagasse supply', which in turn affected the Total Energy Supply (which is in this case analogous to the Total Primary Energy Supply).

2.2.3 Renewable Energy Share of Total Primary Energy Supply

Changes in the timeline of the indicator 'renewable energy shares in total energy supply' are due to updates in the definition of 'bagasse supply', which affected both the numerator 'renewable energy supply' and the denominator 'total energy supply'. Note that 'total energy supply' and 'total primary energy supply' are considered equivalent terms in this usage.

2.2.4 Percentage of Renewable Energy in Electricity Mix

Any changes reflected in the timeline of the indicator 'Renewable Energy Share in the National Electricity Mix' is the result of revisions made to the 'electricity generation from bagasse' definition, which forms part of the numerator in: Renewable electricity / total electricity generated.

2.2.5 Renewable Energy Generating Capacity (per capita)

This indicator is calculated using SIB's annual population mid-year estimates, which were last revised after the 2022 census.

2.2.6 Regional Comparisons for Key Performance Indicators

The composition of the regional groups as confirmed by OLADE (through email). Central America is composed of Belize, Costa Rica, El Salvador, Guatemala, Honduras, Panamá and Nicaragua. The Caribbean is composed of Barbados, Cuba, Grenada, Guyana, Haiti, Jamaica, Dominican Republic, Surinam, and Trinidad and Tobago

The indicator 'energy intensity in terms of current GDP' was calculated instead of 'energy intensity in terms of constant GDP' for the purposes of comparability with regional datasets. The indicator used for comparison was 'Intensidad energética final PIB nominal' from OLADE's sieLAC (Sistema de Información Energética de Latinoamérica y el Caribe).

The indicator 'renewable energy share in total energy supply' used in the comparison is the same as used in Section 2.2.3, which was compared against the indicator 'Índice de renovabilidad de la oferta total de energía' from OLADE's sieLAC (Sistema de Información Energética de Latinoamérica y el Caribe).

The indicator 'renewable energy share in the electricity generation mix' was recalculated to exclude imports from Mexico in the denominator 'total electricity generated', for the sake of comparability with OLADE's data. The indicator used for regional comparison was 'Índice de renovabilidad de la generación eléctrica' from OLADE's sieLAC (Sistema de Información Energética de Latinoamérica y el Caribe).

2023 data was the latest data available for all three indicators used for regional comparison.

Section 3.3.1 Primary Energy:

The energy supply represented by Belize's consumption of fuelwood or firewood for 2024 as well as in earlier annual energy reports, is not quantified by direct measurement or monitoring. Instead, it is derived from yearly estimates based on population and labour force survey data published by the Statistical Institute of Belize, with the baseline being the 2010 national census.

Section 3.5.3 Gross Electricity Consumption by Sectors:

The breakdown of gross electricity consumption by economic sectors is defined by the customer tariff groupings as stipulated by Belize Electricity Limited. Therefore, its coverage is limited to the national grid-connected customers and does not include microgrid or mini-grid systems, which are present in Belize. It also excludes coverage of privately generated electricity and electricity sourced from distributed generation.

It should also be noted that while BEL utilizes five tariff groupings - residential, social, commercial, industrial, and street lighting. For this report, the social and residential groupings have been aggregated into one category, resulting in four main groups.

Section 4.6 Electricity Production by Plant Type:

The data related to electricity production required the classification of independent power producers to showcase the disaggregation of power plant types in Belize and their contributions to electricity production. Plants were then classified as: Hydroelectric, Combined Power and Heat (CHP), Solar PV and Non-Renewable Thermal plants. This classification may be subject to change upon further review.

5.1 Crude Oil Prices

Annual average values for crude oil were gathered by reading automatically generated mean values off the timeline on the website: https://tradingeconomics.com/commodity/brent-crude-oil

Data was last accessed online on 8th July 2025.

5.2 Petroleum Products Prices

Refined fuels national averages were calculated based on effective price dates received from the Ministry of Finance (in the case of traditional motor fuels) and the Ministry of Agriculture (in the case of LPG). Averages were weighted by the number of days in a year on which the given prices were in effect.

Regional data from the Economic Commission of Latin America (ECLAC/CEPAL), as part of a preliminary statistical report on the hydrocarbon subsector. Data for the published report draws from the capital cities and has available data only up to 2023, for most countries listed.

Data cited as: Información preliminar de CEPAL, 2025, Centroamérica y la República Dominicana estadísticas de hidrocarburos, 2023

The 2024 AER analysis assumes that: the gallons referred to in the ECLAC report refers to US Gallons, and that 'Gasolina prémium sin plomo' is comparable to Belize's 'Premium Gasoline'.

5.3 Mean Electricity Rate

Regional data from the Economic Commission of Latin America (ECLAC/CEPAL), as part of a preliminary statistical report on the electricity subsector. Data for the published report draws from the capital cities and has available data only up to 2023, for most countries listed.

Data cited as: Información preliminar de CEPAL, 2025, Estadísticas del Subsector Eléctrico de los Países del Sistema de Integración Centroamericana (SICA), 2023

5.4 Average Cost of Power

Cost of power figures are received from the Public Utilities Commission and apply only to sources that feed directly into BEL's national grid. Averages are weighted by amount of MWh of each type sold to BEL.

GHG Emissions from the Energy Sector

Belize's Fifth National Inventory Report described greenhouse gas emissions and removals in the Energy, Industrial Processes and Product Use, Agriculture, Forest and Other Land Use (FOLU), and Waste Sectors.

This report documents Belize's submission of its national greenhouse gas (GHG) inventory for the year 2022. It also reports on the greenhouse gas trends for the period 1994 to 2022. It is compiled per the guidelines provided by the United Nations Framework Convention on Climate Change (UNFCCC) and follows the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories (IPCC, 2006), IPCC Good Practice Guidance (GPG) (IPCC, 2000; IPCC, 2003; IPCC, 2014), and the 2019 Refinement to the 2006 IPCC Guidelines (IPCC, 2019). This report does not explain the methods (Tier approaches), activity data, and emission factors used to develop the inventory. This information is included in Belize's Fifth National Inventory Document submitted to the UNFCCC in December 2024.

Appendix D: Measurement/Conversion Units

This section provides a summary of the units used throughout the 2024 Annual Energy Report, along with their definitions and derivations (Table 9 and 10). Included are some conversions to the metric system. While Belize has historically used both Imperial and American units, recent movements towards an internationally recognized standard has prompted the incorporation of metric-derived systems.

Economics

All dollars and cents that are referenced in this report are in Belize dollars (BZD), unless stated otherwise. Each Belize dollar is exchanged at a rate of approximately 0.5 to 1 US dollar. GDP is measured in Belize dollars, while GDP per capita is measured in Belize dollars per person (BZD/person).

Area

Spatial area, which is used to quantify land and land uses, is measured in km2.

Volume

Instead of the corresponding SI units of cubic metres (m^3) or kilolitres (kL) for volume, barrels (bbl) and US gallons (US Gal) are used for the volumetric measurement of liquid fuels such as gasoline and diesel. One barrel is equivalent to 159 litres, and one US gallon equals 3.8 litres. For gaseous fuels, such as natural gas, the measurement unit used is thousand cubic feet (Mcf).

Mass

For most solid fuel masses, the standard SI unit is kilotons (kt) or thousand tonnes (10^3 t). In Belize, the import and retail of gaseous fuels such as Liquefied Petroleum Gas (LPG), are measured in pounds (lbs), where 1 pound is equivalent to 0.5 kilograms (kg) in SI unit. Quantities of fuels, regardless of their physical state, may often be expressed in energy units, as shown below.

Energy/Power

The standard SI unit of energy, the joule, is key to this report, along with its common multiples: the Terajoule (TJ) and Gigajoule (GJ). Also important is the Watt-hour, which measures energy in the context of electricity, and its multiples: the Kilowatt-hour (KWh), Megawatt-hour (MWh) and Gigawatt-hour (GWh). One (1) KWh is equivalent to 0.0036 GJ. Barrels-of-oil-equivalent (boe) are also used to measure energy, with each boe corresponding to 0.00581 TJ. Similarly, tons-of-oil-equivalent (toe), equivalent to 0.04184 TJ, are used.

Power is measured in Watts and its multiples: Kilowatts, Megawatts, and Gigawatts. Electric potential, which denotes the charge-carrying capacity of electric power lines, is measured in kilovolts (kV), an SI unit.

Table 16. Multiples of Energy Units.

Common Multiple	Base Unit Equivalent
Electricity	
Kilowatt	1,000 Watts
Megawatt	1,000,000 Watts
Gigawatt	1,000, 000, 000 Watts
Terawatt	1,000, 000, 000, 000 Watts
Energy	
Kilowatt-hour	1,000 Watt-hours
Megawatt-hour	1,000,000 Watts-hours
Gigawatt-hour	1,000, 000, 000 Watts-hours
Terawatt-hour	1,000, 000, 000, 000 Watts-hours
Kilojoule	1,000 Joules
Megajoule	1,000,000 Joules
Gigajoule	1,000,000,000 Joules
Terajoule	1,000,000,000,000 Joules

Table 17. Conversion Table for Units Used in this Publication.

Common Unit	Standard/SI Unit
Currency	
1 Belize Dollar	0.5 US Dollars
Volume	
1 Barrel	159 Litres [30]
1 US Gallon	3.8 Litres [15]
Million Cubic Meters	10^9 Litres [15]
Thousand Cubic Feet	28,317 Litres [15]
Mass	
1 Pound	0.5 Kilograms [15]
1 Metric Kiloton/thousand tonnes	1,000,000 kilograms
Energy	
1 Kilowatt-hour	3.6×10^{-6} Terajoules [15]
1 Barrels-of-Oil-Equivalent	0.00581 Terajoules [31]
1 Tons-of-Oil-Equivalent	0.04184 Terajoules [15]

[30] (International Energy Agency (IEA), 2023)
[31] (Organización Latinoamericana de Energía (OLADE), 2016)

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